OC IMP KLIMA


PRODUKT KATALOG

Wir sorgen für gesunde Luft

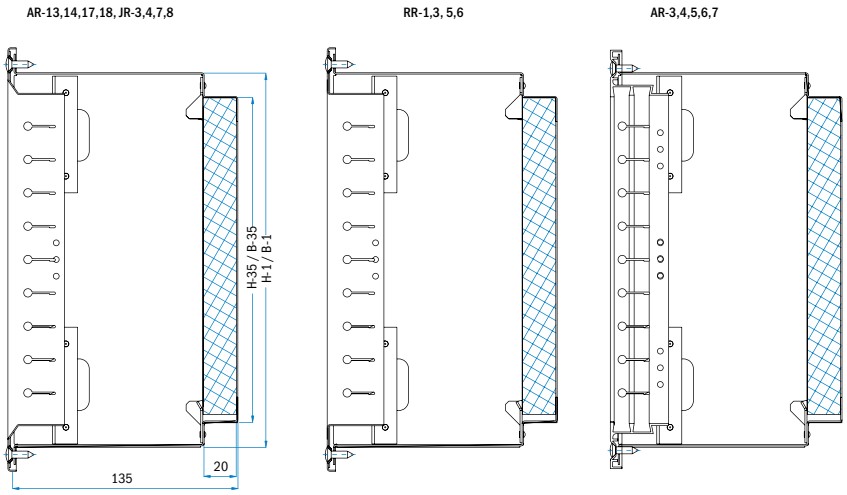
# Luft Verteilung

## Filter grilles.../PF

**Application**
Grilles with pre-filter are designed for application in rooms with special demands (computer centres, libraries, archives).

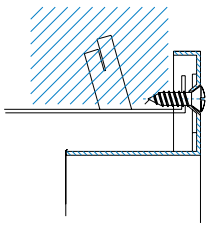
**Description**
Filter housing is designed to fit all sizes of ventilating grilles. It consists of galvanized sheet steel. Air volume is controlled by the means of F or T type air volume damper. Filter class G2 to F5. Filter builds up the initial pressure of 50Pa by the air flow volume of 500 $m^3/h$ and air velocity $V_{ef}$ = 1.4 m/s (at the grille). In the course of time, when filter gets dirty, pressure drop is increased.

**Filter replacement**
When replacing the filter, remove the grille and take out the filter infill. Replace used filter infill with new one of the same quality. Fasten the new infill in the housing and finally replace the grille.

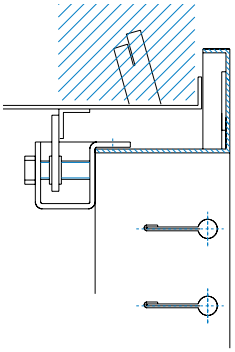



**Installation**
Filter housing can be built-in or screwed in the duct. Grille is mounted on the filter housing:

1. with screws on the frame (AR, JR) **PF/V**



2. with locks (hidden installation) (AR, JR) **PF/2**

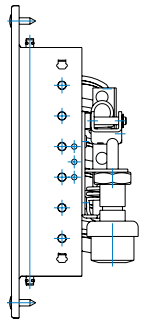


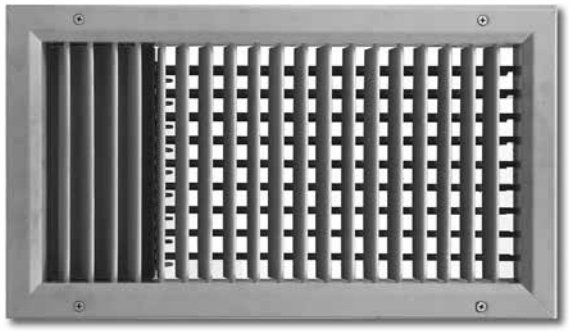
### Ordering example

**Ventilating grille:**

| | |
|---|---|
| With pre-filter: | **AR-13PF/G2/2 – F** |
| Size: | **B = 825 H = 125** |
| Filter quality: | **G2, G3, G4, F5** |
| Pcs: | **4** |

# Grilles with thermostatic regulation

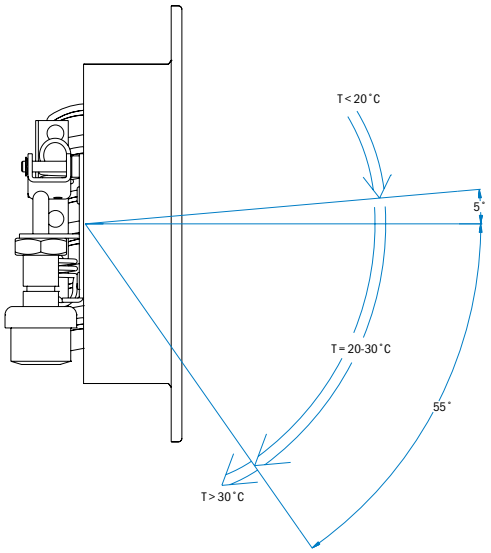




## Steel grille with thermostatic regulation JR-8/TR

The grille is intended for air supply. The first row of vertical blades can be set freely while the second row of horizontal blades is set automatically and adapted to the temperature of the supplied air. As long as the air temperature does not reach 20˚C the blades are directed at 5˚ above the horizontal position. In the range between 20˚C and 30˚C the blades are set automatically according to the characteristic of the thermostatic element. When the air temperature reaches or exceeds 30˚C the blades are directed at 55˚ below the horizontal position.

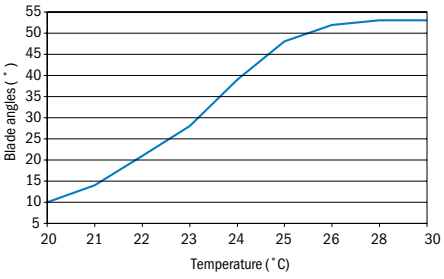
**Depiction of blade angles at different temperatures of supplied air**




### Description

JR-8/TR grille is made of steel sheet. Blades in the second row are made of aluminum anodized profile. The whole grill is powder painted in RAL 9010 or in the colour requested by buyer.

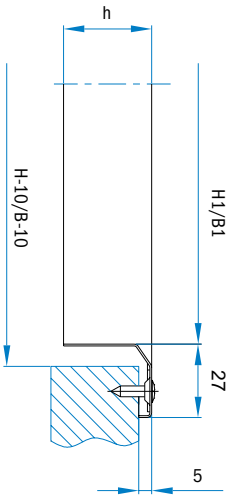
### Diagram: blade angles depending on the temperature of supplied air



## Installation of grilles with screws on the frame

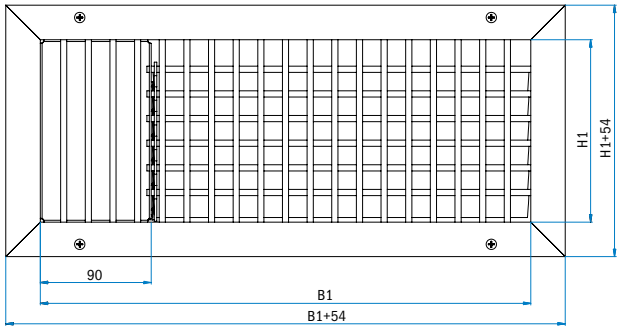
### Visible screw installation / V

B1 = B-27  H1 = H-27
JR-8/TR h = 46 mm
Marking: JR-8/TR/V




**Dimensions and clean cross sections in m²:**

| B/H | 175 | 225 | 325 | 425 | 525 |
|---|---|---|---|---|---|
| 425 | 0.029 | 0.039 | 0.061 | 0.082 | |
| 525 | 0.039 | 0.054 | 0.082 | 0.111 | 0.140 |
| 625 | 0.050 | 0.068 | 0.104 | 0.140 | 0.177 |
| 725 | 0.060 | 0.082 | 0.126 | 0.170 | 0.213 |
| 825 | 0.070 | 0.096 | 0.147 | 0.199 | 0.250 |
| 925 | 0.081 | 0.110 | 0.169 | 0.228 | 0.287 |
| 1025 | 0.091 | 0.124 | 0.191 | 0.257 | 0.323 |
| 1125 | 0.102 | 0.139 | 0.212 | 0.286 | 0.360 |
| 1225 | 0.112 | 0.153 | 0.234 | 0.315 | 0.397 |




## Ordering key

**JR-8 / TR / V – S  B x H**

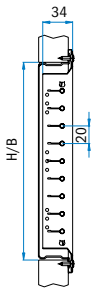
- **S** Register S
- **V** Visible screw installation
- **TR** Thermostat regulation
- **JR-8** Grille type

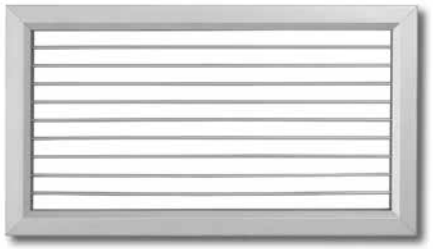
## Steel grilles

- Visible or hidden screw installation
- Steel sheet powder painted in standard RAL 9010 colour

### JR-3, JRP-3

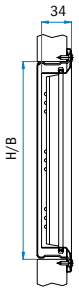
- Individually adjustable horizontal blades
- JRP-3: galvanised steel sheet

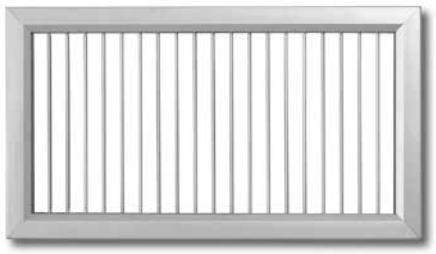


### JR-4, JRP-4

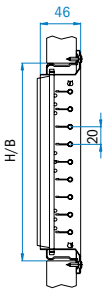
- Individually adjustable vertical blades
- JRP-4: galvanised steel sheet

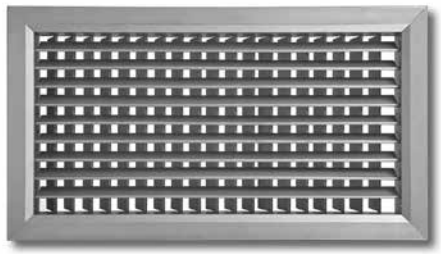


### JR-7, JRP-7

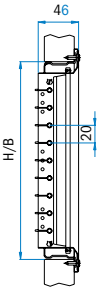
- Individually adjustable horizontal and vertical blades
- JRP-7: galvanised steel sheet

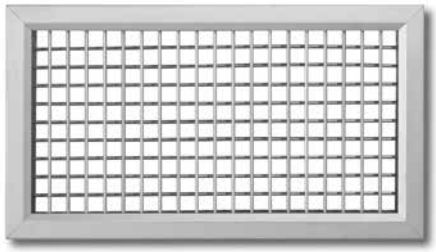


### JR-8, JRP-8

- Individually adjustable horizontal and vertical blades
- JRP-8: galvanised steel sheet



### Ordering key

**JR-3 / 2-F B x H**

- **F** Registers F, S, T
- **V** Visible screw installation
- **2** Hidden screw installation
- **V2** Visible screw installation + installation frame
- **3** Spring
- **3** Grille type JR-3, JR-4, JR-7, JR-8
- **JR** Steel grille
- **JRP** Galvanised steel grille

**Grille standard dimensions and cross-sections (m²) for JR-3, JR-4:**

| B/H | 75 | 125 | 175 | 225 | 325 | 425 | 525 |
|---|---|---|---|---|---|---|---|
| 225 | 0.007 | 0.015 | 0.021 | 0.029 | | | |
| 325 | 0.011 | 0.023 | 0.033 | 0.044 | 0.066 | | |
| 425 | 0.015 | 0.031 | 0.044 | 0.060 | 0.089 | 0.118 | |
| 525 | 0.019 | 0.038 | 0.055 | 0.075 | 0.112 | 0.148 | 0.185 |
| 625 | 0.022 | 0.046 | 0.067 | 0.090 | 0.134 | 0.179 | 0.223 |
| 725 | 0.026 | 0.054 | 0.078 | 0.106 | 0.157 | 0.209 | 0.261 |
| 825 | 0.030 | 0.062 | 0.089 | 0.121 | 0.180 | 0.239 | 0.298 |
| 925 | 0.034 | 0.070 | 0.101 | 0.136 | 0.203 | 0.270 | 0.336 |
| 1025 | 0.038 | 0.077 | 0.112 | 0.151 | 0.226 | 0.300 | 0.374 |
| 1125 | 0.041 | 0.085 | 0.123 | 0.167 | 0.248 | 0.330 | 0.412 |
| 1225 | 0.045 | 0.093 | 0.134 | 0.182 | 0.271 | 0.360 | 0.450 |

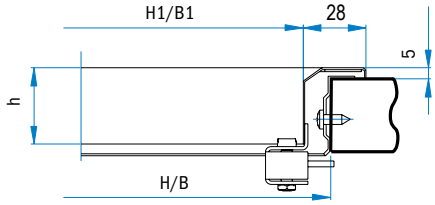
| B/H | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 500 |
|---|---|---|---|---|---|---|---|---|
| 150 | 0.007 | 0.011 | | | | | | |
| 200 | 0.010 | 0.016 | 0.022 | | | | | |
| 250 | 0.013 | 0.021 | 0.029 | 0.037 | | | | |
| 300 | 0.015 | 0.026 | 0.035 | 0.046 | 0.055 | | | |
| 350 | 0.018 | 0.031 | 0.042 | 0.055 | 0.065 | 0.078 | | |
| 400 | 0.021 | 0.036 | 0.049 | 0.063 | 0.076 | 0.090 | 0.103 | |
| 450 | 0.024 | 0.041 | 0.055 | 0.072 | 0.086 | 0.103 | 0.117 | |
| 500 | 0.027 | 0.046 | 0.062 | 0.080 | 0.097 | 0.115 | 0.131 | 0.166 |
| 600 | 0.033 | 0.055 | 0.075 | 0.098 | 0.117 | 0.140 | 0.160 | 0.202 |
| 700 | 0.039 | 0.065 | 0.088 | 0.115 | 0.138 | 0.165 | 0.188 | 0.238 |
| 800 | 0.044 | 0.075 | 0.102 | 0.132 | 0.159 | 0.190 | 0.216 | 0.274 |
| 900 | 0.050 | 0.085 | 0.115 | 0.150 | 0.180 | 0.214 | 0.245 | 0.309 |
| 1000 | 0.056 | 0.095 | 0.128 | 0.167 | 0.201 | 0.239 | 0.273 | 0.345 |
| 1100 | 0.062 | 0.104 | 0.142 | 0.184 | 0.221 | 0.264 | 0.301 | 0.381 |
| 1200 | 0.068 | 0.114 | 0.155 | 0.202 | 0.242 | 0.289 | 0.330 | 0.417 |

**Grille standard dimensions and cross-sections (m²) for JR-7, JR-8:**

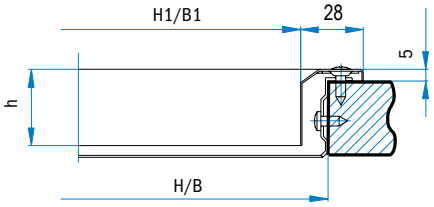
| B/H | 75 | 125 | 175 | 225 | 325 | 425 | 525 |
|---|---|---|---|---|---|---|---|
| 225 | 0.006 | 0.014 | 0.021 | 0.029 | | | |
| 325 | 0.009 | 0.020 | 0.032 | 0.043 | 0.066 | | |
| 425 | 0.012 | 0.027 | 0.042 | 0.057 | 0.088 | 0.118 | |
| 525 | 0.015 | 0.034 | 0.053 | 0.072 | 0.109 | 0.147 | 0.185 |
| 625 | 0.018 | 0.040 | 0.063 | 0.086 | 0.131 | 0.176 | 0.222 |
| 725 | 0.021 | 0.047 | 0.074 | 0.100 | 0.153 | 0.206 | 0.258 |
| 825 | 0.024 | 0.054 | 0.084 | 0.114 | 0.174 | 0.235 | 0.295 |
| 925 | 0.027 | 0.061 | 0.094 | 0.128 | 0.196 | 0.264 | 0.332 |
| 1025 | 0.030 | 0.067 | 0.105 | 0.142 | 0.218 | 0.293 | 0.368 |
| 1125 | 0.032 | 0.074 | 0.115 | 0.157 | 0.239 | 0.322 | 0.405 |
| 1225 | 0.035 | 0.081 | 0.126 | 0.171 | 0.261 | 0.351 | 0.442 |

| B/H | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 500 |
|---|---|---|---|---|---|---|---|---|
| 150 | 0.006 | 0.011 | | | | | | |
| 200 | 0.009 | 0.015 | 0.022 | | | | | |
| 250 | 0.011 | 0.020 | 0.029 | 0.037 | | | | |
| 300 | 0.013 | 0.024 | 0.034 | 0.045 | 0.055 | | | |
| 350 | 0.016 | 0.028 | 0.041 | 0.053 | 0.066 | 0.078 | | |
| 400 | 0.018 | 0.032 | 0.047 | 0.061 | 0.075 | 0.089 | 0.103 | |
| 450 | 0.021 | 0.037 | 0.053 | 0.069 | 0.085 | 0.102 | 0.118 | |
| 500 | 0.023 | 0.041 | 0.059 | 0.077 | 0.095 | 0.113 | 0.130 | 0.166 |
| 600 | 0.028 | 0.049 | 0.071 | 0.093 | 0.114 | 0.136 | 0.158 | 0.201 |
| 700 | 0.033 | 0.058 | 0.083 | 0.109 | 0.134 | 0.160 | 0.185 | 0.236 |
| 800 | 0.037 | 0.067 | 0.096 | 0.125 | 0.154 | 0.183 | 0.212 | 0.271 |
| 900 | 0.042 | 0.075 | 0.108 | 0.141 | 0.174 | 0.207 | 0.240 | 0.305 |
| 1000 | 0.047 | 0.084 | 0.120 | 0.157 | 0.194 | 0.230 | 0.267 | 0.340 |
| 1100 | 0.052 | 0.092 | 0.133 | 0.173 | 0.213 | 0.254 | 0.294 | 0.375 |
| 1200 | 0.057 | 0.101 | 0.145 | 0.189 | 0.233 | 0.277 | 0.322 | 0.410 |

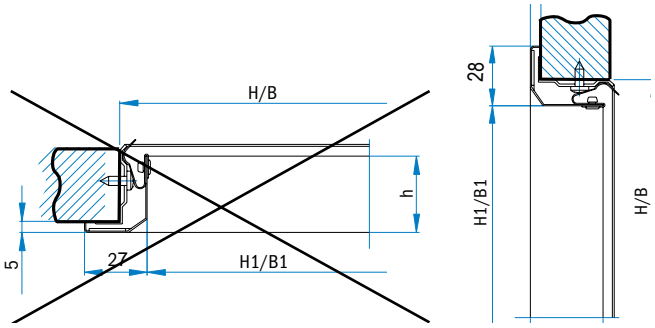
**Hidden screw fixing / 2 (lock)**
B1 = B-27 H1 = H-27
JR-3, JR-4 h = 34 mm
JR-7, JR-8 h = 46 mm
Marking: JR-3/2, JR-4/2, JR-7/2, JR-8/2




**Visible screw fixing + installation frame / V2**
B1 = B-27 H1 = H-27
JR-3, JR-4 h = 34 mm
JR-7, JR-8 h = 46 mm
Marking: JR-3/V2, JR-4/V2, JR-7/V2, JR-8/V2

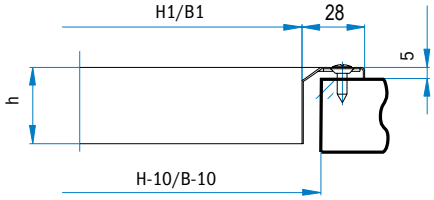



**Hidden fixing / 3 (spring)**
**Warning: only for wall installation**
B1 = B-27 H1 = H-27
JR-3, JR-4 h = 34 mm
JR-7, JR-8 h = 46 mm
Marking: JR-3/3, JR-4/3, JR-7/3, JR-8/3



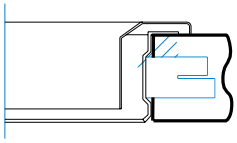

## Mounting of grilles without installation frame

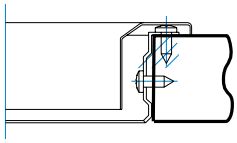
**Visible screw installation / V**
B1 = B-27 H1 = H-27
JR-3, JR-4 h = 34 mm
JR-7, JR-8 h = 46 mm
Marking: JR-3/V, JR-4/V, JR-7/V, JR-8/V

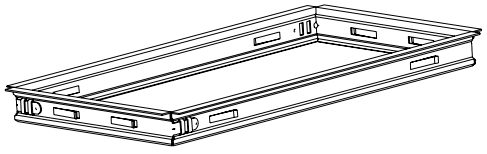



## Mounting of grilles with installation frame

The installation frame may be mortar-mounted (in concrete or brick walls) or fixed with screws (walls, ceilings, ducts, ...).





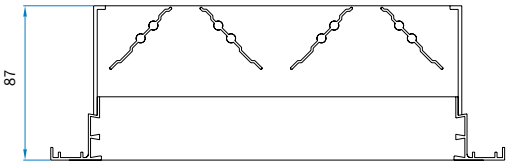


## Registers

When adjusting the system, desired operating conditions are obtained by the means of ventilation elements control. Registers are installed for additional air volume control, thus influencing air velocity and throw distance as well. All types of registers, except type of register F, are made of sheet steel and corrosion protected with dipcoat processing in blackwater soluble colour. Upon customer's request registers can be made of galvanised sheet steel and coloured in any colour. Typ of register F is made of plastics.

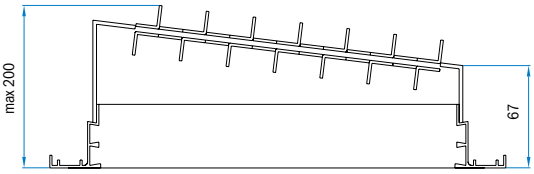
### F

Register has wide counter-directional blades which can be moved with screw-driver via the gear wheel. It is used to control the air flow volume.Blades are made of plastics.



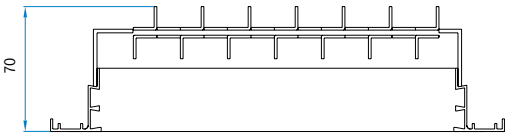

### S

Register has fixed deflector and slider which opens and closes the slots. Due to inclined deflection, air volume damper S is particularly useful for longer grilles, because air flow is evenly distributed throughout the grille.



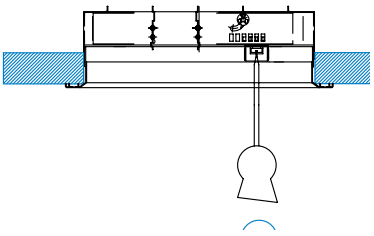

### T

Register has fixed deflector and slider which opens and closes the slots. It isused to control and deflect the air flow from the duct.

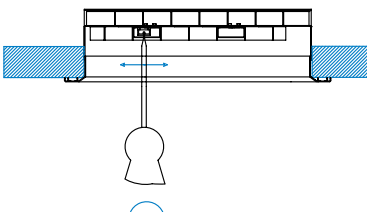



## Set-up of different registers

**Register F**



**Register T**

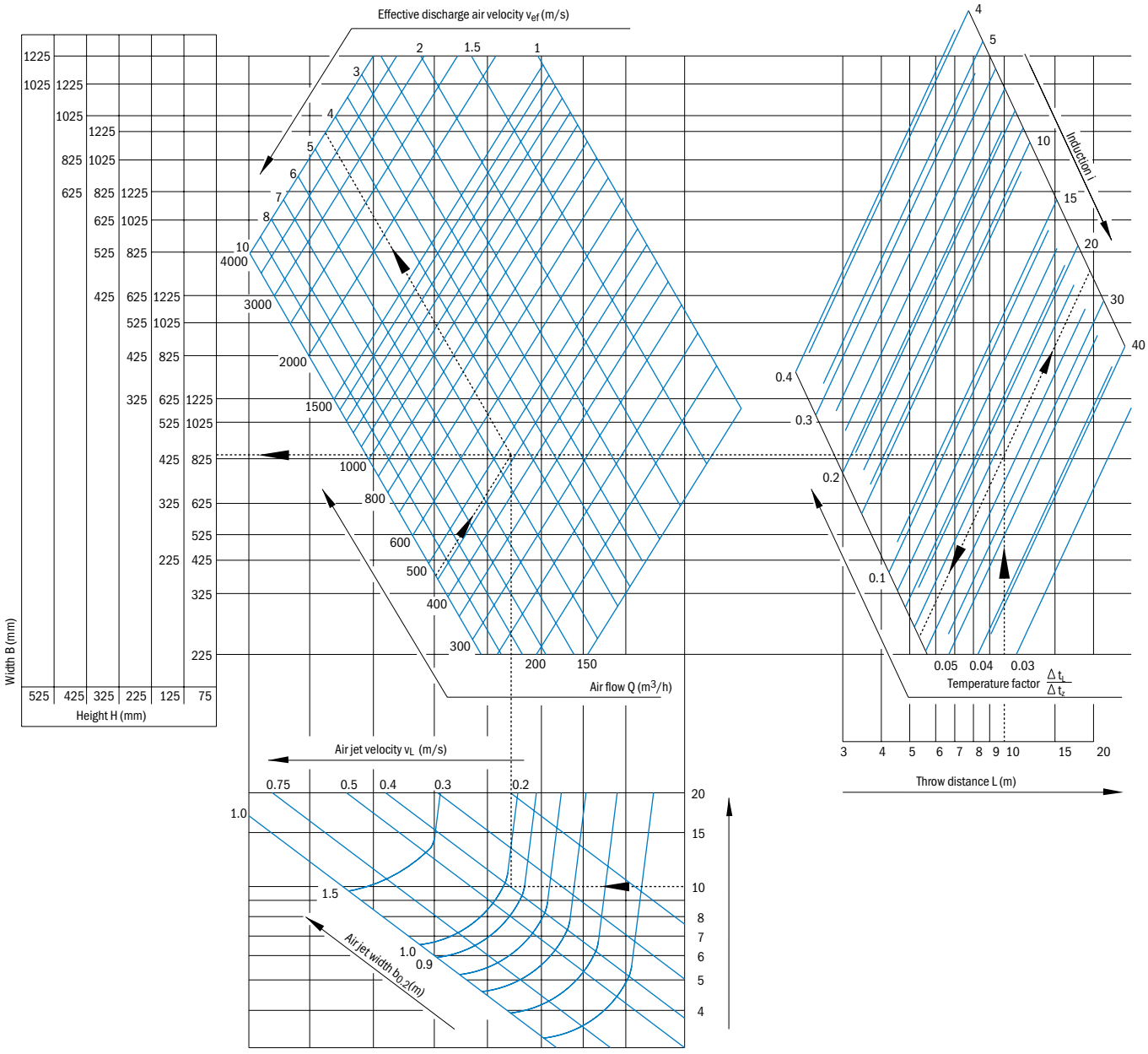


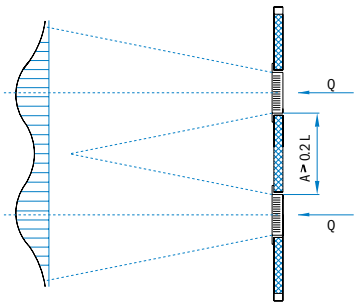
## Ventilating grilles/registers combinations

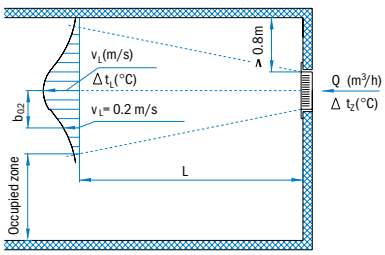
| | | | | |
|---|---|---|---|---|
| Grille | F | F2 | S | T |
| JR-3 | ■ | | ■ | ■ |
| JR-4 | ■ | | ■ | ■ |
| JR-7 | ■ | | ■ | ■ |
| JR-8 | ■ | | ■ | ■ |

# Ventilating grilles JR-3, 4, 7, 8; without ceiling effect (distance from ceiling ≥ 0.8 m)

**Chart for determining the size, induction and temperature of the air flow**
valid for B/H ≤ 12 – fully opened blades



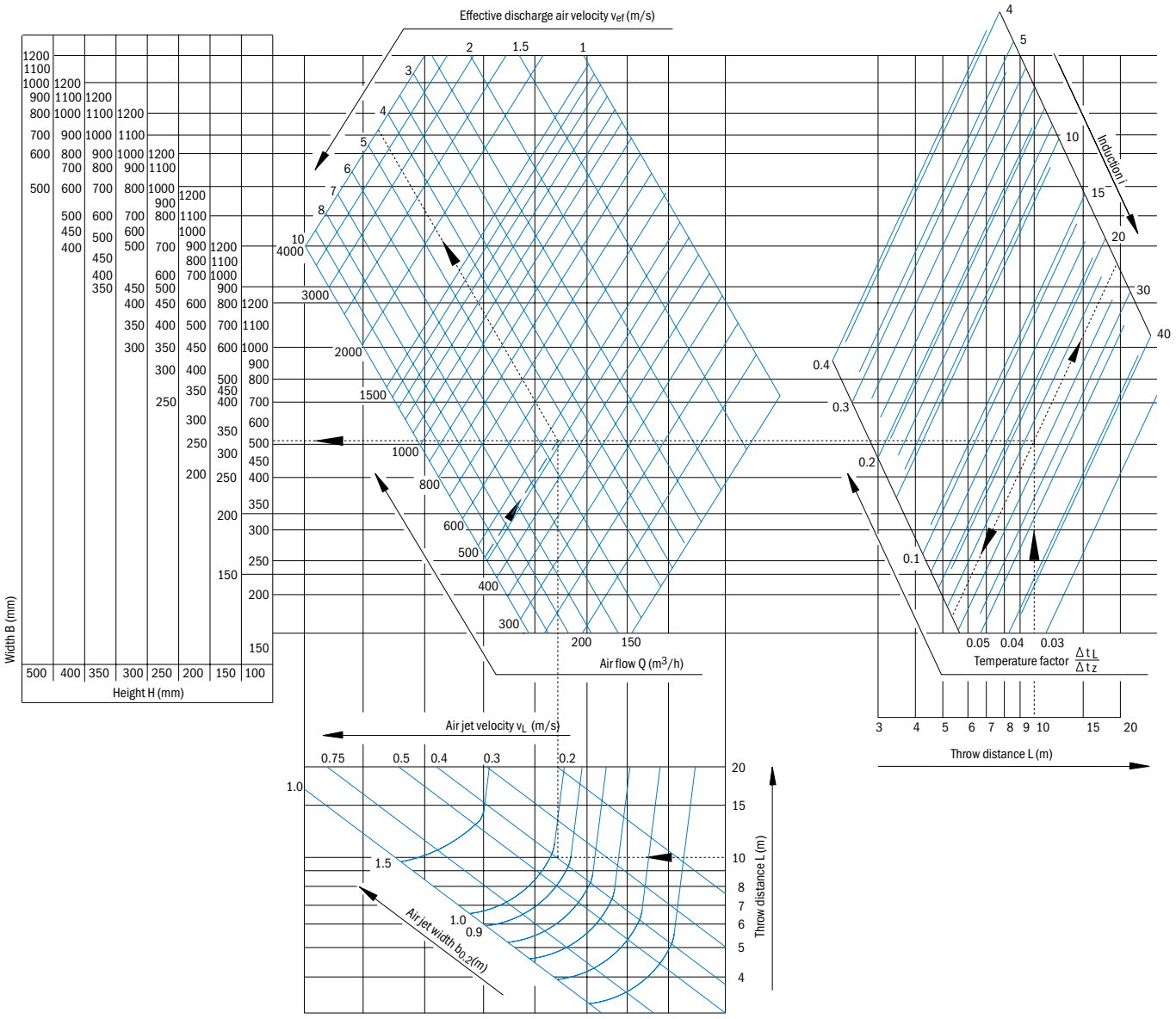




## Definition of Symbols

| | |
|---|---|
| **Q (m³/h)** | Air flow |
| **L (m)** | Throw distance |
| **$V_{ef}$ (m/s)** | Effective discharge air velocity |
| **$V_L$ (m/s)** | Max. air velocity at the throw distance L |
| **$\Delta t_z$ (K)** | Temperature difference between supply and room air |
| **$\Delta t_L$ (K)** | Temperature difference between air jet and room temperature |
| **i** | Induction rate = total airstream volume flow / volume flow at diffuser discharge |
| **$b_{0.2}$ (m)** | Width of air jet is measured at a distance from ceiling where air flow velocity 0.2 m/s |

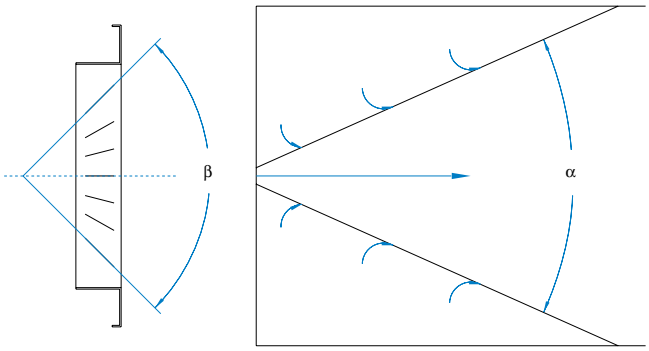
# Ventilating grilles JR-3, 4, 7, 8 without ceiling effect (distance from ceiling ≥ 0.8 m)

**Chart for determining the size, induction and temperature of the air flow**
valid for B/H ≤ 12 – fully opened blades



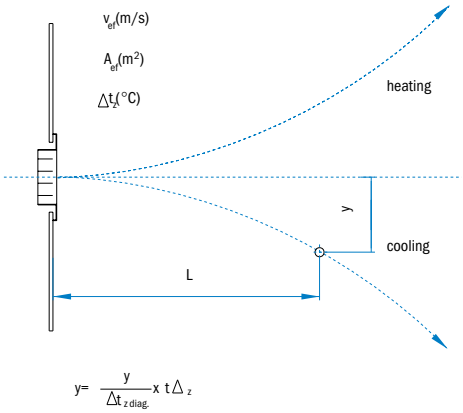
# Ventilating grilles JR-3, 4, 7, 8; without ceiling effect (distance from ceiling ≥ 0.8 m)

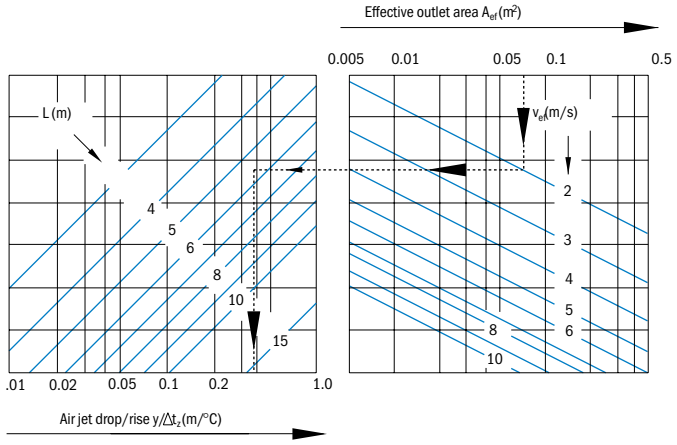
### Table with correcting factors for horizontal air jet deflection:




| | | | |
|---|---|---|---|
| Blade adjusting angle | β | 45° | 90° |
| Air jet spread angle | α | 35° | 60° |
| Air flow velocity | $V_L$ | $V_L$ diag. x 0.7 | x 0.5 |
| Temperature factor $\Delta t_L/\Delta t_Z$ | ($\Delta t_L/\Delta t_Z$ diag.) | x 0.7 | x 0.5 |
| Induction | i | i diag. x 1.4 | x 2.0 |
| Air jet drop | y | y diag. x 1.4 | x 2.0 |
| Distance between grilles | A | 0.25 L | 0.3 L |

### Chart for determining air jet deflection:




## Example

**Given:**

| | |
|---|---|
| Air flow: | **Q = 460 m³/h, L = 10m** |
| Air flow velocity: | **VL = 0.4 m/s** |
| Temperature difference: | **$\Delta t_Z$ = 5 °C** |

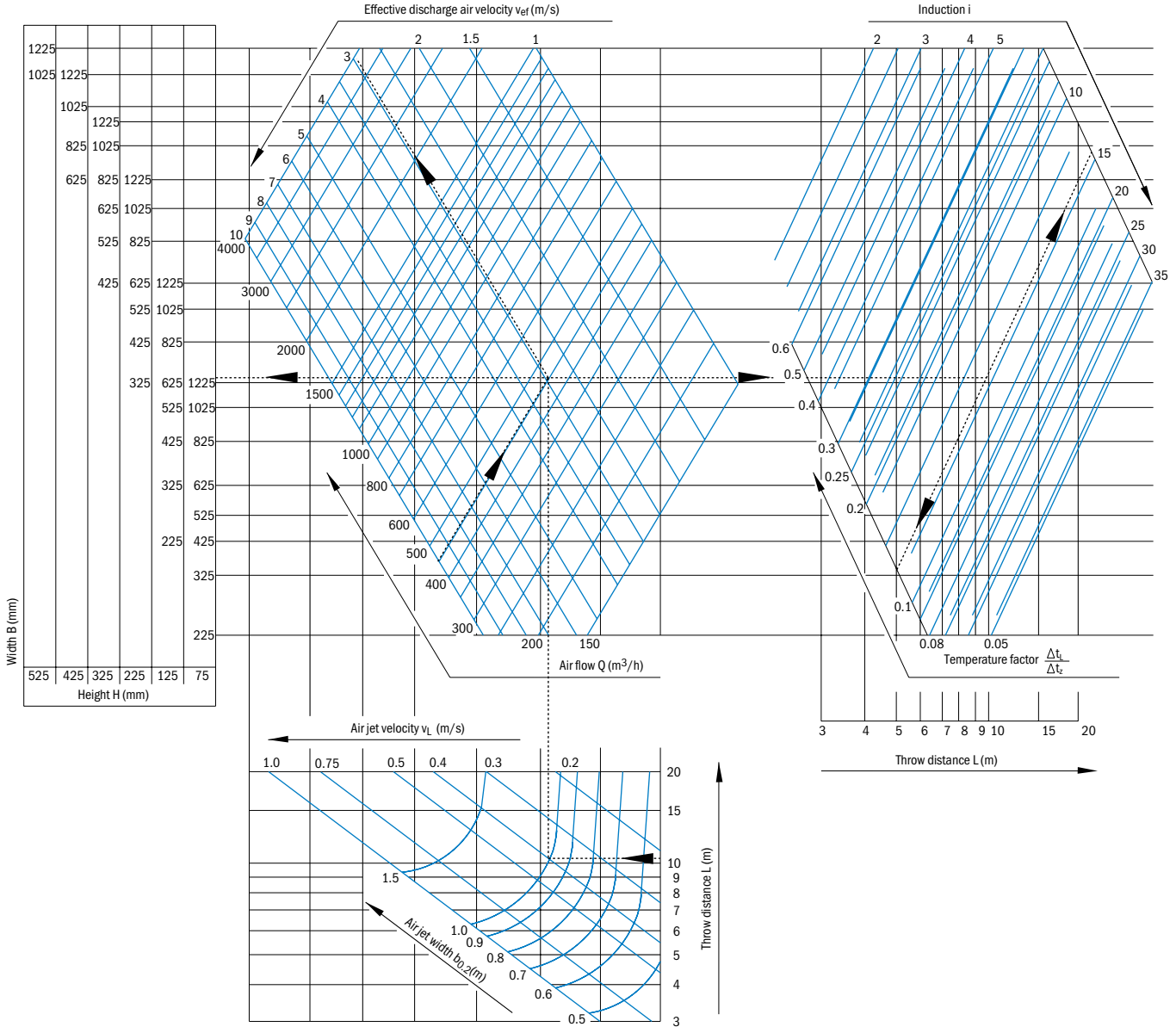
**Solution:**

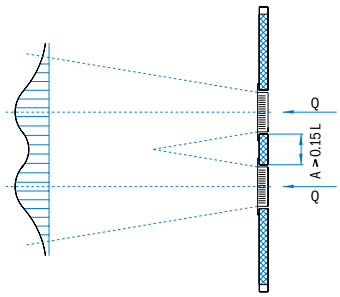
Use the chart, distance from ceiling ≥ 0.8 m
and select the grille type JR-3 size B = 425, H = 125

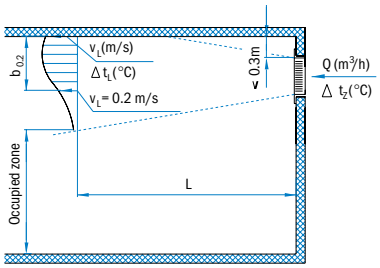
| | |
|---|---|
| Effective outlet air velocity | **$V_{ef}$ = 4.5 m/s** |
| Temperature factor | **$\Delta t_L/\Delta t_Z$ = 0.065** |
| Temperature difference | **$\Delta t_L$ = 0.065 x 5 = 0.32 °C** |
| Induction | **i = 23** |
| Width of the air jet | **$b_{0.2}$ = 1.0 m** |
| Min. distance between grilles | **A = 2 m** |

# Ventilating grilles JR-3, 4, 7, 8; with ceiling effect (distance from ceiling ≤ 0.3 m)

**Chart for determining the size, induction and temperature of the air flow**
valid for B/H ≤ 12 – fully opened blades



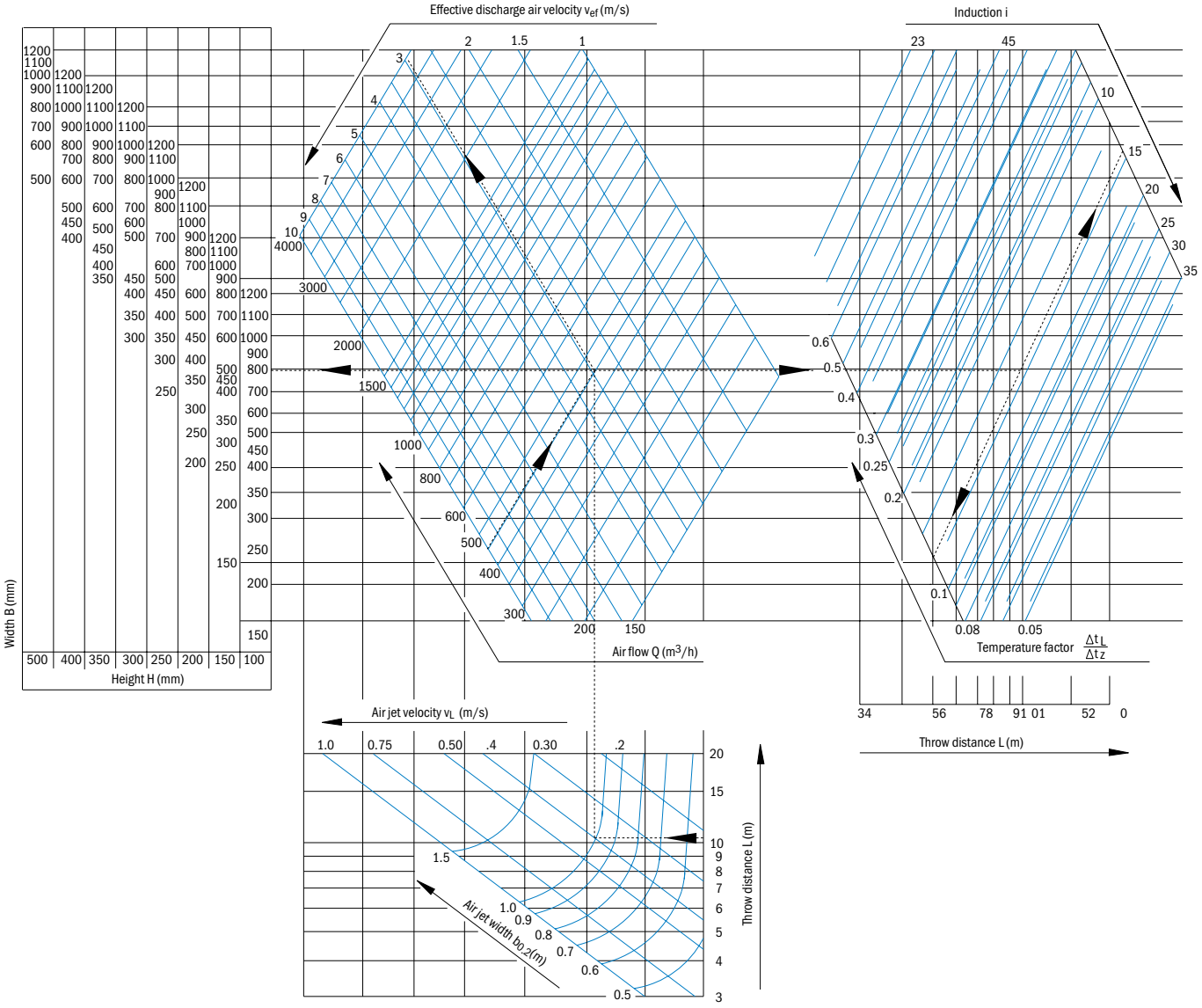




## Definition of symbols

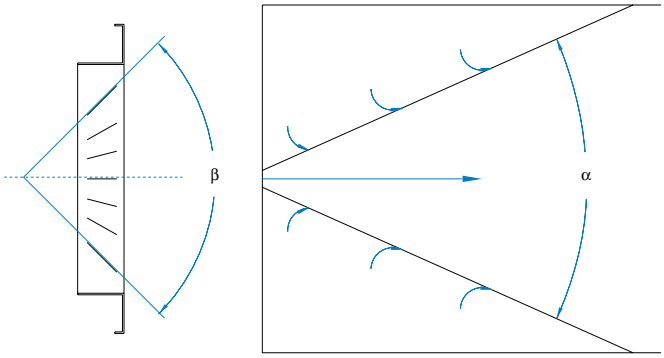
| | |
|---|---|
| **Q (m³/h)** | Air flow |
| **L (m)** | Throw distance |
| **$V_{ef}$ (m/s)** | Effective discharge air velocity |
| **$V_L$ (m/s)** | Max. air velocity at the throw distance L |
| **$\Delta t_z$ (K)** | Temperature difference between supply and room air |
| **$\Delta t_L$ (K)** | Temperature difference between air jet and room temperature |
| **i** | Induction rate = total airstream volume flow / volume flow at diffuser discharge |
| **$b_{0.2}$ (m)** | Width of air jet is measured at a distance from ceiling where air flow velocity 0.2 m/s |

# Ventilating grilles JR-3, 4, 7, 8; with ceiling effect (distance from ceiling ≤ 0.3 m)

**Chart for determining the size, induction and temperature of the air flow**
valid for B/H ≤ 12 – fully opened blades

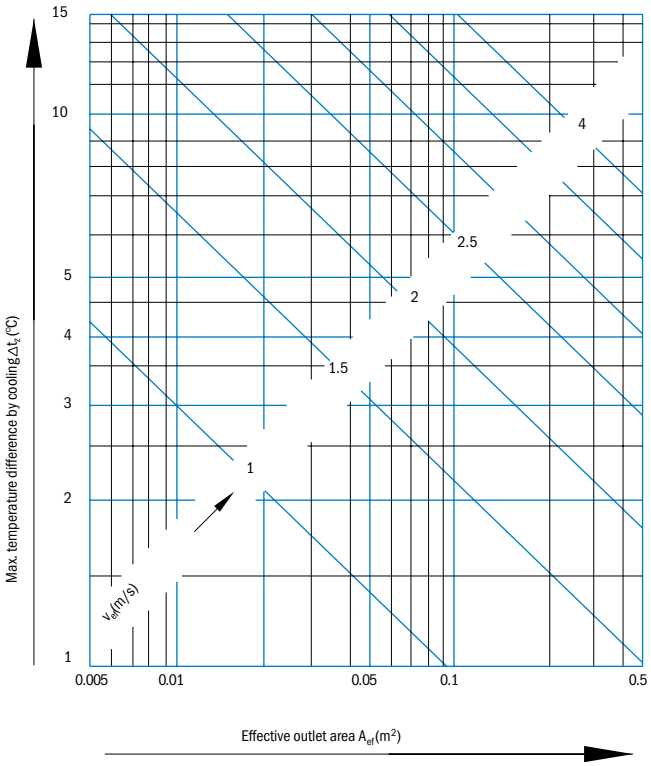


### Table with correcting factors for horizontal air jet deflection




| | | | |
|---|---|---|---|
| Blade adjusting angle | β | 45° | 90° |
| Air jet spread angle | α | 35° | 60° |
| Air flow velocity | $V_L$ | $V_L$ diag. x 0.7 | x 0.5 |
| Temperature factor $\Delta t_L/\Delta t_Z$ | ($\Delta t_L/\Delta t_Z$ diag.) | x 0.7 | x 0.5 |
| Induction | i | i diag. x 1.4 | x 2.0 |
| Air jet drop | y | y diag. x 1.4 | x 2.0 |
| Distance between grilles | A | 0.25 L | 0.3 L |

### Chart for determining air jet deflection




## Example

**Given:**

| | |
|---|---|
| Air flow: | **Q = 460 m³/h, L = 10m** |
| Air flow velocity: | **$V_L$ = 0.4 m/s** |
| Temperature difference: | **$\Delta t_Z$ = 5 °C** |

**Solution:**

Use the chart, distance from ceiling ≤ 0.3 m

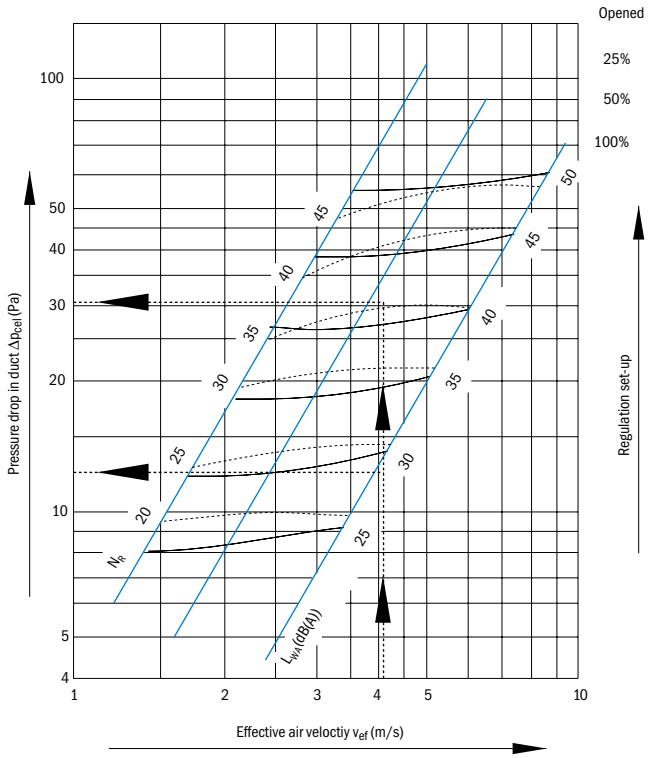
and select the grille type JR-3 size B = 625, H = 125

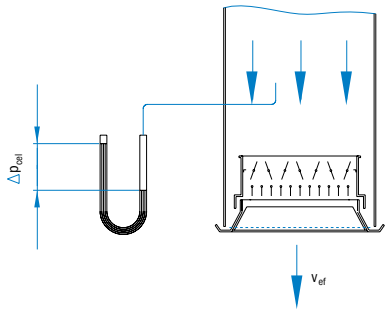
| | |
|---|---|
| Effective outlet air velocity | **$V_{ef}$ = 2.8 m/s** |
| Temperature factor | **$\Delta t_L/\Delta t_Z$ = 0.13** |
| Temperature difference | **$\Delta t_L$ = 0.13 x 5 = 0.65 °C** |
| Induction | **i = 15** |
| Width of the air jet | **$b_{0.2}$ = 1.0 m** |
| Min. distance between grilles | **A = 1.5 m** |

# Technical data for ventilating grilles

### Pressure drop and sound power level diagram for grilles JR-3, 4, 7, 8 with volume control damper F

Fully opened blades



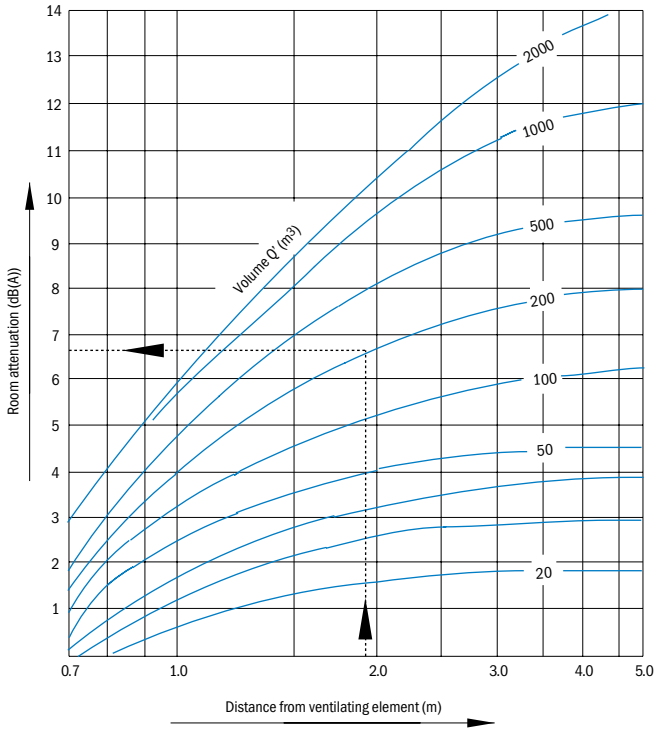

### Table of correction factors for acoustic data

| $A_{ef}$ (m²) | 0.01 | 0.02 | 0.05 | 0.1 | 0.2 | 0.4 |
|---|---|---|---|---|---|---|
| Correction (dB(A)) $N_R$ | -10 | -7 | -3 | 0 | +3 | +6 |

## Definition of symbols

| | |
|---|---|
| **$A_{ef}$** | Effective outlet area |
| **$\Delta p_{cel}$ (Pa)** | Pressure drop |
| **$L_{WA}$ (dB(A))** | Sound power level |
| **$N_R$** | Max. value acc. to ISO |

### Room sound attenuation diagram




**The following data are necessary to calculate the volume Q':**

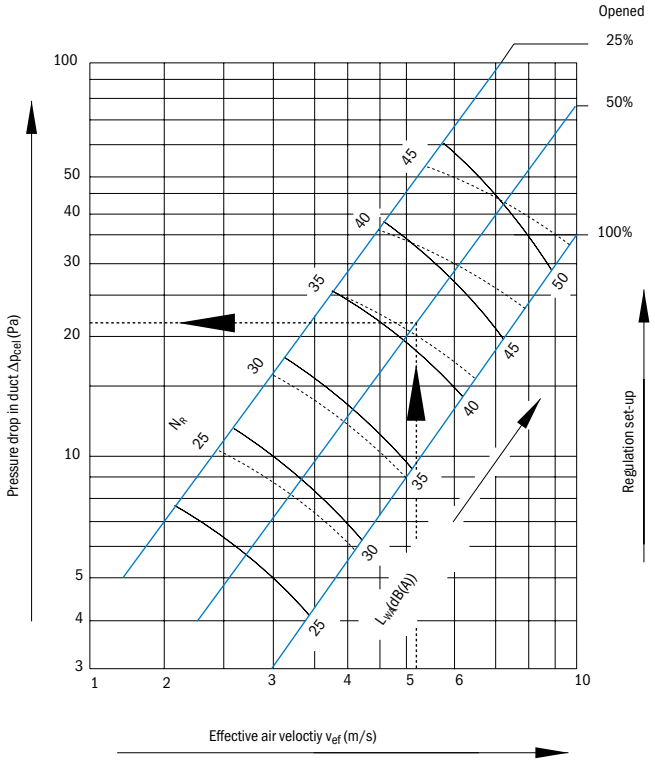
| | |
|---|---|
| 1. Normal rooms | Q' = Q |
| 2. Rooms with highly reflective walls | Q' = 0.5Q |
| 3. Rooms with absorption walls | Q' = 2Q |

## Definition of symbols

| | |
|---|---|
| **Q' (m³)** | Calculated volume, depending on room reflectance |
| **Q (m³)** | Actual room volume |

# Technical data for extracting grilles

**Presure drop and sound power level for grilles JR-3, 4, 7, 8 with volume control damper F**
Fully opened blades



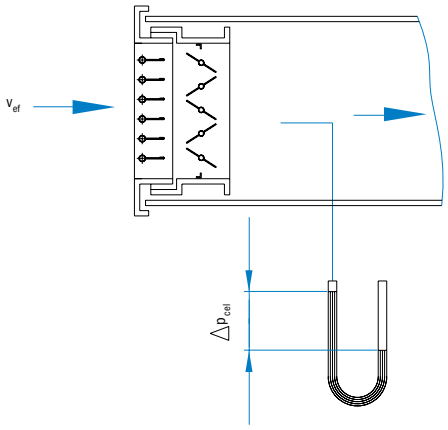



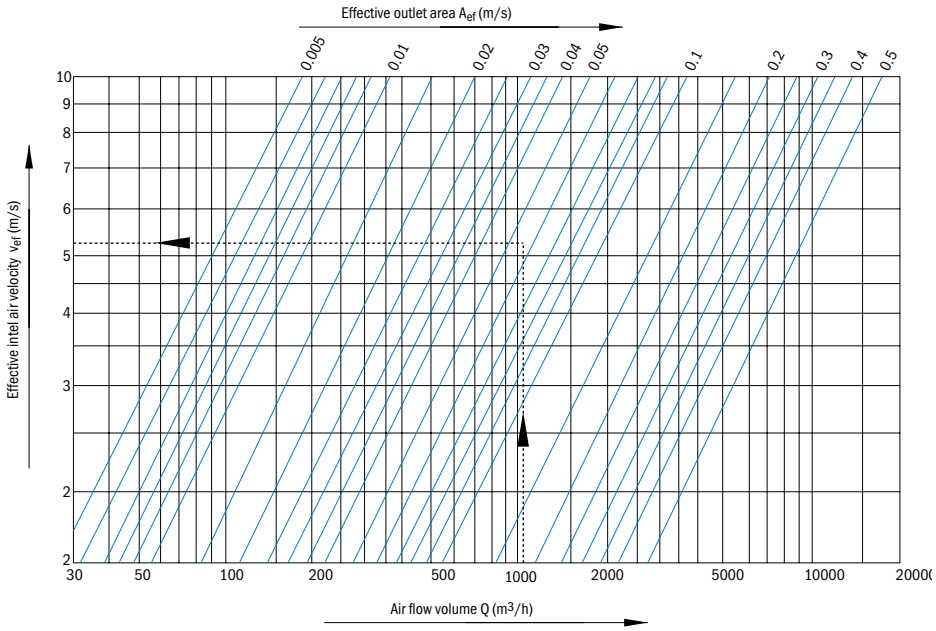

**Table of correction factors for acoustic data**

| $A_{ef}$ (m²) | 0.005 | 0.01 | 0.02 | 0.05 | 0.1 | 0.2 | 0.4 |
|---|---|---|---|---|---|---|---|
| Correction (dB(A)) $N_R$ | -13 | -10 | -7 | -3 | 0 | +3 | +6 |

## Definition of symbols

| | |
|---|---|
| **$\Delta p_{cel}$ (Pa)** | Pressure drop |
| **$L_{WA}$ (dB(A))** | Sound power level |
| **$N_R$** | Max. value acc. to ISO |

### Effective supply air velocity diagram




## Example

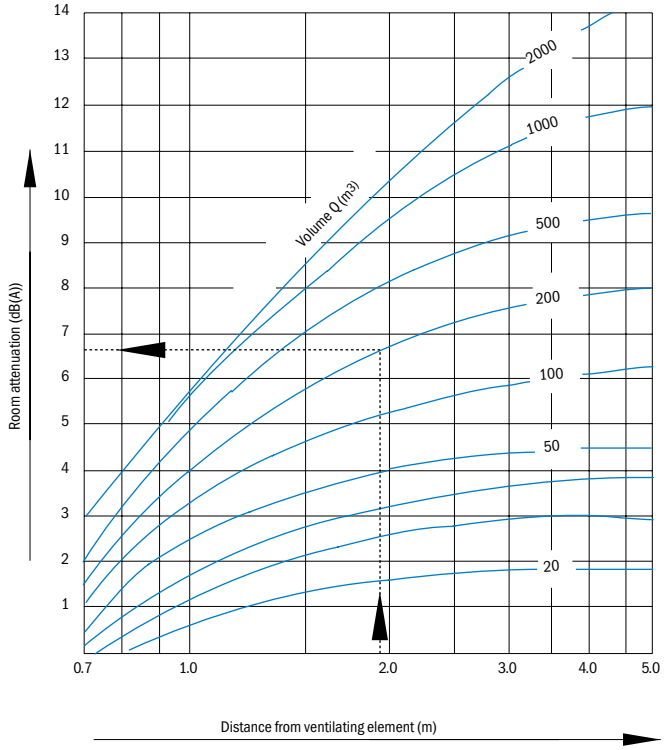
Q = 1000 m³/h

$A_{ef}$ = 0.05 m³ (from the Effective area table)

As follows from the diagram.

$V_{ef}$ = 5.3 m/s

### Room sound attenuation diagram



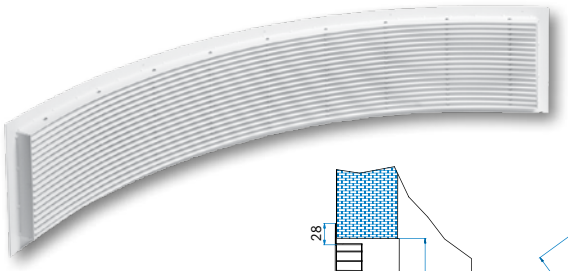

**The following data are necessary to calculate the volume Q':**

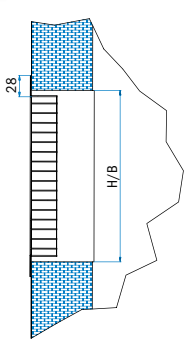
| | |
|---|---|
| 1. Normal rooms | Q' = Q |
| 2. Rooms with highly reflective walls | Q' = 0.5Q |
| 3. Rooms with absorption walls | Q' = 2Q |

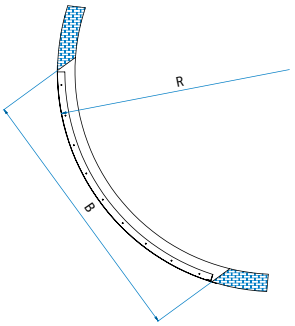
## Definition of symbols

| | |
|---|---|
| **Q' (m³)** | Calculated volume, depending on room reflectance |
| **Q (m³)** | Actual room volume |

## Curved steel grilles






### Application

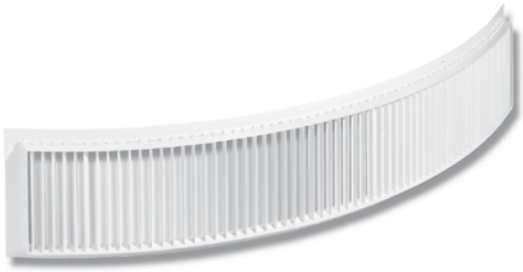
Ventilating curved grilles are designed for all types of low-pressure- air-conditioning, heating and ventilation systems with built in air flow and throw distance control. JRU-6 also has built-in regulation of discharge angle. They can be used for both, supply air and exhaust air applications.

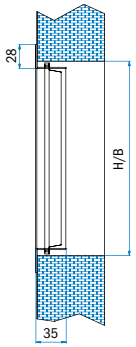
### Description

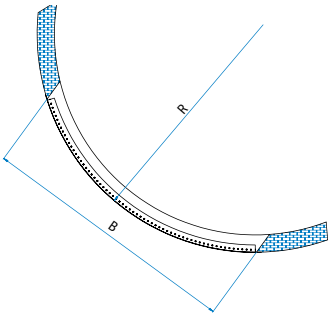
Steel curved grilles are made of sheet steel and powder-coated in RAL 9010. Upon customers request they can be made of galvanised or stainless steel or painted in any other RAL colour. Both types are available in concave or convex version.

### Standard dimensions

| B/H | 75 | 125 | 225 | 325 | 425 | 525 |
|---|---|---|---|---|---|---|
| 225 | ■ | ■ | ■ | | | |
| 325 | ■ | ■ | ■ | ■ | | |
| 425 | ■ | ■ | ■ | ■ | ■ | |
| 525 | ■ | ■ | ■ | ■ | ■ | ■ |
| 625 | ■ | ■ | ■ | ■ | ■ | ■ |
| 825 | ■ | ■ | ■ | ■ | ■ | ■ |
| 1025 | ■ | ■ | ■ | ■ | ■ | ■ |
| 1125 | ■ | ■ | ■ | ■ | ■ | ■ |
| 1225 | ■ | ■ | ■ | ■ | ■ | ■ |






### JRU-5

- Individually adjustable horizontal curved blades
- Frame (curve R)
- Visible screw installation

| JRU – 5 | B | H | R |
|---|---|---|---|
| min (mm) | 395 | 50 | 200 |

### JRU-6

- Individually adjustable vertical curved blades
- Frame (curve R)
- Visible screw installation

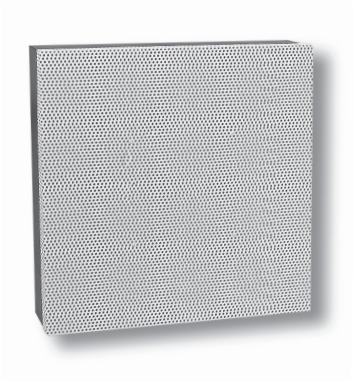
| JRU – 6 | B | H | R |
|---|---|---|---|
| min (mm) | 395 | 50 | 200 |

### Ordering key

JRU – 5/V/KK B x H x R

- KK Convex
- KO Concave
- Visible screw installation
- Grille type

## Square diffuser KD-15



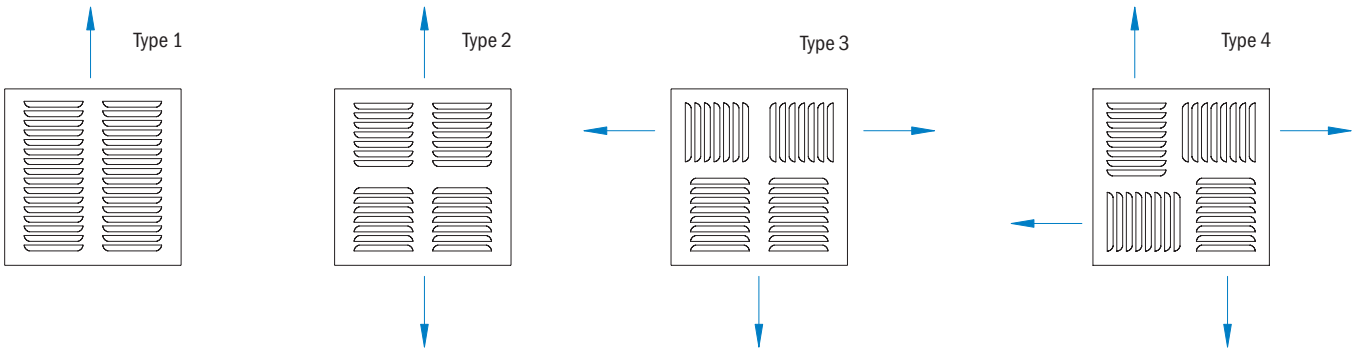

**Application**
Square diffusers are designed for supply and extract air applications in the rooms with floor to ceiling heights from 2.4 to 4 m. They can be installed in panel ceilings why their dimensions fits the size of the ceiling panels. Inlet spigot dimensions are designed to fit standard duct sizes.

**Description**
Square diffuser KD-15 consists of perforated diffuser face and plenum box with inlet spigot. Dispersing sheet steel allows different discharge angles (one, two, three or four directions). Dispersing sheet steel and housing are coloured in black and perforated diffuser face in RAL 9010, or according to customer's request.

**Component parts:**
1. Perforated diffuser face
2. Dispersing sheet steel
3. Housing
4. Inlet spigot
5. Volume control damper

| Type | A | B | Φ $A_{ef}$ ($m^2$) |
|---|---|---|---|
| KD-15/A | 595 | 595 | 0.13099 |

**Dispersing sheet steel types**




## Ordering key

**KD-15A/M/1/I**

**I5** Thermal insulation (PE), thickness 5 mm on the outside of the plenum box
**I9** Sound and thermal insulation (from -40 °C to 105 °C) thickness 9 mm on the outside of the plenum box (the material is synthetic rubber-based)
**I19** Sound and thermal insulation (from -40 °C to 105 °C) thickness 19 mm on the outside of the plenum box (the material is synthetic rubber-based)

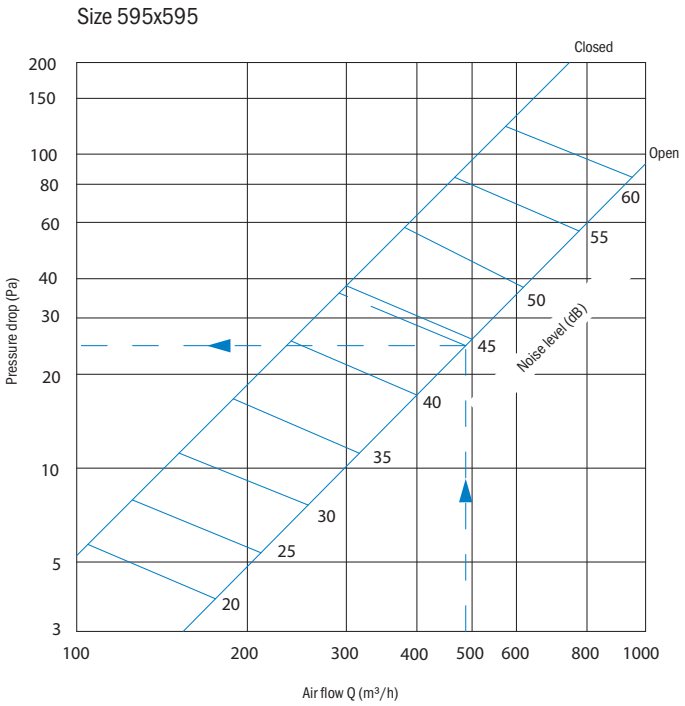
**1** Dispersing sheet types
**2**
**3**
**4**

**M** Volume control damper

**A** Size 595 x 595 mm
**C** Front plate 595 x 595 mm only

**Pressure drop and sound power level diagram**
(Control flap angle: 90° – open, 0° – closed)

**Diagram for determination of throw distance**




## Example

**Given data:**

| | |
|---|---|
| Air flow volume: | Q = 490 m³/h, L = 1.4 m |
| Max. air velocity at the throw distance L: | $v_L$ = 0.20 m/s |
| Sound power level: | $L_{WA}$ = 44 dB(A) |
| Pressure drop: | Δp = 24 Pa |

## Floor Slot Diffusers LD-16N

**Application**
LD-16N floor slot diffusers are a suitable solution for swimming pools and similar rooms with large glass surfaces and windows. They are designed for installation in the floor. Warm air is supplied in the upwards direction, towards the window. With appropriate dimensions, proper air supply is guaranteed, free of excessive draught or noise ($L_{WA}$<35 dB(A)).

**Description**
LD-16N slot diffusers are designed in 1, 2, 3, 4, 5 and 6 slot versions. They are made of fixed aluminium sections and an aluminium structural frame. On request, the diffusers are available also in powder coated version.

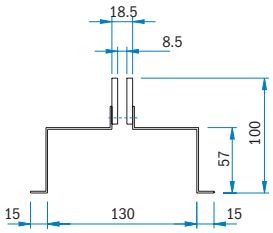
The diffusers are available in single piece lengths 200 mm to 2000 mm.

**Advantages**

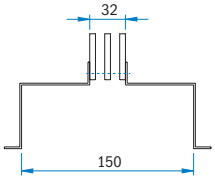
- No glass misting
- Optimal ventilation
- No heat losses
- Low pressure drop
- Prevents the descent of cold air along windows
- Does not cause heating of air near the windows even in the sunshine
- Easy installation

## Versions

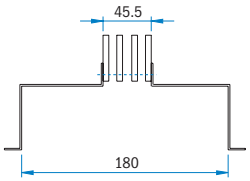
single slot LD-16N/**1**



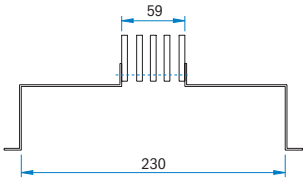

two slots LD-16N/**2**



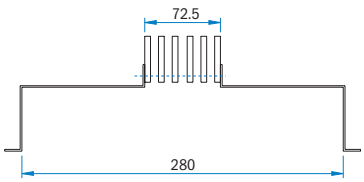

three slots LD-16N/**3**



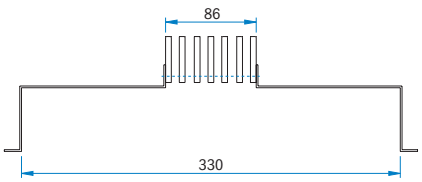

four slots LD-16N/**4**



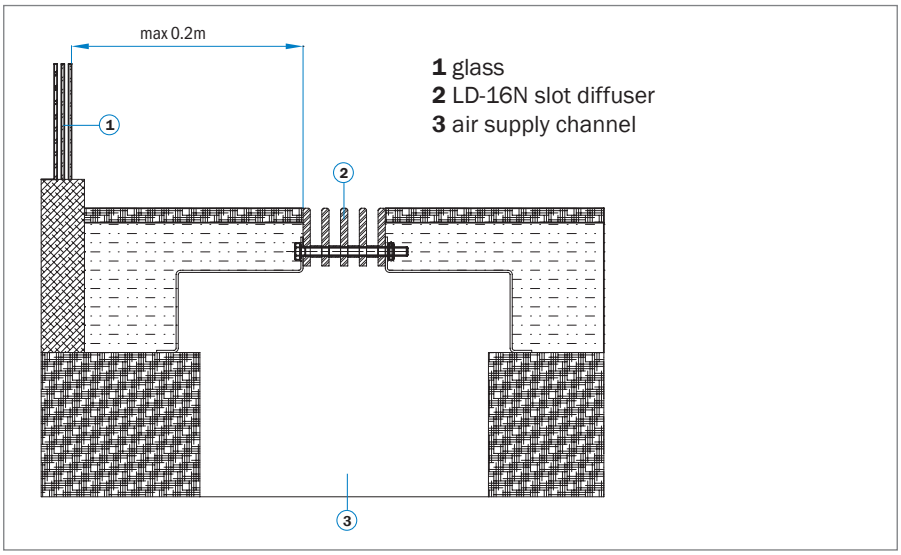

five slots LD-16N/**5**




six slots LD-16N/**6**

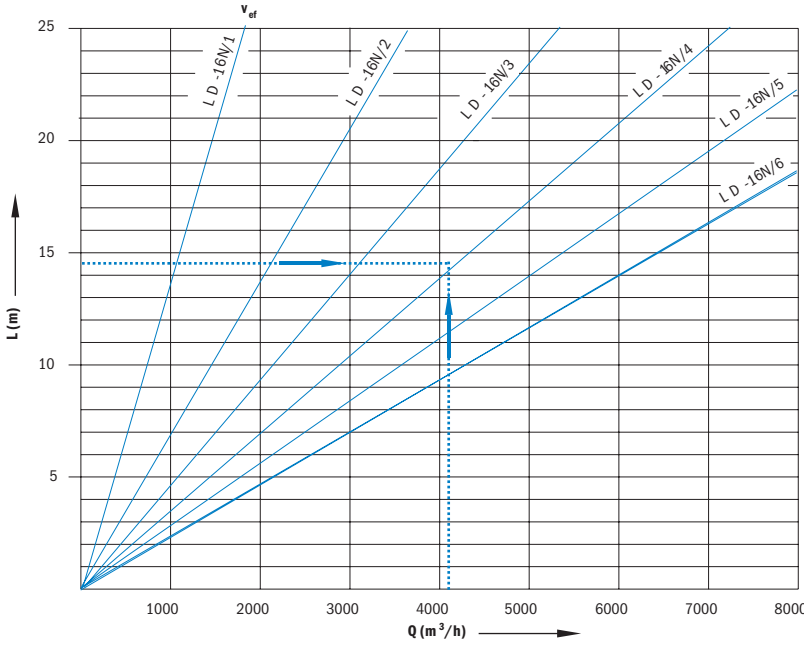


## Installation method




## Fast selection diagram

$L_{wA}$ < 35 dB(A); $V_{ef}$ =2,5 m/s; $\Delta p_t$ = 16 Pa




## Example

The available floor area next to the glass surface is 15 m in length. The calculated supplied air flow rate is 4000 m³/h. From the diagram, the type:
LD-16N/3 L=15m is selected.

| | |
|---|---|
| **Q (m³/h)** | Air flow rate |
| **$L_{WA}$ (dB(A))** | Sound power level |
| **$\Delta p_t$ (Pa)** | Pressure drop |
| **L (m)** | Slot diffuser length |
| **$v_{ef}$ (m/s)** | Effective air velocity |

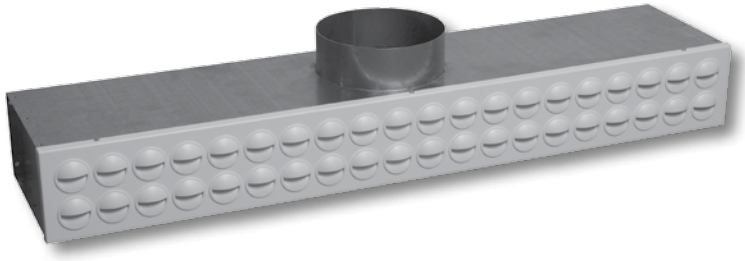
## Ordering key

**LD-16N / 1 / L / n**

- n — Number of longitudinal sections (pieces)
- L — Single piece length **(L = 200, 300, ..., 2000)**
- 1 — Number of slots
  - **1**
  - **2**
  - **3**
  - **4**
  - **5**
  - **6**
- **LD-16N** Floor slot diffuser

**Note:**
Available only in anodized version, powder coated on request.

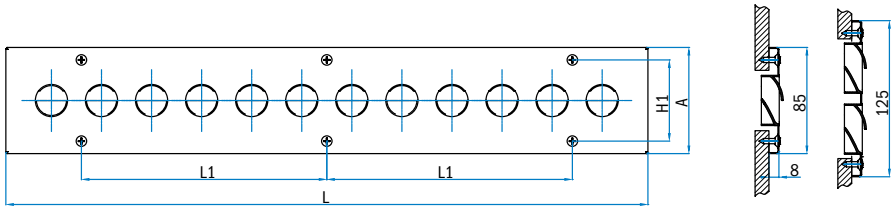
# Nozzle diffuser LD-19

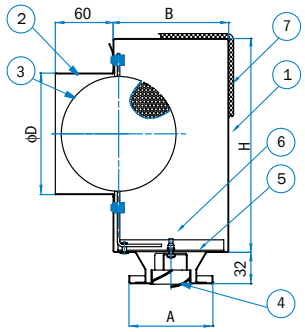


**Application**
Nozzle diffuser LD-19 is designed for supply of warm or cold air and can be mounted in the wall or in the ceiling. Adjustable deflectors allow us to set different directions of air discharge.

**Description**
Front plate is made of sheet steel and powder painted in white (RAL 9010) or any other RAL colour (on customer's request). Individually adjustable nozzles are made of plastics in white (RAL 9010) or black (RAL 9005) colour.

Plenum box is made of sheet steel. Nozzle diffusers are made in standard lenghts (one section) from 600 up to 2000 mm with 100 mm step.




1. Plenum box
2. Spigot
3. Volume control damper (M)
4. Nozzle
5. Cross bar
6. Fixing screw
7. Insulation (entire outside surface of the plenum box)

**Dimensions**

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **L** | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 |
| **L1** | 552 | 652 | 752 | 852 | 476 | 526 | 576 | 626 | 676 | 726 | 776 | 826 | 876 | 926 | 976 |
| **No. of nozzles*** | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 34 | 36 | 38 | 40 |

*Up to length L=900mm: fixing with 4 screws. Other sizes: fixing with 6 screws.

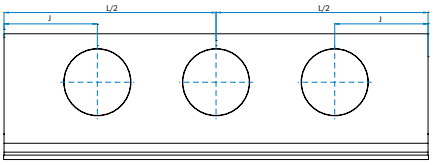
| No. of rows | A | H1 | B | H |
|---|---|---|---|---|
| **1** | 85 | 65 | 117 | 216.5 |
| **2** | 125 | 105 | 162 | 236.5 |

## Number and dimensions of spigots

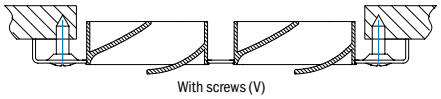
| L | 600 – 1000 | 1100 – 1500 | 1600 – 2000 |
|---|---|---|---|
| No. of rows | Number and dimensions of spigots ϕD | | |
| 1 | 1x123 | 2x123 | 2x138 |
| 2 | 1x158 | 2x138 | 2x158 |

## Position of inlet spigots

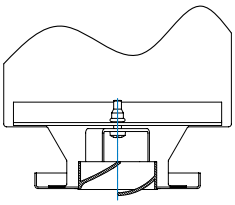
| No. of inlet spigots | Standard length | Position of inlet spigots |
|---|---|---|
| 1 | 600-1000 | L/2 |
| 2 | 1100-1500 | J=300 |
| 2 | 1600-2000 | J=400 |




## Front plate installation

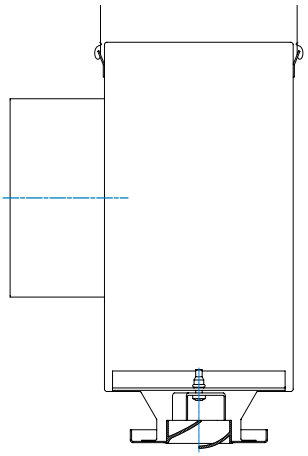


With screws (V)



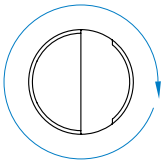
Installation with a cross-member (Z)

Installation on a cross bar can be made through the hole, in which is mounted a nozzle.

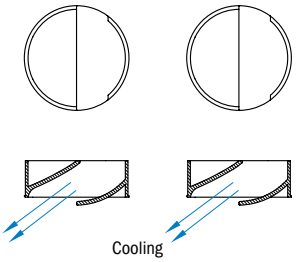


Installation of a plenum box with suspension bracket (P)

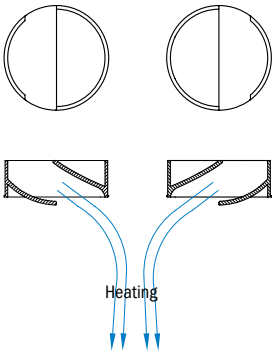
## Types of air discharge



Possible angle settings



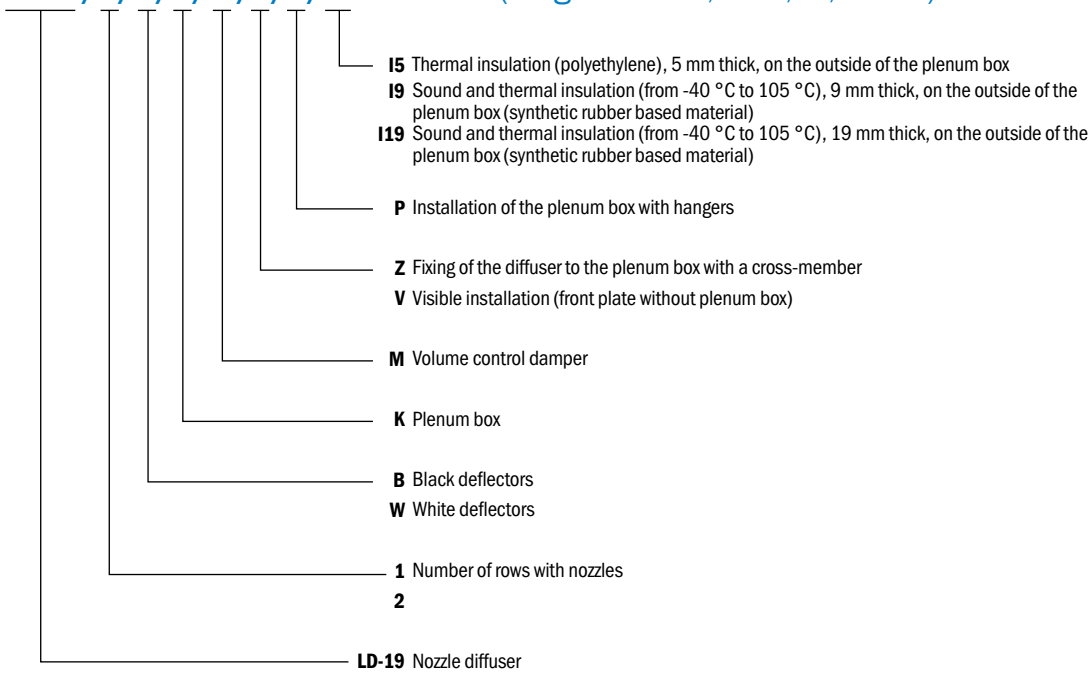
Cooling



Heating

## Ordering key

**LD-19/1/B/K/M/Z/P/I5** L=1000 (length L=600, 700, ..., 2000)




**Note:**
Standard colour is RAL 9010. Other colours on customer's request.

## Quick selection

### Sound power level, pressure drop and throw distances

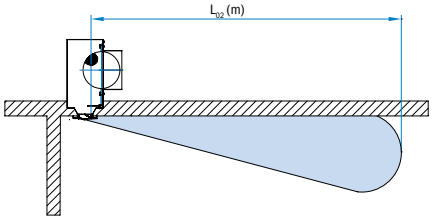
| Horizontal discharge ΔT= 0K | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Type** | **Q** | **(l/s)** | **13.9** | **27.8** | **41.7** | **55.6** | **69.4** | **83.3** | **111.1** |
| | | **(m³/h)** | **50** | **100** | **150** | **200** | **250** | **300** | **400** |
| **LD-19/1 L=600 mm** | $L_{WA}$ | (dB(A)) | 27 | 40 | 46.8 | / | / | / | / |
| | $\Delta p_t$ | (Pa) | 12.8 | 47 | 101.2 | / | / | / | / |
| | $L_{0.2}$ | (m) | 2.7 | 3.5 | 4.1 | / | / | / | / |
| | $L_{min}$ | (m) | 4.3 | 5.9 | 7.1 | / | / | / | / |
| **LD-19/1 L=1000 mm** | $L_{WA}$ | (dB(A)) | 21.4 | 33.7 | 40.8 | 44.8 | / | / | / |
| | $\Delta p_t$ | (Pa) | 5 | 17.7 | 37.7 | 64.6 | / | / | / |
| | $L_{0.2}$ | (m) | 2.2 | 2.8 | 3.6 | 4.4 | / | / | / |
| | $L_{min}$ | (m) | 3.2 | 4.4 | 6.0 | 7.6 | / | / | / |
| **LD-19/1 L=1500 mm** | $L_{WA}$ | (dB(A)) | 16.4 | 27.4 | 34.8 | 39.7 | 43.1 | / | / |
| | $\Delta p_t$ | (Pa) | 2.3 | 7.9 | 16.9 | 28.9 | 43.8 | / | / |
| | $L_{0.2}$ | (m) | 2 | 2.5 | 2.8 | 3.3 | 3.9 | / | / |
| | $L_{min}$ | (m) | 2.7 | 3.7 | 4.4 | 5.4 | 6.6 | / | / |
| **LD-19/1 L=2000 mm** | $L_{WA}$ | (dB(A)) | 13.1 | 22.8 | 30 | 35.2 | 39.1 | 41.9 | 45.5 |
| | $\Delta p_t$ | (Pa) | 1.4 | 4.6 | 9.7 | 16.5 | 25 | 35.2 | 60.4 |
| | $L_{0.2}$ | (m) | 1.9 | 2.2 | 2.6 | 2.9 | 3.2 | 3.6 | 3.9 |
| | $L_{min}$ | (m) | 2.5 | 3.1 | 3.9 | 4.5 | 5.1 | 5.9 | 6.6 |
| **LD-19/2 L=600 mm** | $L_{WA}$ | (dB(A)) | 19.1 | 30.9 | 38.2 | / | / | / | / |
| | $\Delta p_t$ | (Pa) | 3.4 | 12.2 | 26 | / | / | / | / |
| | $L_{0.2}$ | (m) | 3.2 | 4.6 | 6.8 | / | / | / | / |
| | $L_{min}$ | (m) | 5.4 | 8.2 | 12.6 | / | / | / | / |
| **LD-19/2 L=1000 mm** | $L_{WA}$ | (dB(A)) | 13.1 | 22.8 | 30 | 35.2 | / | / | / |
| | $\Delta p_t$ | (Pa) | 1.5 | 4.9 | 10.1 | 17.1 | / | / | / |
| | $L_{0.2}$ | (m) | 2.7 | 3.5 | 4.3 | 5.4 | / | / | / |
| | $L_{min}$ | (m) | 4.3 | 5.9 | 7.6 | 9.8 | / | / | / |
| **LD-19/2 L=1500 mm** | $L_{WA}$ | (dB(A)) | 10.3 | 18.4 | 24.9 | 30.1 | 34.2 | / | / |
| | $\Delta p_t$ | (Pa) | 0.7 | 2.4 | 4.8 | 7.9 | 11.9 | / | / |
| | $L_{0.2}$ | (m) | 2.4 | 3 | 3.4 | 4.2 | 4.8 | / | / |
| | $L_{min}$ | (m) | 3.7 | 4.9 | 5.7 | 7.3 | 8.5 | / | / |
| **LD-19/2 L=2000 mm** | $L_{WA}$ | (dB(A)) | 9.1 | 16.6 | 22.8 | 27.8 | 31.9 | 35.3 | 40.3 |
| | $\Delta p_t$ | (Pa) | 0.5 | 1.4 | 2.8 | 4.7 | 6.9 | 9.6 | 16.2 |
| | $L_{0.2}$ | (m) | 2.4 | 2.8 | 3.1 | 3.6 | 4 | 4.4 | 5.6 |
| | $L_{min}$ | (m) | 3.6 | 4.4 | 5.1 | 6.1 | 6.9 | 7.7 | 10.1 |

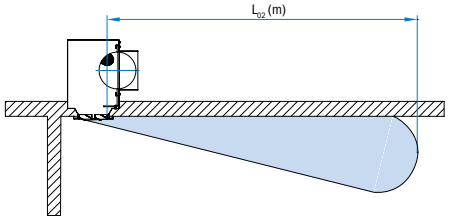
## Definition of symbols

**$L_{WA}$ (dB(A))** Sound power level
**$\Delta p_t$ (Pa)** Total pressure drop
**$L_{0.2}$ (m)** Isothermal throw length of supply air jet, when its speed drops down to 0.2 m/s
**$L_{min}$ (m)** Minimum distance between diffusers, that the jet velocity is less than or equal to 0.2 m/s

## Conditions for $L_{min}$:

| | |
|---|---|
| Room height: | H=2.8 m |
| Occupied zone height: | 1.8 m |
| Room temperature: | 24 °C |
| Supply temperature by cooling: | ΔT= - 6 K |



## Sound power level, pressure drop and throw distances

**Vertical discharge ΔT= 0K**

| Type | Q | (l/s) | 13.9 | 27.8 | 41.7 | 55.6 | 69.4 | 83.3 | 111.1 |
|---|---|---|---|---|---|---|---|---|---|
| | | (m³/h) | 50 | 100 | 150 | 200 | 250 | 300 | 400 |
| LD-19/2 L=600 mm | $L_{WA}$ | (dB(A)) | 19.1 | 30.9 | 38.2 | / | / | / | / |
| | $\Delta p_t$ | (Pa) | 3.4 | 12.2 | 26 | / | / | / | / |
| | $L_{0.2}$ | (m) | 1.8 | 2.6 | 3.9 | / | / | / | / |
| LD-19/2 L=1000 mm | $L_{WA}$ | (dB(A)) | 13.1 | 22.8 | 30 | 35.2 | / | / | / |
| | $\Delta p_t$ | (Pa) | 1.5 | 4.9 | 10.1 | 17.1 | / | / | / |
| | $L_{0.2}$ | (m) | 1.6 | 2.0 | 2.3 | 2.8 | / | / | / |
| LD-19/2 L=1500 mm | $L_{WA}$ | (dB(A)) | 10.3 | 18.4 | 24.9 | 30.1 | 34.2 | / | / |
| | $\Delta p_t$ | (Pa) | 0.7 | 2.4 | 4.8 | 7.9 | 11.9 | / | / |
| | $L_{0.2}$ | (m) | 1.4 | 1.7 | 1.9 | 2.4 | 2.7 | / | / |
| LD-19/2 L=2000 mm | $L_{WA}$ | (dB(A)) | 9.1 | 16.6 | 22.8 | 27.8 | 31.9 | 35.3 | 40.3 |
| | $\Delta p_t$ | (Pa) | 0.5 | 1.4 | 2.8 | 4.7 | 6.9 | 9.6 | 16.2 |
| | $L_{0.2}$ | (m) | 1.3 | 1.6 | 1.8 | 2.1 | 2.3 | 2.5 | 3.2 |

**Vertical discharge ΔT= +5K**

| Type | Q | (l/s) | 13.89 | 27.78 | 41.67 | 55.56 | 69.44 | 83.33 | 111.11 |
|---|---|---|---|---|---|---|---|---|---|
| | | (m³/h) | 50.00 | 100.00 | 150.00 | 200.00 | 250.00 | 300.00 | 400.00 |
| LD-19/2 L=600 mm | $L_{WA}$ | (dB(A)) | 19.1 | 30.9 | 38.2 | / | / | / | / |
| | $\Delta p_t$ | (Pa) | 3.4 | 12.2 | 26 | / | / | / | / |
| | $L_{0.2}$ | (m) | 1.20 | 1.72 | 2.55 | / | / | / | / |
| LD-19/2 L=1000 mm | $L_{WA}$ | (dB(A)) | 13.1 | 22.8 | 30 | 35.2 | / | / | / |
| | $\Delta p_t$ | (Pa) | 1.5 | 4.9 | 10.1 | 17.1 | / | / | / |
| | $L_{0.2}$ | (m) | 1.16 | 1.45 | 1.64 | 2.03 | / | / | / |
| LD-19/2 L=1500 mm | $L_{WA}$ | (dB(A)) | 10.3 | 18.4 | 24.9 | 30.1 | 34.2 | / | / |
| | $\Delta p_t$ | (Pa) | 0.7 | 2.4 | 4.8 | 7.9 | 11.9 | / | / |
| | $L_{0.2}$ | (m) | 1.07 | 1.33 | 1.51 | 1.87 | 2.14 | / | / |
| LD-19/2 L=2000 mm | $L_{WA}$ | (dB(A)) | 9.1 | 16.6 | 22.8 | 27.8 | 31.9 | 35.3 | 40.3 |
| | $\Delta p_t$ | (Pa) | 0.5 | 1.4 | 2.8 | 4.7 | 6.9 | 9.6 | 16.2 |
| | $L_{0.2}$ | (m) | 1.03 | 1.26 | 1.40 | 1.62 | 1.80 | 1.98 | 2.52 |

**Vertical discharge ΔT= +10K**

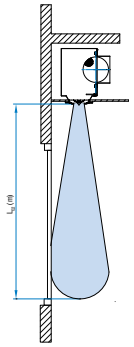
| Type | Q | (l/s) | 13.89 | 27.78 | 41.67 | 55.56 | 69.44 | 83.33 | 111.11 |
|---|---|---|---|---|---|---|---|---|---|
| | | (m³/h) | 50.00 | 100.00 | 150.00 | 200.00 | 250.00 | 300.00 | 400.00 |
| LD-19/2 L=600 mm | $L_{WA}$ | (dB(A)) | 19.1 | 30.9 | 38.2 | / | / | / | / |
| | $\Delta p_t$ | (Pa) | 3.4 | 12.2 | 26 | / | / | / | / |
| | $L_{0.2}$ | (m) | 0.85 | 1.22 | 1.81 | / | / | / | / |
| LD-19/2 L=1000 mm | $L_{WA}$ | (dB(A)) | 13.1 | 22.8 | 30 | 35.2 | / | / | / |
| | $\Delta p_t$ | (Pa) | 1.5 | 4.9 | 10.1 | 17.1 | / | / | / |
| | $L_{0.2}$ | (m) | 0.86 | 1.07 | 1.22 | 1.50 | / | / | / |
| LD-19/2 L=1500 mm | $L_{WA}$ | (dB(A)) | 10.3 | 18.4 | 24.9 | 30.1 | 34.2 | / | / |
| | $\Delta p_t$ | (Pa) | 0.7 | 2.4 | 4.8 | 7.9 | 11.9 | / | / |
| | $L_{0.2}$ | (m) | 0.74 | 0.92 | 1.04 | 1.29 | 1.47 | / | / |
| LD-19/2 L=2000 mm | $L_{WA}$ | (dB(A)) | 9.1 | 16.6 | 22.8 | 27.8 | 31.9 | 35.3 | 40.3 |
| | $\Delta p_t$ | (Pa) | 0.5 | 1.4 | 2.8 | 4.7 | 6.9 | 9.6 | 16.2 |
| | $L_{0.2}$ | (m) | 0.69 | 0.85 | 0.94 | 1.09 | 1.21 | 1.33 | 1.69 |

## Definitions of symbols

**$L_{WA}$ (dB(A))** Sound power level

**$\Delta p_t$ (Pa)** Total pressure drop

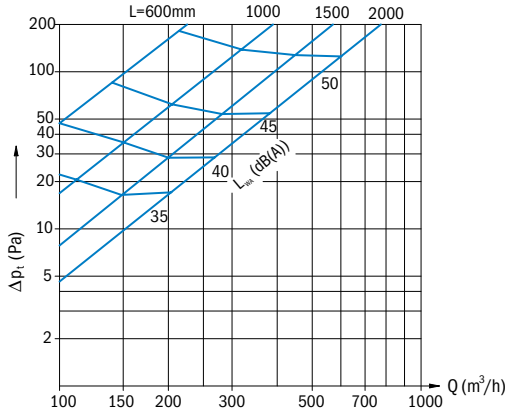
**$L_{0.2}$ (m)** Isothermal throw length of supply air jet, when its speed drops down to 0.2 m/s



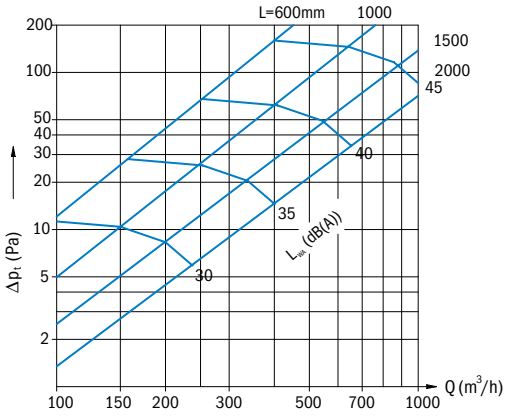
## Sound power level and pressure drop

Pressure drop by horizontal discharge and 100 % opened volume control damper.

### LD 19/1




### LD 19/2



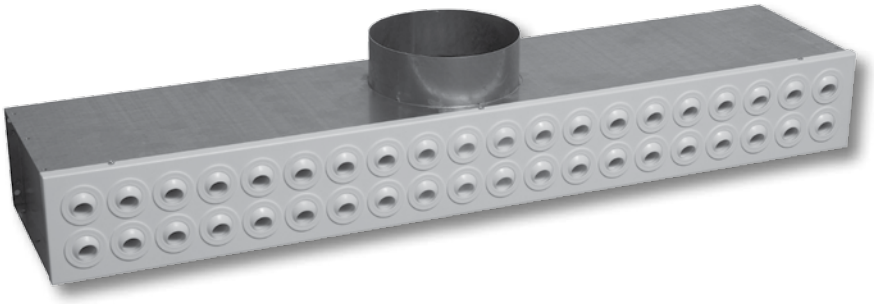

### Correction factors applicable to LD-19

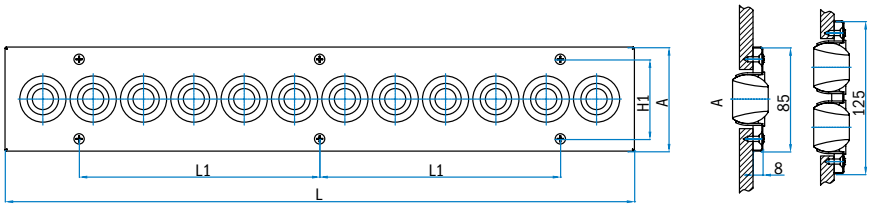
| Length | LD-19/1 | | LD-19/2 | |
|---|---|---|---|---|
| | Volume control damper | | Volume control damper | |
| | open | closed | open | closed |
| **L=600** | X 1 | X 1.3 | X 1 | X 1.8 |
| **L=1000** | X 1 | X 1.4 | X 1 | X 2 |
| **L=1500** | X 1 | X 1.5 | X 1 | X 2.2 |
| **L=2000** | X 1 | X 2 | X 1 | X 2.5 |

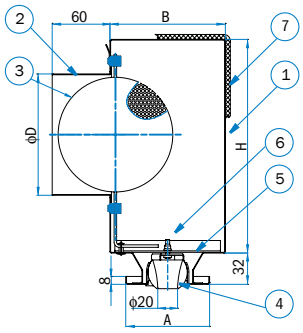
# Nozzle diffuser LD-20

**Application**
Nozzle diffuser LD-20 is designed to supply low quantities of air on big window surfaces to prevent condensation (ceiling installation near windows) or for big throws for cooling when wall installation (Coanda effect).

**Description**
The front plate is made of sheet steel powder painted in white (RAL 9010) or any other RAL colour (on customer's request). Individually adjustable nozzles are made from plastic in white (RAL 9010) or black (RAL 9005) colour. Plenum box is made of sheet steel. Nozzle diffuser LD-20 can be made in standard lenghts (one section) from 600 up to 2000 mm with 100 mm step.






1. Plenum box
2. Inlet spigot
3. Volume control damper (M)
4. Nozzle
5. Cross-bar
6. Fixing screw
7. Insulation (entire outside surface of the plenum box)

| L | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L1 | 552 | 652 | 752 | 852 | 476 | 526 | 576 | 626 | 676 | 726 | 776 | 826 | 876 | 926 | 976 |
| No. of nozzles | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 34 | 36 | 38 | 40 |

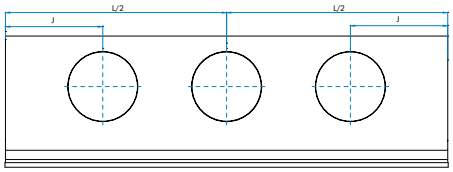
| No. of rows | H1 | B | H | A |
|---|---|---|---|---|
| 1 | 65 | 117 | 216.5 | 85 |
| 2 | 105 | 162 | 236.5 | 125 |

## Number and dimensions of spigots

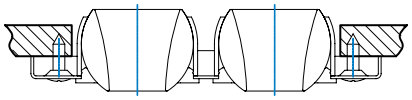
| L | 600 – 1000 | 1100 – 1500 | 1600 – 2000 |
|---|---|---|---|
| No. of rows | Number and dimensions of spigots ϕD | | |
| 1 | 1x123 | 2x123 | 2x138 |
| 2 | 1x158 | 2x138 | 2x158 |

## Position of inlet spigots

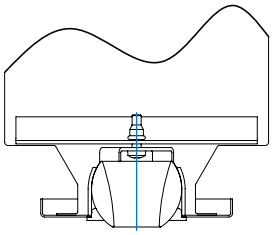
| No. of inlet spigots | Standard length | Position of inlet spigots |
|---|---|---|
| 1 | 600-1000 | L/2 |
| 2 | 1100-1500 | J=300 |
| 2 | 1600-2000 | J=400 |



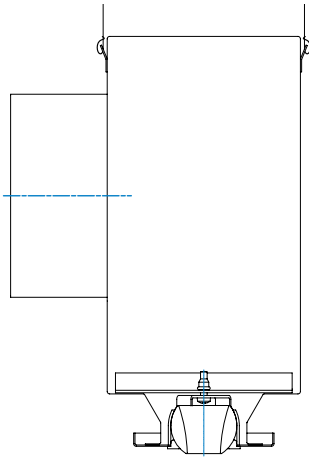

## Front plate installation



With screws(V)

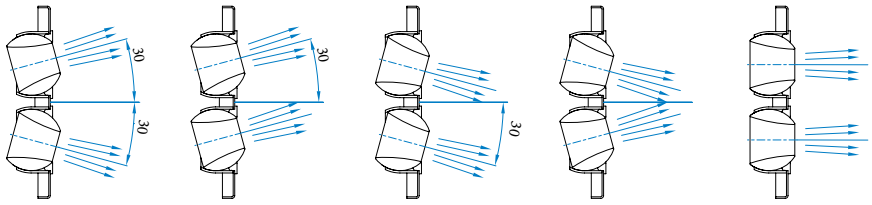


Installation with a cross-member (Z)
Installation on a cross bar can be made through the hole, in which is mounted a nozzle.



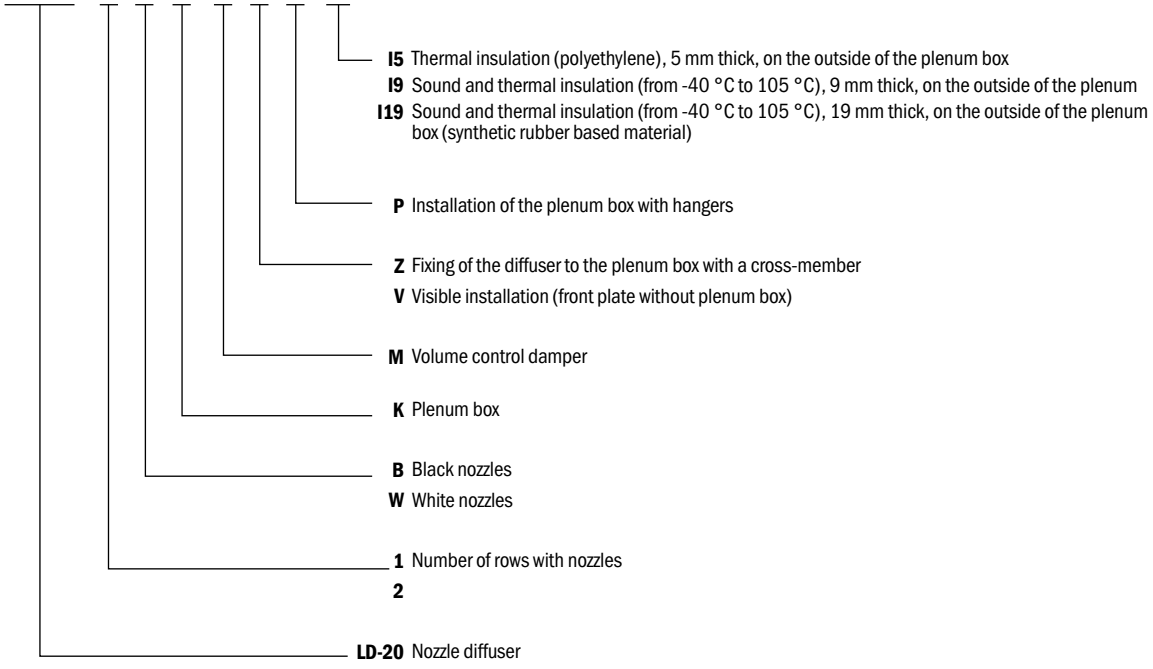
Installation of a plenum box with suspension bracket (P)

## Possible angle settings



## Ordering key

**LD-20/1/B/K/M/Z/P/I5** L=1000 (lenght L=600, 700, ..., 2000)




**Note:**
Standard colour is RAL 9010. Other colours on customer's request.

## Quick selection

### Sound power level, pressure drop and throw distances

| Horizontal discharge ΔT=0K | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Type** | **Q** | **(l/s)** | **13.9** | **27.8** | **41.7** | **55.6** | **69.4** | **83.3** | **111.1** |
| | | **(m³/h)** | **50** | **100** | **150** | **200** | **250** | **300** | **400** |
| **LD-20/1 L=600 mm** | $L_{WA}$ | (dB(A)) | 20 | 33.8 | 41 | / | / | / | / |
| | $\Delta p_t$ | (Pa) | 13.5 | 35.6 | 74.8 | / | / | / | / |
| | $L_{0.2}$ | (m) | 6.6 | > 10 | > 10 | / | / | / | / |
| **LD-20/1 L=1000 mm** | $L_{WA}$ | (dB(A)) | 11 | 23.2 | 30 | 36 | / | / | / |
| | $\Delta p_t$ | (Pa) | 12 | 22 | 43 | 76 | / | / | / |
| | $L_{0.2}$ | (m) | 3.8 | 6.6 | 9.3 | > 10 | / | / | / |
| **LD-20/1 L=1500 mm** | $L_{WA}$ | (dB(A)) | 8 | 14.5 | 25 | 31 | 35 | 37.5 | 43 |
| | $\Delta p_t$ | (Pa) | 5.5 | 12.5 | 25 | 39.6 | 55 | 86.4 | 136.8 |
| | $L_{0.2}$ | (m) | 2.1 | 3.5 | 5 | 6.4 | 7.9 | 9.3 | > 10 |
| **LD-20/1 L=2000 mm** | $L_{WA}$ | (dB(A)) | / | 11 | 21 | 26.5 | 31 | 34.7 | 40 |
| | $\Delta p_t$ | (Pa) | / | 7.5 | 15 | 23.7 | 33 | 45.5 | 75.2 |
| | $L_{0.2}$ | (m) | / | 2.5 | 3.6 | 4.6 | 5.7 | 6.7 | 7.5 |
| **LD-20/2 L=600 mm** | $L_{WA}$ | (dB(A)) | 14 | 25 | 31 | / | / | / | / |
| | $\Delta p_t$ | (Pa) | 2 | 8.3 | 18.3 | / | / | / | / |
| | $L_{0.2}$ | (m) | 4.2 | 9.1 | > 10 | / | / | / | / |
| **LD-20/2 L=1000 mm** | $L_{WA}$ | (dB(A)) | / | 19 | 24 | 27.8 | 31 | / | / |
| | $\Delta p_t$ | (Pa) | / | 4 | 8 | 15 | 22 | / | / |
| | $L_{0.2}$ | (m) | / | 7.1 | 8.9 | > 10 | > 10 | / | / |
| **LD-20/2 L=1500 mm** | $L_{WA}$ | (dB(A)) | / | 14.6 | 20.4 | 24 | 27 | 28.5 | 32.5 |
| | $\Delta p_t$ | (Pa) | / | 2.4 | 4.7 | 7.6 | 13 | 17 | 28.5 |
| | $L_{0.2}$ | (m) | / | 4.3 | 5.3 | 6.2 | 7.3 | 8.1 | 8.9 |
| **LD-20/2 L=2000 mm** | $L_{WA}$ | (dB(A)) | / | 11 | 17 | 21.5 | 24 | 26.3 | 30.3 |
| | $\Delta p_t$ | (Pa) | / | 1.4 | 2.7 | 4.2 | 6.5 | 8.2 | 14.4 |
| | $L_{0.2}$ | (m) | / | 2.8 | 3.5 | 4.0 | 4.7 | 5.3 | 5.8 |

## Sound power level, pressure drop and throw distances

**Horizontal discharge ΔT=-5K**

| Type | Q | (l/s) | 13.9 | 27.8 | 41.7 | 55.6 | 69.4 | 83.3 | 111.1 |
|---|---|---|---|---|---|---|---|---|---|
| | | (m³/h) | 50 | 100 | 150 | 200 | 250 | 300 | 400 |
| LD-20/1 L=600 mm | $L_{WA}$ | (dB(A)) | 20 | 33.8 | 41 | / | / | / | / |
| | $\Delta p_t$ | (Pa) | 13.5 | 35.6 | 74.8 | / | / | / | / |
| | $L_{0.2}$ | (m) | 5.1 | > 10 | > 10 | / | / | / | / |
| LD-20/1 L=1000 mm | $L_{WA}$ | (dB(A)) | 11 | 23.2 | 30 | 36 | / | / | / |
| | $\Delta p_t$ | (Pa) | 12 | 22 | 43 | 76 | / | / | / |
| | $L_{0.2}$ | (m) | 2.9 | 6.9 | 8.8 | > 10 | / | / | / |
| LD-20/1 L=1500 mm | $L_{WA}$ | (dB(A)) | 8 | 14.5 | 25 | 31 | 35 | 37.5 | 43 |
| | $\Delta p_t$ | (Pa) | 5.5 | 12.5 | 25 | 39.6 | 55 | 86.4 | 136.8 |
| | $L_{0.2}$ | (m) | 1.6 | 3.8 | 4.8 | 6.6 | 8.2 | 9.8 | > 10 |
| LD-20/1 L=2000 mm | $L_{WA}$ | (dB(A)) | / | 11 | 21 | 26.5 | 31 | 34.7 | 40 |
| | $\Delta p_t$ | (Pa) | / | 7.5 | 15 | 23.7 | 33 | 45.5 | 75.2 |
| | $L_{0.2}$ | (m) | / | 2.7 | 3.4 | 4.7 | 5.8 | 7.0 | 8.1 |
| LD-20/2 L=600 mm | $L_{WA}$ | (dB(A)) | 14 | 25 | 31 | / | / | / | / |
| | $\Delta p_t$ | (Pa) | 2 | 8.3 | 18.3 | / | / | / | / |
| | $L_{0.2}$ | (m) | 7.3 | 9.1 | > 10 | / | / | / | / |
| LD-20/2 L=1000 mm | $L_{WA}$ | (dB(A)) | / | 19 | 24 | 27.8 | 31 | / | / |
| | $\Delta p_t$ | (Pa) | / | 4 | 8 | 15 | 22 | / | / |
| | $L_{0.2}$ | (m) | / | 4.7 | 7.1 | 9.3 | > 10 | / | / |
| LD-20/2 L=1500 mm | $L_{WA}$ | (dB(A)) | / | 14.6 | 20.4 | 24 | 27 | 28.5 | 32.5 |
| | $\Delta p_t$ | (Pa) | / | 2.4 | 4.7 | 7.6 | 13 | 17 | 28.5 |
| | $L_{0.2}$ | (m) | / | 2.8 | 4.3 | 5.6 | 7.0 | 8.2 | 9.3 |
| LD-20/2 L=2000 mm | $L_{WA}$ | (dB(A)) | / | 11 | 17 | 21.5 | 24 | 26.3 | 30.3 |
| | $\Delta p_t$ | (Pa) | / | 1.4 | 2.7 | 4.2 | 6.5 | 8.2 | 14.4 |
| | $L_{0.2}$ | (m) | / | 1.8 | 2.8 | 3.6 | 4.5 | 5.3 | 6.0 |

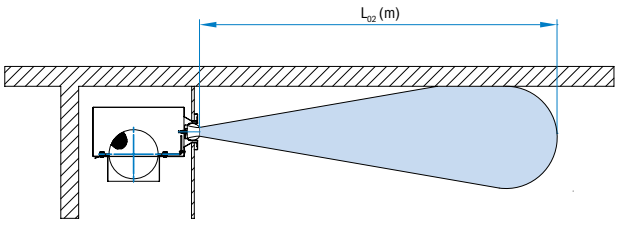
### Sound power level, pressure drop and throw distances

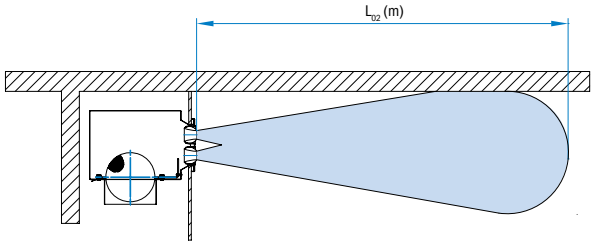
**Horizontal discharge ΔT=-10K**

| Type | Q | (l/s) | 13.9 | 27.8 | 41.7 | 55.6 | 69.4 | 83.3 | 111.1 |
|---|---|---|---|---|---|---|---|---|---|
| | | (m³/h) | 50 | 100 | 150 | 200 | 250 | 300 | 400 |
| LD-20/1 L=600 mm | $L_{WA}$ | (dB(A)) | 20 | 33.8 | 41 | / | / | / | / |
| | $\Delta p_t$ | (Pa) | 13.5 | 35.6 | 74.8 | / | / | / | / |
| | $L_{0.2}$ | (m) | 3.5 | 8.5 | > 10 | / | / | / | / |
| LD-20/1 L=1000 mm | $L_{WA}$ | (dB(A)) | 11 | 23.2 | 30 | 36 | / | / | / |
| | $\Delta p_t$ | (Pa) | 12 | 22 | 43 | 76 | / | / | / |
| | $L_{0.2}$ | (m) | 2 | 4.9 | 8.1 | > 10 | / | / | / |
| LD-20/1 L=1500 mm | $L_{WA}$ | (dB(A)) | 8 | 14.5 | 25 | 31 | 35 | 37.5 | 43 |
| | $\Delta p_t$ | (Pa) | 5.5 | 12.5 | 25 | 39.6 | 55 | 86.4 | 136.8 |
| | $L_{0.2}$ | (m) | 1.1 | 2.6 | 4.4 | 5.9 | 7.3 | 9.1 | > 10 |
| LD-20/1 L=2000 mm | $L_{WA}$ | (dB(A)) | / | 11 | 21 | 26.5 | 31 | 34.7 | 40 |
| | $\Delta p_t$ | (Pa) | / | 7.5 | 15 | 23.7 | 33 | 45.5 | 75.2 |
| | $L_{0.2}$ | (m) | / | 1.9 | 3.1 | 4.2 | 5.3 | 6.6 | 7.5 |
| LD-20/2 L=600 mm | $L_{WA}$ | (dB(A)) | 14 | 25 | 31 | / | / | / | / |
| | $\Delta p_t$ | (Pa) | 2 | 8.3 | 18.3 | / | / | / | / |
| | $L_{0.2}$ | (m) | 3.4 | 4.3 | 7.74 | / | / | / | / |
| LD-20/2 L=1000 mm | $L_{WA}$ | (dB(A)) | / | 19 | 24 | 27.8 | 31 | / | / |
| | $\Delta p_t$ | (Pa) | / | 4 | 8 | 15 | 22 | / | / |
| | $L_{0.2}$ | (m) | / | 2.5 | 4.5 | 6.7 | 9.7 | / | / |
| LD-20/2 L=1500 mm | $L_{WA}$ | (dB(A)) | / | 14.6 | 20.4 | 24 | 27 | 28.5 | 32.5 |
| | $\Delta p_t$ | (Pa) | / | 2.4 | 4.7 | 7.6 | 13 | 17 | 28.5 |
| | $L_{0.2}$ | (m) | / | 1.5 | 2.7 | 4.0 | 5.8 | 6.9 | 8.3 |
| LD-20/2 L=2000 mm | $L_{WA}$ | (dB(A)) | / | 11 | 17 | 21.5 | 24 | 26.3 | 30.3 |
| | $\Delta p_t$ | (Pa) | / | 1.4 | 2.7 | 4.2 | 6.5 | 8.2 | 14.4 |
| | $L_{0.2}$ | (m) | / | 1.0 | 1.8 | 2.6 | 3.8 | 4.5 | 5.4 |

## Definition of symbols

**$L_{WA}$ (dB(A))** Sound power level
**$\Delta p_t$ (Pa)** Total pressure drop
**$L_{0.2}$ (m)** Isothermal throw length of supply air jet, when its speed drops down to 0.2 /s



## Sound power level, pressure drop and throw distances

**Vertical discharge ΔT=0K**

| Type | Q | (l/s) | 13.9 | 27.8 | 41.7 | 55.6 | 69.4 | 83.3 | 111.1 |
|---|---|---|---|---|---|---|---|---|---|
| | | (m³/h) | 50 | 100 | 150 | 200 | 250 | 300 | 400 |
| LD-20/1 L=600 mm | $L_{WA}$ | (dB(A)) | 20 | 33.8 | 41 | / | / | / | / |
| | $\Delta p_t$ | (Pa) | 13.5 | 35.6 | 74.8 | / | / | / | / |
| | $L_{0.2}$ | (m) | 5.2 | > 10 | > 10 | / | / | / | / |
| LD-20/1 L=1000 mm | $L_{WA}$ | (dB(A)) | 11 | 23.2 | 30 | 36 | / | / | / |
| | $\Delta p_t$ | (Pa) | 12 | 22 | 43 | 76 | / | / | / |
| | $L_{0.2}$ | (m) | 3.2 | 7.4 | 9.4 | > 10 | / | / | / |
| LD-20/1 L=1500 mm | $L_{WA}$ | (dB(A)) | 8 | 14.5 | 25 | 31 | 35 | 37.5 | 43 |
| | $\Delta p_t$ | (Pa) | 5.5 | 12.5 | 25 | 39.6 | 55 | 86.4 | 136.8 |
| | $L_{0.2}$ | (m) | 1.5 | 3.9 | 6.6 | 9.8 | > 10 | > 10 | > 10 |
| LD-20/1 L=2000 mm | $L_{WA}$ | (dB(A)) | / | 11 | 21 | 26.5 | 31 | 34.7 | 40 |
| | $\Delta p_t$ | (Pa) | / | 7.5 | 15 | 23.7 | 33 | 45.5 | 75.2 |
| | $L_{0.2}$ | (m) | / | 2.6 | 4.6 | 6.6 | 9 | > 10 | > 10 |
| LD-20/2 L=600 mm | $L_{WA}$ | (dB(A)) | 14 | 25 | 31 | / | / | / | / |
| | $\Delta p_t$ | (Pa) | 2 | 8.3 | 18.3 | / | / | / | / |
| | $L_{0.2}$ | (m) | 2.7 | 5.4 | 8.8 | / | / | / | / |
| LD-20/2 L=1000 mm | $L_{WA}$ | (dB(A)) | / | 19 | 24 | 27.8 | 31 | / | / |
| | $\Delta p_t$ | (Pa) | / | 4 | 8 | 15 | 22 | / | / |
| | $L_{0.2}$ | (m) | / | 3 | 5.4 | 7.2 | 8.9 | / | / |
| LD-20/2 L=1500 mm | $L_{WA}$ | (dB(A)) | / | 14.6 | 20.4 | 24 | 27 | 28.5 | 32.5 |
| | $\Delta p_t$ | (Pa) | / | 2.4 | 4.7 | 7.6 | 13 | 17 | 28.5 |
| | $L_{0.2}$ | (m) | / | 3.3 | 4.6 | 6.1 | 7.7 | 9.4 | > 10 |
| LD-20/2 L=2000 mm | $L_{WA}$ | (dB(A)) | / | 11 | 17 | 21.5 | 24 | 26.3 | 30.3 |
| | $\Delta p_t$ | (Pa) | / | 1.4 | 2.7 | 4.2 | 6.5 | 8.2 | 14.4 |
| | $L_{0.2}$ | (m) | / | 1.9 | 2.6 | 3.4 | 4.2 | 5.1 | 7.1 |

## Sound power level, pressure drop and throw distances

**Vertical discharge ΔT=+5K**

| Type | Q | (l/s) | 13.9 | 27.8 | 41.7 | 55.6 | 69.4 | 83.3 | 111.1 |
|---|---|---|---|---|---|---|---|---|---|
| | | (m³/h) | 50 | 100 | 150 | 200 | 250 | 300 | 400 |
| LD-20/1 L=600 mm | $L_{WA}$ | (dB(A)) | 20 | 33.8 | 41 | / | / | / | / |
| | $\Delta p_t$ | (Pa) | 13.5 | 35.6 | 74.8 | / | / | / | / |
| | $L_{0.2}$ | (m) | 3.9 | > 10 | > 10 | | | | |
| LD-20/1 L=1000 mm | $L_{WA}$ | (dB(A)) | 11 | 23.2 | 30 | 36 | / | / | / |
| | $\Delta p_t$ | (Pa) | 12 | 22 | 43 | 76 | / | / | / |
| | $L_{0.2}$ | (m) | 2 | 5.1 | 8.6 | > 10 | / | / | / |
| LD-20/1 L=1500 mm | $L_{WA}$ | (dB(A)) | 8 | 14.5 | 25 | 31 | 35 | 37.5 | 43 |
| | $\Delta p_t$ | (Pa) | 5.5 | 12.5 | 25 | 39.6 | 55 | 86.4 | 136.8 |
| | $L_{0.2}$ | (m) | 1.2 | 3 | 5.1 | 7.5 | > 10 | | |
| LD-20/1 L=2000 mm | $L_{WA}$ | (dB(A)) | / | 11 | 21 | 26.5 | 31 | 34.7 | 40 |
| | $\Delta p_t$ | (Pa) | / | 7.5 | 15 | 23.7 | 33 | 45.5 | 75.2 |
| | $L_{0.2}$ | (m) | / | 2.1 | 3.6 | 5.2 | 7 | 9.1 | > 10 |
| LD-20/2 L=600 mm | $L_{WA}$ | (dB(A)) | 14 | 25 | 31 | / | / | / | / |
| | $\Delta p_t$ | (Pa) | 2 | 8.3 | 18.3 | / | / | / | / |
| | $L_{0.2}$ | (m) | 2.3 | 5.9 | > 10 | / | / | / | / |
| LD-20/2 L=1000 mm | $L_{WA}$ | (dB(A)) | / | 19 | 24 | 27.8 | 31 | / | / |
| | $\Delta p_t$ | (Pa) | / | 4 | 8 | 15 | 22 | / | / |
| | $L_{0.2}$ | (m) | / | 3 | 5.4 | 7.2 | 8.4 | / | / |
| LD-20/2 L=1500 mm | $L_{WA}$ | (dB(A)) | / | 14.6 | 20.4 | 24 | 27 | 28.5 | 32.5 |
| | $\Delta p_t$ | (Pa) | / | 2.4 | 4.7 | 7.6 | 13 | 17 | 28.5 |
| | $L_{0.2}$ | (m) | / | 1.85 | 3.1 | 4.5 | 6.2 | 7.9 | > 10 |
| LD-20/2 L=2000 mm | $L_{WA}$ | (dB(A)) | / | 11 | 17 | 21.5 | 24 | 26.3 | 30.3 |
| | $\Delta p_t$ | (Pa) | / | 1.4 | 2.7 | 4.2 | 6.5 | 8.2 | 14.4 |
| | $L_{0.2}$ | (m) | / | 1.6 | 2.2 | 3.2 | 4.3 | 5.4 | 8 |

## Sound power level, pressure drop and throw distances

**Vertical discharge ΔT=+10K**

| Type | Q | (l/s) | 13.9 | 27.8 | 41.7 | 55.6 | 69.4 | 83.3 | 111.1 |
|---|---|---|---|---|---|---|---|---|---|
| | | (m³/h) | 50 | 100 | 150 | 200 | 250 | 300 | 400 |
| LD-20/1 L=600 mm | $L_{WA}$ | (dB(A)) | 20 | 33.8 | 41 | / | / | / | / |
| | $\Delta p_t$ | (Pa) | 13.5 | 35.6 | 74.8 | / | / | / | / |
| | $L_{0.2}$ | (m) | 2.6 | 6.3 | > 10 | / | / | / | / |
| LD-20/1 L=1000 mm | $L_{WA}$ | (dB(A)) | 11 | 23.2 | 30 | 36 | / | / | / |
| | $\Delta p_t$ | (Pa) | 12 | 22 | 43 | 76 | / | / | / |
| | $L_{0.2}$ | (m) | 1.5 | 3.6 | 6.2 | 8.8 | / | / | / |
| LD-20/1 L=1500 mm | $L_{WA}$ | (dB(A)) | 8 | 14.5 | 25 | 31 | 35 | 37.5 | 43 |
| | $\Delta p_t$ | (Pa) | 5.5 | 12.5 | 25 | 39.6 | 55 | 86.4 | 136.8 |
| | $L_{0.2}$ | (m) | 1.5 | 2 | 3.3 | 4.8 | 6.5 | 8.3 | > 10 |
| LD-20/1 L=2000 mm | $L_{WA}$ | (dB(A)) | / | 11 | 21 | 26.5 | 31 | 34.7 | 40 |
| | $\Delta p_t$ | (Pa) | / | 7.5 | 15 | 23.7 | 33 | 45.5 | 75.2 |
| | $L_{0.2}$ | (m) | / | 1.4 | 2.4 | 3.4 | 4.6 | 5.8 | 8.5 |
| LD-20/2 L=600 mm | $L_{WA}$ | (dB(A)) | 14 | 25 | 31 | / | / | / | / |
| | $\Delta p_t$ | (Pa) | 2 | 8.3 | 18.3 | / | / | / | / |
| | $L_{0.2}$ | (m) | 1.5 | 4.5 | 8.2 | / | / | / | / |
| LD-20/2 L=1000 mm | $L_{WA}$ | (dB(A)) | / | 19 | 24 | 27.8 | 31 | / | / |
| | $\Delta p_t$ | (Pa) | / | 4 | 8 | 15 | 22 | / | / |
| | $L_{0.2}$ | (m) | / | 2 | 3.6 | 5.3 | 7.4 | / | / |
| LD-20/2 L=1500 mm | $L_{WA}$ | (dB(A)) | / | 14.6 | 20.4 | 24 | 27 | 28.5 | 32.5 |
| | $\Delta p_t$ | (Pa) | / | 2.4 | 4.7 | 7.6 | 13 | 17 | 28.5 |
| | $L_{0.2}$ | (m) | / | 1.1 | 2.1 | 3.3 | 4.6 | 6.1 | 9.2 |
| LD-20/2 L=2000 mm | $L_{WA}$ | (dB(A)) | / | 11 | 17 | 21.5 | 24 | 26.3 | 30.3 |
| | $\Delta p_t$ | (Pa) | / | 1.4 | 2.7 | 4.2 | 6.5 | 8.2 | 14.4 |
| | $L_{0.2}$ | (m) | / | 0.7 | 1.3 | 2.1 | 3 | 3.9 | 6.1 |

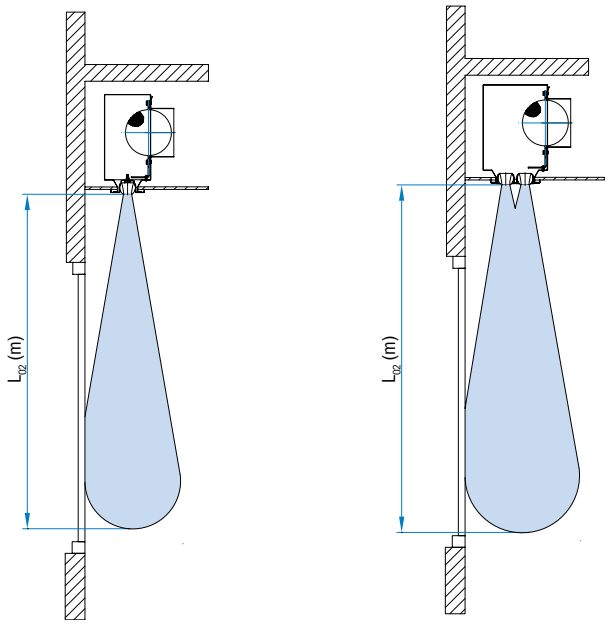
### Sound power level, pressure drop and throw distances

**Vertical discharge ΔT=+15K**

| Type | Q | (l/s) | 13.9 | 27.8 | 41.7 | 55.6 | 69.4 | 83.3 | 111.1 |
|---|---|---|---|---|---|---|---|---|---|
| | | (m³/h) | 50 | 100 | 150 | 200 | 250 | 300 | 400 |
| LD-20/1 L=600 mm | $L_{WA}$ | (dB(A)) | 20 | 33.8 | 41 | / | / | / | / |
| | $\Delta p_t$ | (Pa) | 13.5 | 35.6 | 74.8 | / | / | / | / |
| | $L_{0.2}$ | (m) | 1.8 | 4.5 | 7.9 | / | / | / | / |
| LD-20/1 L=1000 mm | $L_{WA}$ | (dB(A)) | 11 | 23.2 | 30 | 36 | / | / | / |
| | $\Delta p_t$ | (Pa) | 12 | 22 | 43 | 76 | / | / | / |
| | $L_{0.2}$ | (m) | 1.1 | 2.6 | 4.3 | 5.1 | / | / | / |
| LD-20/1 L=1500 mm | $L_{WA}$ | (dB(A)) | 8 | 14.5 | 25 | 31 | 35 | 37.5 | 43 |
| | $\Delta p_t$ | (Pa) | 5.5 | 12.5 | 25 | 39.6 | 55 | 86.4 | 136.8 |
| | $L_{0.2}$ | (m) | 1.1 | 1.4 | 2.4 | 3.5 | 4.6 | 6 | 8.8 |
| LD-20/1 L=2000 mm | $L_{WA}$ | (dB(A)) | / | 11 | 21 | 26.5 | 31 | 34.7 | 40 |
| | $\Delta p_t$ | (Pa) | / | 7.5 | 15 | 23.7 | 33 | 45.5 | 75.2 |
| | $L_{0.2}$ | (m) | / | 1 | 1.6 | 2.4 | 3.3 | 4.2 | 6.1 |
| LD-20/2 L=600 mm | $L_{WA}$ | (dB(A)) | 14 | 25 | 31 | / | / | / | / |
| | $\Delta p_t$ | (Pa) | 2 | 8.3 | 18.3 | / | / | / | / |
| | $L_{0.2}$ | (m) | 1.2 | 3.1 | 5.6 | / | / | / | / |
| LD-20/2 L=1000 mm | $L_{WA}$ | (dB(A)) | / | 19 | 24 | 27.8 | 31 | / | / |
| | $\Delta p_t$ | (Pa) | / | 4 | 8 | 15 | 22 | / | / |
| | $L_{0.2}$ | (m) | / | 1.6 | 2.4 | 3.7 | 5.3 | / | / |
| LD-20/2 L=1500 mm | $L_{WA}$ | (dB(A)) | / | 14.6 | 20.4 | 24 | 27 | 28.5 | 32.5 |
| | $\Delta p_t$ | (Pa) | / | 2.4 | 4.7 | 7.6 | 13 | 17 | 28.5 |
| | $L_{0.2}$ | (m) | / | 1 | 1.5 | 2.3 | 3.2 | 4.2 | 6.3 |
| LD-20/2 L=2000 mm | $L_{WA}$ | (dB(A)) | / | 11 | 17 | 21.5 | 24 | 26.3 | 30.3 |
| | $\Delta p_t$ | (Pa) | / | 1.4 | 2.7 | 4.2 | 6.5 | 8.2 | 14.4 |
| | $L_{0.2}$ | (m) | / | 0.6 | 0.9 | 1.5 | 2.1 | 2.8 | 4.2 |

## Definition of symbols

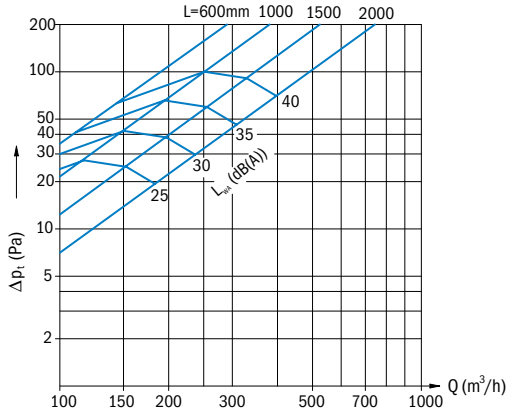
**$L_{WA}$ (dB(A))** Sound power level
**$\Delta p_t$ (Pa)** Total pressure drop
**$L_{0.2}$ (m)** Isothermal throw length of supply air jet, when its speed drops down to 0.2 m/s



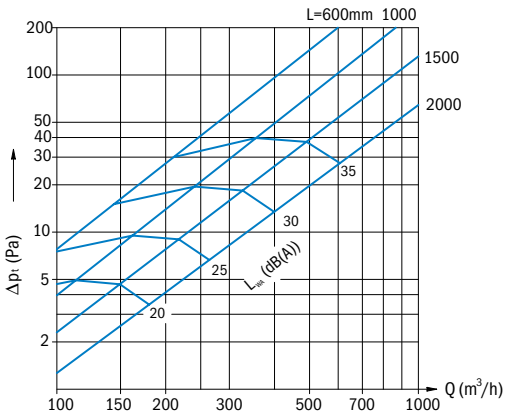
## Sound power level and pressure drop

Pressure drop by horizontal discharge and 100 % opened volume control damper

**LD-20/1**




**LD-20/2**




### Correction factors applicable to LD-20

| Length | LD-20/1 | | LD-20/2 | |
|---|---|---|---|---|
| | Volume control damper | | Volume control damper | |
| | open | closed | open | closed |
| **L=600** | X 1 | X 1.25 | X 1 | X 1.6 |
| **L=1000** | X 1 | X 1.3 | X 1 | X 1.8 |
| **L=1500** | X 1 | X 1.4 | X 1 | X 2 |
| **L=2000** | X 1 | X 1.8 | X 1 | X 2.3 |

# Square diffusers

## Square diffusers KD-1, KD-2

### KD-1

- Fixed diffuser rings
- Central screw installation or fixing with peripheral screws
- Peripheral foamy sealing strip
- Registers F1

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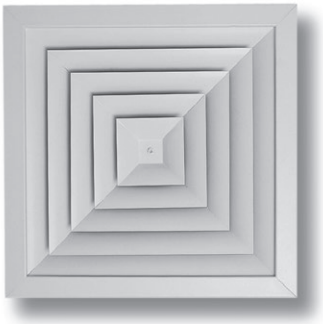
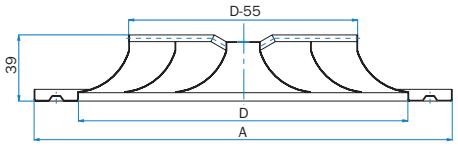
CD



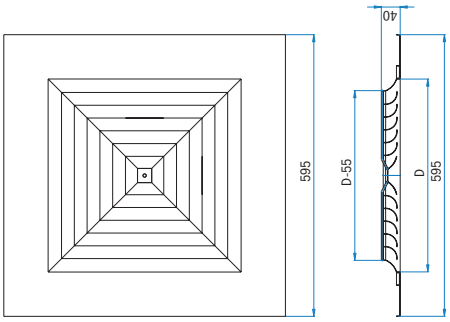



### KD-1 in the plate

- KD-1 in the plate 595x595
- Sizes from 1 to 6 are available
- Installation with cross-bar or installation on the register fastened in the duct is possible
- Plenum boxes are equal to those for standard KD-1 corresponding nominal sizes
- Three mask types, depending to the air supply direction; two-, three- or four--way air supply

St

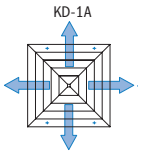
RAL 9010




**Dimensions table for KD-1:**

| Size | D (mm) | A (mm) | H (mm) | KD-1 $A_{ef}$ ($m^2$) |
|---|---|---|---|---|
| **1** | 186 | 240 | 40 | 0.0104 |
| **2** | 244 | 298 | 50 | 0.0185 |
| **3** | 299 | 353 | 50 | 0.0279 |
| **4** | 354 | 408 | 80 | 0.0440 |
| **5** | 410 | 464 | 80 | 0.0628 |
| **6** | 439 | 493 | 120 | 0.0728 |
| **7** | 539 | 593 | 120 | 0.1175 |
| **8** | 565 | 619 | 120 | 0.1280 |

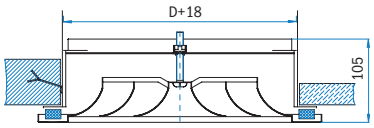
**Types of diffuser faces**



## Installation of circular diffusers KD-1

### Installation 7

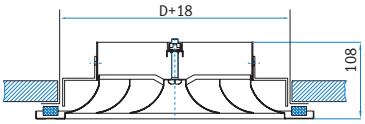
- Installation with crossbar
  Designation: **KD-1A/7**




Built-in duct

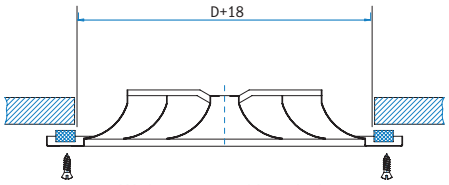
### Installation 8

- Installation on register fastened in the duct
  Designation: **KD-1A/8-F1**

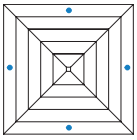



Duct through the panel ceiling

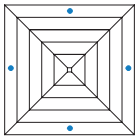
### Direct installation in the ceiling with four screws



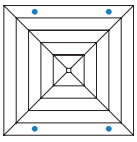

Without central borehole



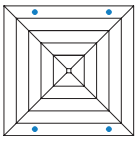
**Installation V1X**
Designation: **KD-1A/V1X**



**Installation V1**
Designation: **KD-1A/V1**



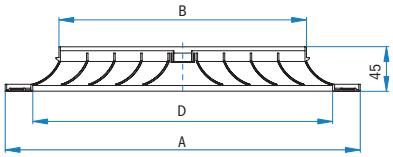
**Installation V2X**
Designation: **KD-1A/V2X**



**Installation V2**
Designation: **KD-1A/V2**

## AKD-1N

- They are made of aluminium sections
- Fixed diffuser rings
- Central screw installation or fixing with peripheral screws
- Peripheral foamy sealing strip
- Registers F1




| Size | D (mm) | A (mm) | B (mm) | AKD-1N $A_{ef}$ ($m^2$) |
|---|---|---|---|---|
| **1** | 188 | 244 | 135 | 0.010 |
| **2** | 244 | 300 | 191 | 0.015 |
| **3** | 300 | 356 | 247 | 0.025 |
| **4** | 356 | 412 | 303 | 0.042 |
| **5** | 412 | 468 | 359 | 0.060 |
| **6** | 442 | 498 | 389 | 0.070 |
| **7** | 542 | 598 | 489 | 0.115 |
| **8** | 567 | 623 | 514 | 0.125 |

## Ordering key

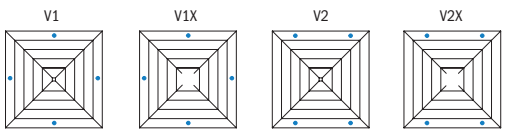
**KD-1A/8-F1 Size 4 / 600**

KD-1 in the plate 595x595* (sizes from 1 to 6 only)

**F1** Registers

**7** Installation with the cross-bar

**8** Installation on volume control damper fastened in the duct



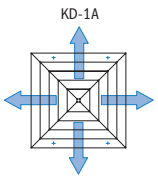

**V1** Boreholes in the middle of each side + central borehole

**V1X** Boreholes in the middle of each side – without central borehole

**V2** Two boreholes on two sides + central borehole

**V2X** Two boreholes on two sides – without central borehole

**A** Four-way inlet




**KD-1**

**AKD-1N**

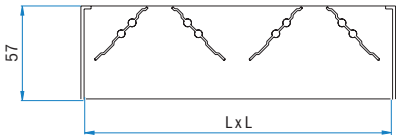
* Only installations number 7 and 8 are enabled if KD-1 version is installed into the plate.

## Registers

When adjusting the system, desired operating conditions are obtained by the means of ventilation elements control. Registers are installed for additional air volume control, thus influencing air velocity and throw distance as well. Registers are made of galvanised sheet steel.

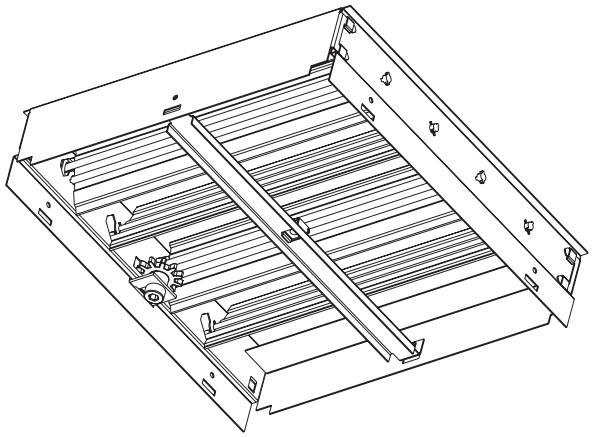
### F1

Register F1 is equipped with wide counter-directional blades, which can be moved by the screwdriver via the cogwheel. It is designed to control the air flow volume. The blades are made of PVC – black colour.




**Dimensions table for registers to fit KD-1**

| Size | L (mm) |
|---|---|
| 1 | 140 |
| 2 | 196 |
| 3 | 252 |
| 4 | 308 |
| 5 | 364 |
| 6 | 394 |
| 7 | 494 |
| 8 | 519 |



**Fast selection diagram for square diffuser KD-1A**

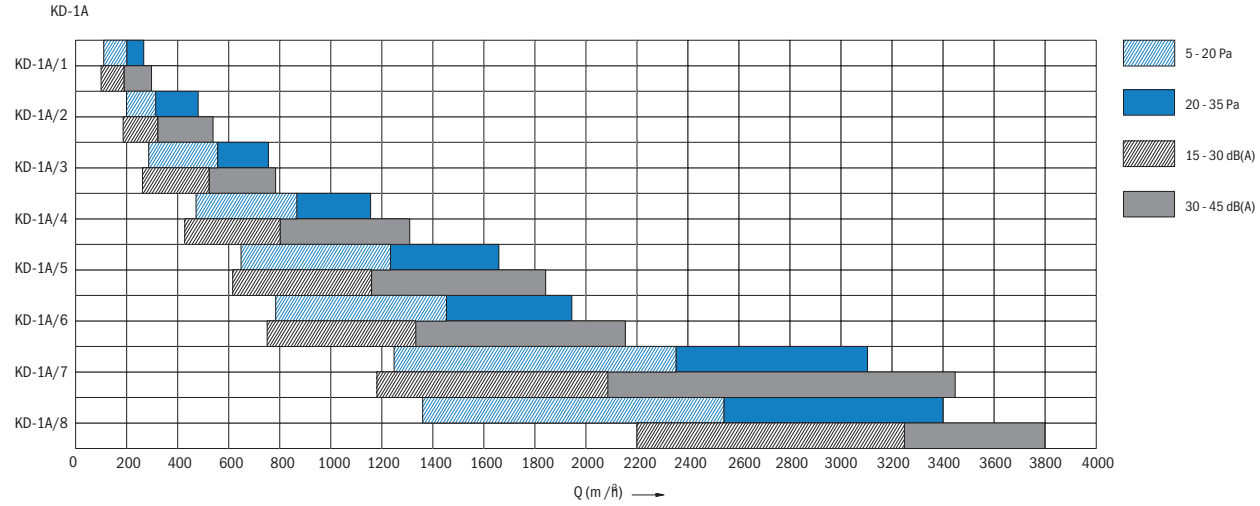
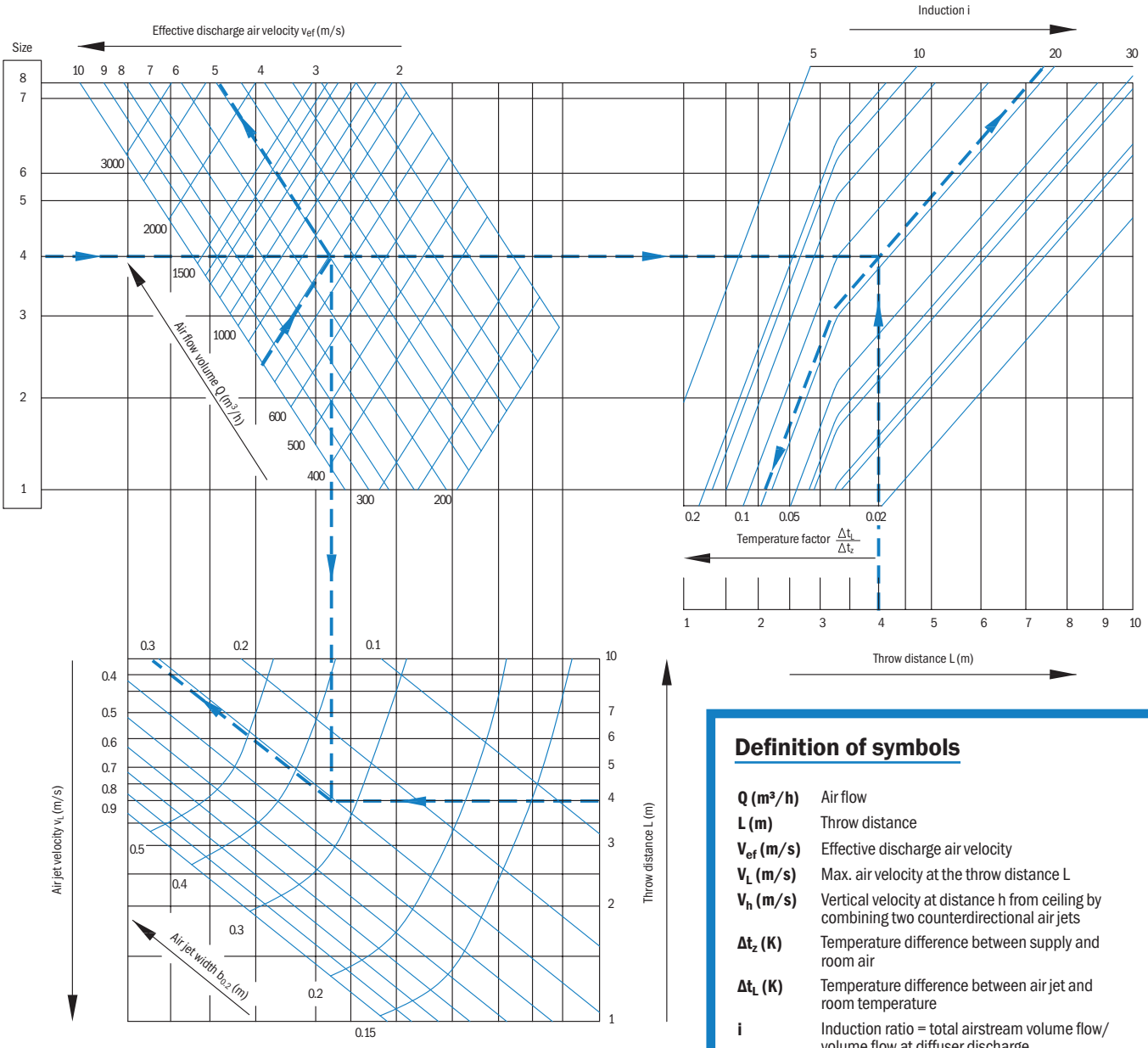
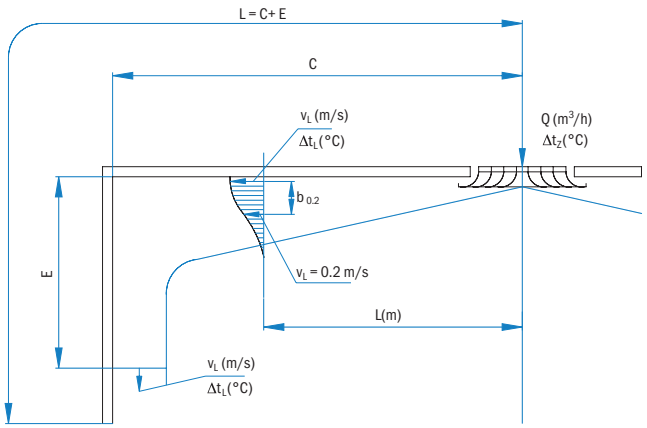


**Diagram for determining the size, induction and temperature of the air jet flow of the square diffuser KD-1A**




## Definition of symbols

| | |
|---|---|
| **Q (m³/h)** | Air flow |
| **L (m)** | Throw distance |
| **$V_{ef}$ (m/s)** | Effective discharge air velocity |
| **$V_L$ (m/s)** | Max. air velocity at the throw distance L |
| **$V_h$ (m/s)** | Vertical velocity at distance h from ceiling by combining two counterdirectional air jets |
| **$\Delta t_z$ (K)** | Temperature difference between supply and room air |
| **$\Delta t_L$ (K)** | Temperature difference between air jet and room temperature |
| **i** | Induction ratio = total airstream volume flow/ volume flow at diffuser discharge |
| **$b_{0.2}$ (m)** | Width of the air jet is measured at a distance from ceiling where air flow velocity is 0.2 m/s |




## Example:

**Given:**

| | |
|---|---|
| Air flow volume: | Q = 790 m³/h, L = 4 m |
| Temperature difference: | $\Delta t_z$ = 5 °C |

**Solution:**

From the diagram select the diffuser KD-1 size 4.

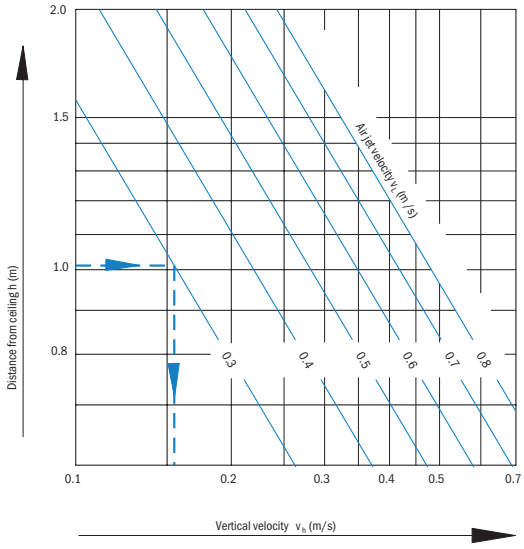
| | |
|---|---|
| Air jet velocity: | $V_L$ = 0.31 m/s |
| effective outlet velocity | $v_{ef}$ = 5 m/s |
| temperatue quotient | $\Delta t_L / \Delta t_Z$ = 0.080 |
| temperature difference | $\Delta t_L$ = 0.080 x 5 = 0.4 °C |
| induction | i = 18 |
| width of the air jet | $b_{0.2}$ = 0.33 m |

## Example

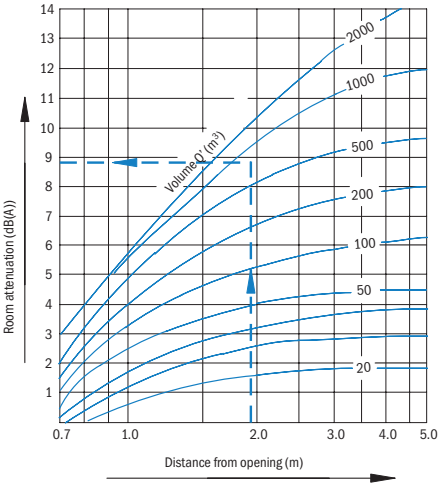
Max temperature quotient $\Delta t_h/\Delta t_z$ determined using the diagram 1 for temperature quotient:

$L_{diagram} = L + h$

### Diagram for determination of vertical velocity




### Room attenuation diagram




Q' (m³) calculated volume, depending on room reflectance
Q (m³) actual room volume

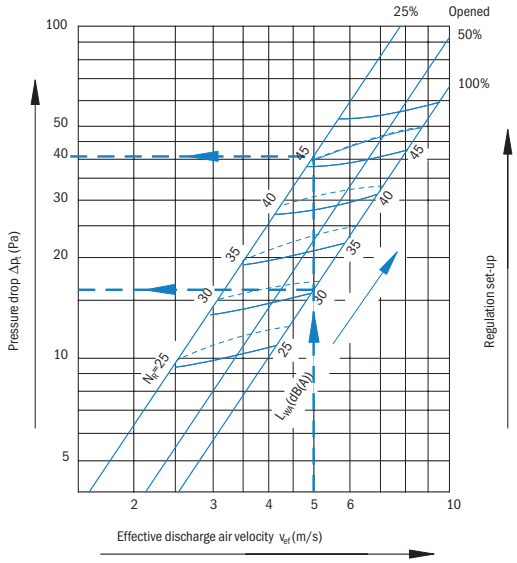
The following data are necessary to calculate the volume Q'.

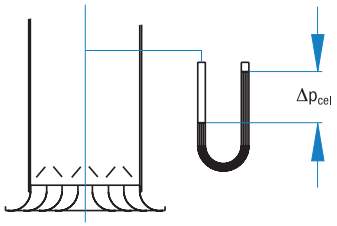
1. Normal rooms Q' = Q
2. Rooms with highly reflective walls Q' = 0.5Q
3. Rooms with absorption walls Q' = 2Q

## Definition of symbols

| | |
|---|---|
| **$\Delta p_t$ (Pa)** | Pressure drop |
| **$L_{WA}$ (dB(A))** | Sound power level |
| **$N_R$** | Max. value according to ISO |

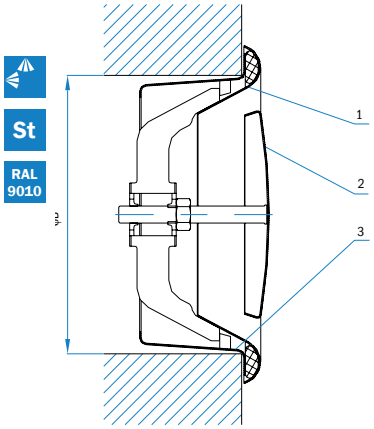
### Pressure drop and room attenuation diagram – directly connected to the duct (valid for the F1 register)



# Ventilating valve

## PV-1N




**Description**
- Fixed diffusion ring
- Adjustable disc for valve opening and closing
- Installation in built-in frame
- Peripheral foamy sealing strip
- Exhaust application

**Material**
- Made of sheet steel and coloured upon customer's request.

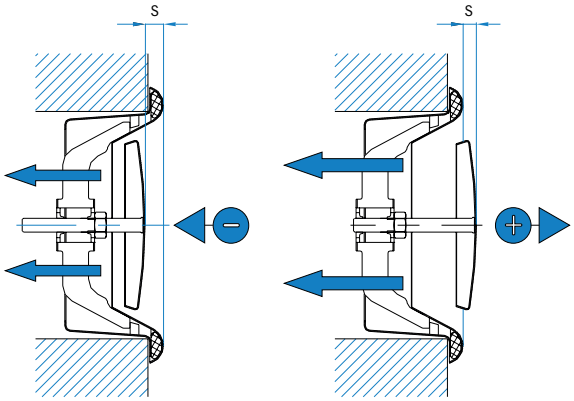
**Component parts**
**1.** Housing
**2.** Valve disc
**3.** Subframe

**Installation**
Frame is suitable for all installation types (wall, ceiling-or duct installation). It is fastened with screws. Place the valve in the groove and rotate it. Foamy sealant between the subframe and valve has a function to guarantee a perfect seal and to hold the valve in its position.

**Air flow regulation**
Adjust the air volume flow by rotating the valve disc in plus or minus direction.

⊖ ⇐ **S** ⇒ ⊕

s (mm)



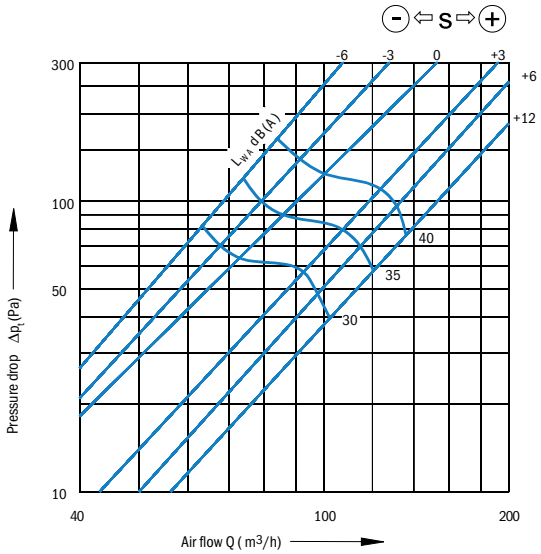

**Dimensions:**

| Size | ΦB |
|---|---|
| **100** | 100 |
| **125** | 125 |
| **150** | 150 |
| **160** | 160 |
| **200** | 200 |

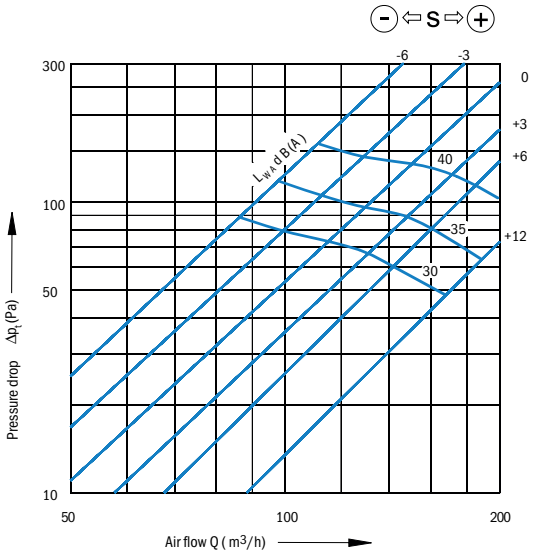
**Ordering example**

| | |
|---|---|
| Ventilating valve: | **PV-1N** |
| Size: | **100** |
| Pcs: | **40** |

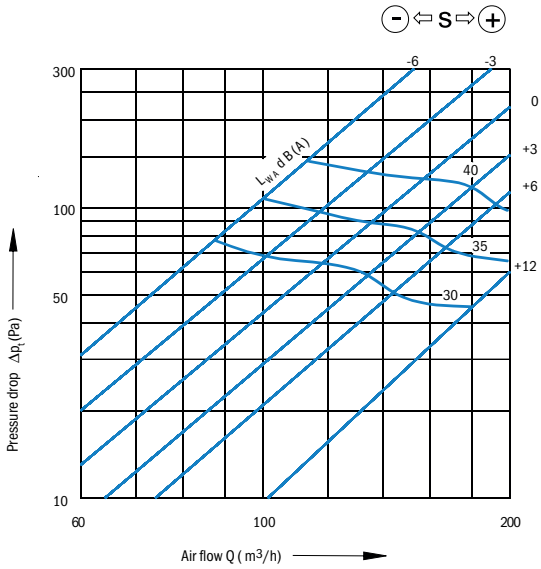
### PV-1N, size 100



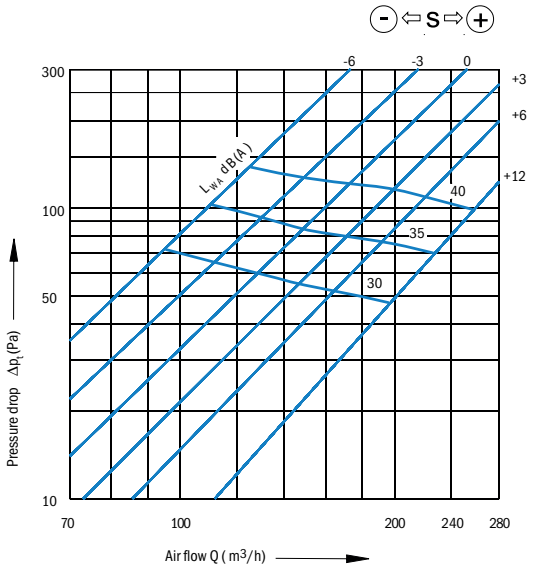

### PV-1N, size 125



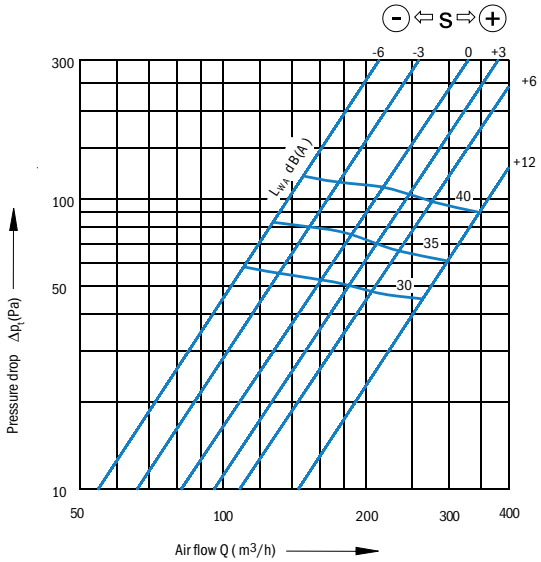

### PV-1N, size 150




### PV-1N, size 160




### PV-1N, size 200




## Example

Use the air flow volume Q ($m^3/h$) and pressure drop over the valve $\Delta P_t$ (Pa) to determine the valve set-up s (mm) – using the positive or negative direction.

**Given data:** Q = 70$m^3/h$, $\Delta P_t$ = 60Pa

Sizing diagram at the value 100 gives the valve set-up s = 0 mm.

## Definition of symbols

| | |
|---|---|
| **Q ($m^3/h$)** | Air flow |
| **$\Delta p_t$ (Pa)** | Pressure drop |
| **$L_{WA}$ (dB(A))** | Sound power level |

## PV-2N

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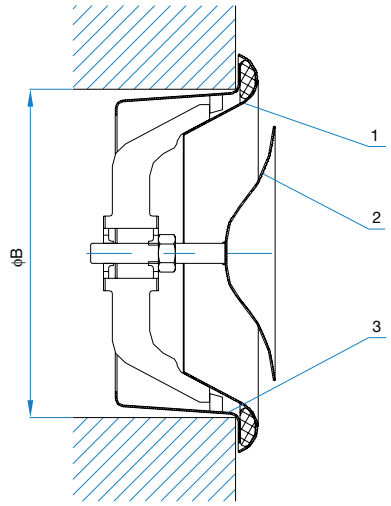
RAL 9010

**Description**
- Fixed diffusion ring
- Adjustable disc for valve opening and closing
- Installation in built-in frame
- Peripheral foamy sealing strip
- Supply application



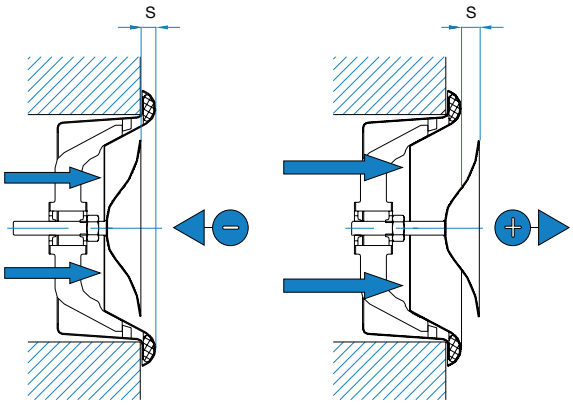

**Material**
- Made of sheet steel and coloured upon customer's request.

**Component parts**
1. Housing
2. Valve disc
3. Subframe

**Installation**
Frame is suitable for all installation types (wall, ceiling-or duct installation). It is fastened with screws. Place the valve in the groove and rotate it. Foamy sealant between the subframe and valve has a function to guarantee a perfect seal and to hold the valve in its position.

**Air flow regulation**
Adjust the air volume flow by rotating the valve disc in plus or minus direction.

⊖ ⇐ **S** ⇒ ⊕
s (mm)



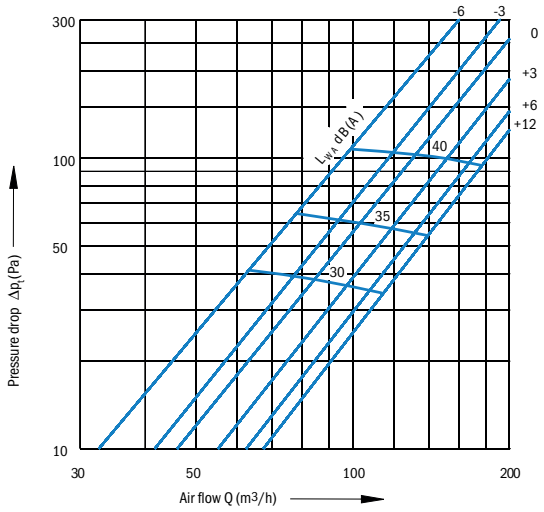

**Dimensions:**

| Size | ΦB |
|---|---|
| **100** | 100 |
| **125** | 125 |
| **150** | 150 |
| **160** | 160 |
| **200** | 200 |

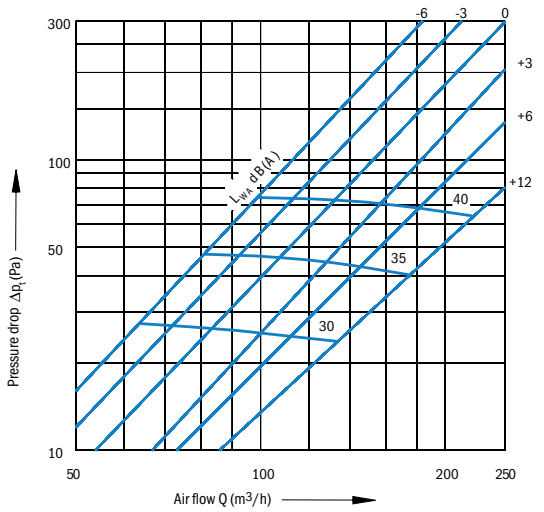
**Ordering example**

| | |
|---|---|
| Ventilating valve: | **PV-2N** |
| Size: | **100** |
| Pcs: | **40** |

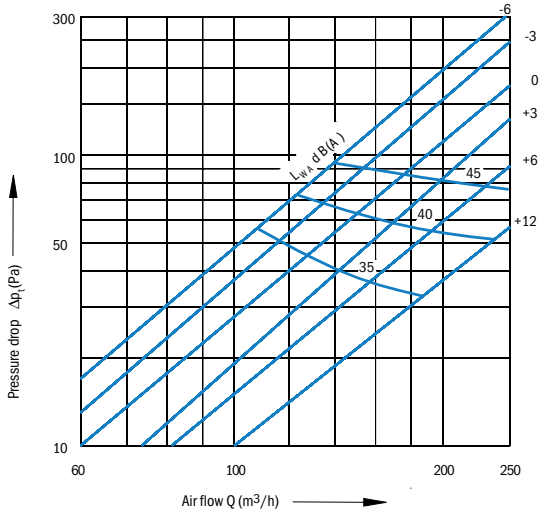
### PV-2N, size 100



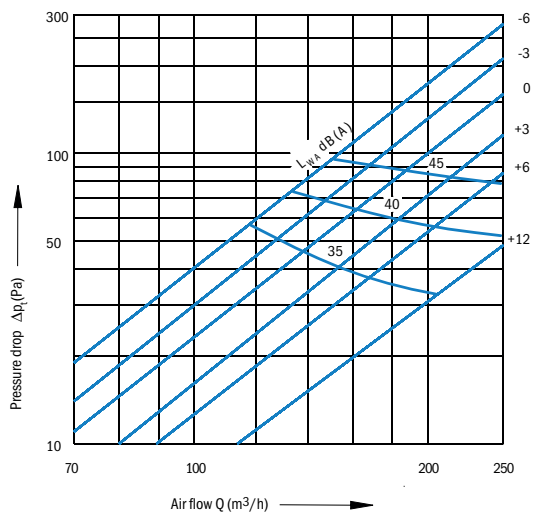

### PV-2N, size 125



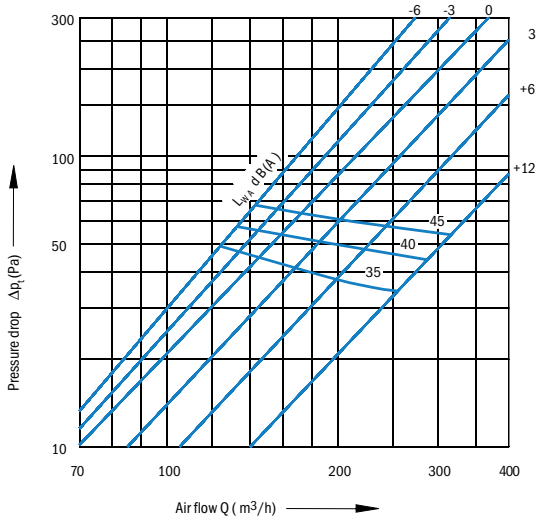

### PV-2N, size 150




### PV-2N, size 160




### PV-2N, size 200




## Definition of symbols

| | |
|---|---|
| **Q (m³/h)** | Air flow |
| **$\Delta p_t$ (Pa)** | Pressure drop |
| **$L_{WA}$ (dB(A))** | Sound power level |

## Steel duct grilles

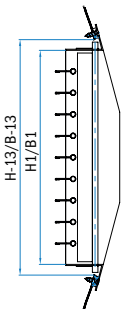
### SK-2, SK-3, SK-4, SK-9

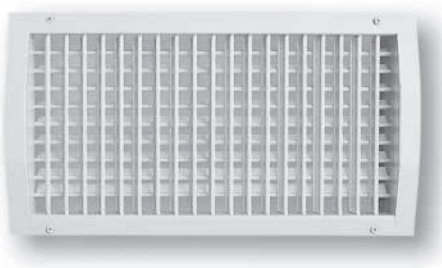
- For circular ducts
- Visible screw installation
- SKP-2, SKP-3, SKP-4, SKP-9: galvanised steel type

St
RAL 9010
CD

### SK-2

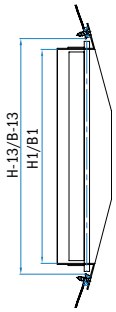
- Individually adjustable horizontal and vertical blades

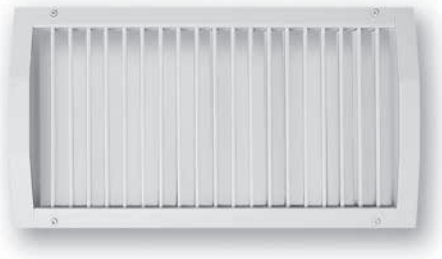


### SK-3

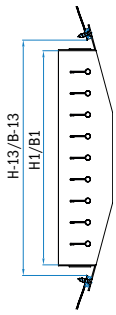
- Individually adjustable vertical blades



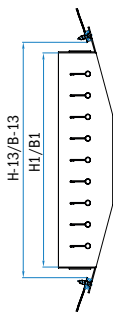
### SK-4

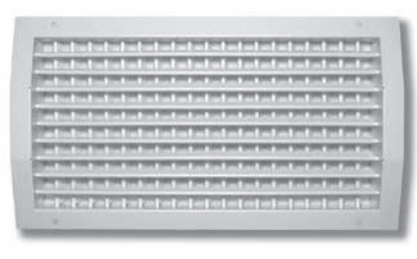
- Individually adjustable horizontal blades




### SK-9

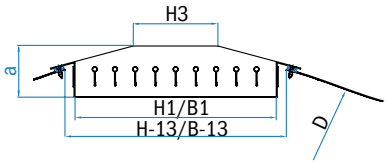
- Individually adjustable horizontal and vertical blades



## Standard dimensions

| B/H | 75 | 125 | 225 | 325 |
|---|---|---|---|---|
| 225 | ■ | ■ | | |
| 325 | ■ | ■ | | |
| 425 | ■ | ■ | ■ | |
| 525 | ■ | ■ | ■ | ■ |
| 625 | ■ | ■ | ■ | ■ |
| 825 | ■ | ■ | ■ | ■ |
| 1025 | ■ | ■ | ■ | ■ |
| 1225 | ■ | ■ | ■ | ■ |




B1 = B-27
H1 = H-27

## Dimensions

| H | H3 | a | diameter D |
|---|---|---|---|
| 75 | 49 | 37 | 200-400 |
| 125 | 67 | 41 | 300-900 |
| 225 | 82 | 53 | 600-2400 |
| 325 | 125 | 73 | 900-2400 |

## Ordering key

**SK-2 / V-F B x H**

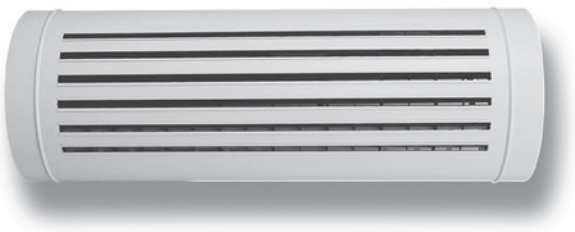
- **F** Registers
- **V** Visible screw installation
- Grille type
- **SK** Steel grilles
- **SKP** Galvanised steel grilles

# Round duct diffusers

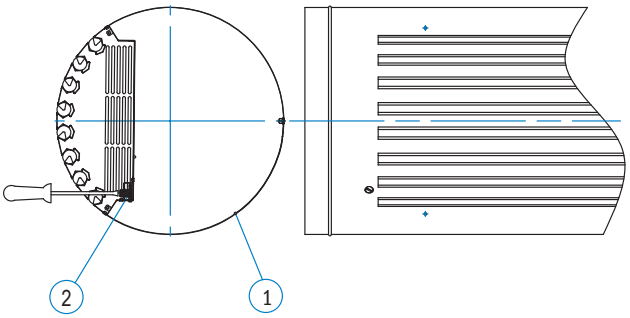
## Round Duct Diffuser SKD-13

**Application**
Round duct diffusers SKD-13 are designed for supplying air to the rooms with large floor to ceiling heights, e.g. conference halls, gyms, industrial halls etc. They can be installed at any location within the duct network, which renders them suitable for supplying of either hot or cold air.

St
RAL 9010



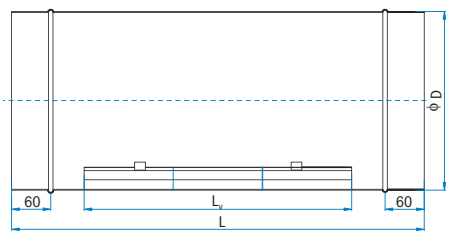
**Description**
The duct diffuser consists of galvanised round cross-section tubes with inserted longitudinal guides, fitting tight into the tubes. Cylindrical deflectors made of recycled plastics are inserted into the guides, to allow continuous adjustment of discharged air direction within the 360o range. Diffusers are available with different number of slots. The tube is painted in a RAL 9010 scale colour, or, on special orders, in other colours. The deflectors, equal to those of LD-13 slot diffusers, are white or black as standard.



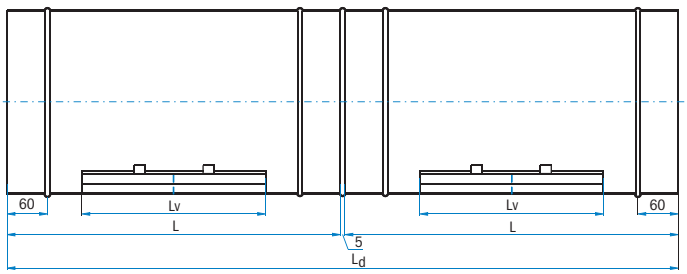

**1.** SKD-13D
**2.** Gear

| $L_D$ | L | $L_V$ |
|---|---|---|
| / | 1000 | 800 |
| **1505** | 750 | 2 x 500 |
| **1755** | 875 | 2 x 600 |
| **2005** | 1000 | 2 X 800 |

### Diffuser structure for lengths exceeding 1000 mm




Note: ϕD is the diffuser internal diameter.

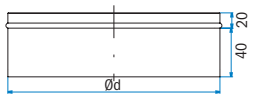


## Accessories

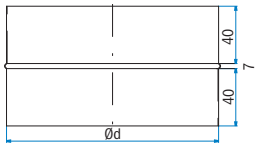
| Size | d | L,r |
|---|---|---|
| 150 | 148.7 – 149.3 | 150 |
| 160 | 158.7 – 159.3 | 160 |
| 180 | 178.6 – 179.3 | 180 |
| 200 | 198.6 – 199.3 | 200 |
| 224 | 222.5 – 223.3 | 224 |
| 250 | 248.5 – 249.3 | 250 |
| 280 | 278.4 – 279.3 | 280 |
| 300 | 298.4 – 299.3 | 300 |
| 315 | 313.4 – 314.3 | 315 |
| 355 | 353.3 – 354.3 | 355 |
| 400 | 398.3 – 399.3 | 400 |
| 450 | 448.2 – 449.3 | 450 |
| 500 | 498.2 – 499.3 | 500 |
| 560 | 558.1 – 559.3 | 560 |
| 630 | 628.1 – 629.3 | 630 |
| 710 | 708.0 – 709.3 | 710 |
| 800 | 798.1 – 799.3 | 800 |
| 900 | 897.0 – 899.3 | 900 |

Note: ϕd is the external diameter.

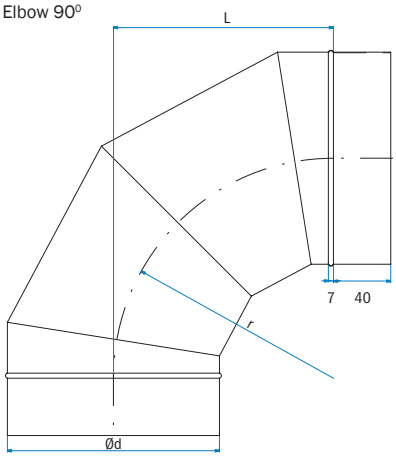
End cover



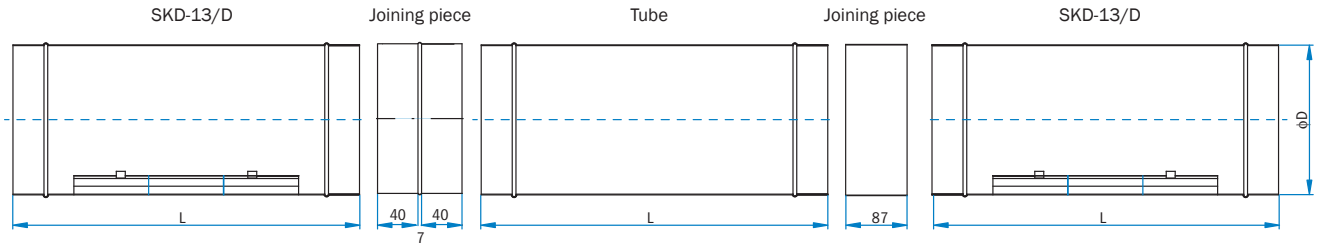

Joining piece




Elbow 90°



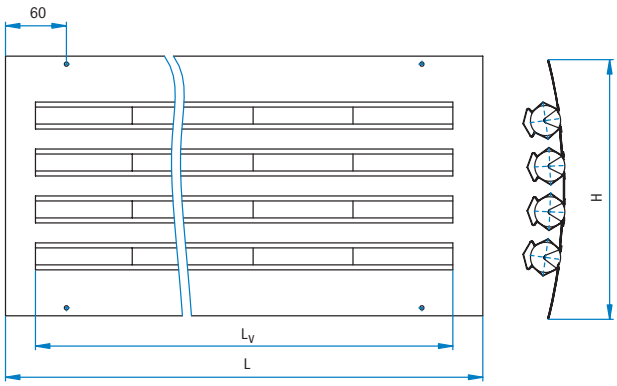

## Installation of SKD-13/D



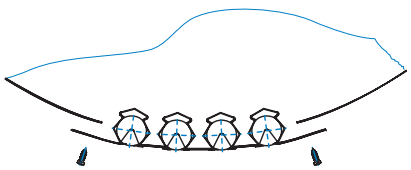

## SKD-13/R

SKD-13/R is constructed for installations into round ducts with square openings.

| L | $L_v$ | H | No. of slots | ΦD of tube | Openings | |
|---|---|---|---|---|---|---|
| | | | | | L-35 | H-35 |
| 580 | 500 | 100 | 1 | 150-355 | 545 | 65 |
| 680 | 600 | 150 | 2 | 355-900 | 645 | 115 |
| 880 | 800 | 200 | 3 | 600-2400 | 845 | 165 |
| 880 | 800 | 250 | 4 | 600-2400 | 845 | 215 |




## Installation of SKD-13/R:



**Ordering key**
SKD-13D

**SKD-13D /B /ϕ355 /2 L=1000 mm**

- Length
- Number of slots
- Tube diameter
- **B** Black deflectors
- **W** White deflectors
- Tube

**Note:**
- Please specify the deflector colour in your order. Other colours on customer's request.

**Ordering key**
SKD-13R

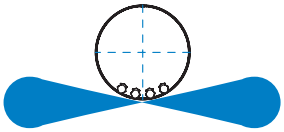
**SKD-13R /B / ϕ355 /2 L=680 mm, H=150 mm**

- Length
- Number of slots
- Tube diameter
- **B** Black deflectors
- **W** White deflectors
- **R** Diffuser designed for installation into round ducts

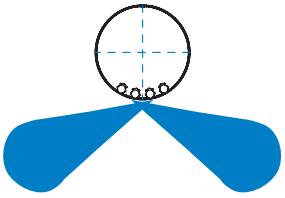
**Example accessory specification:**

Accessory: Elbow 900
Colour: RAL 9010
Quantity: 1 piece

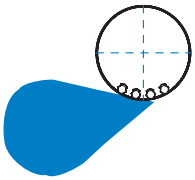
## Types of discharge



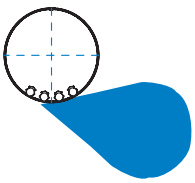
Cooling – two-sided horizontal discharge



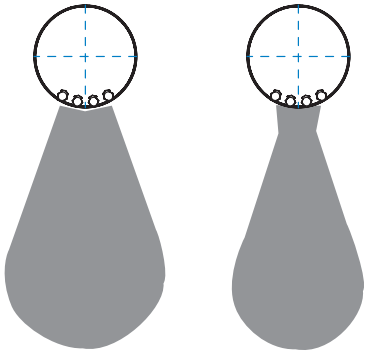
Cooling – alternate sided horizontal discharge



Cooling – one sided left (horizontal)



Cooling – one sided – right (horizontal)



Heating – vertical 90°

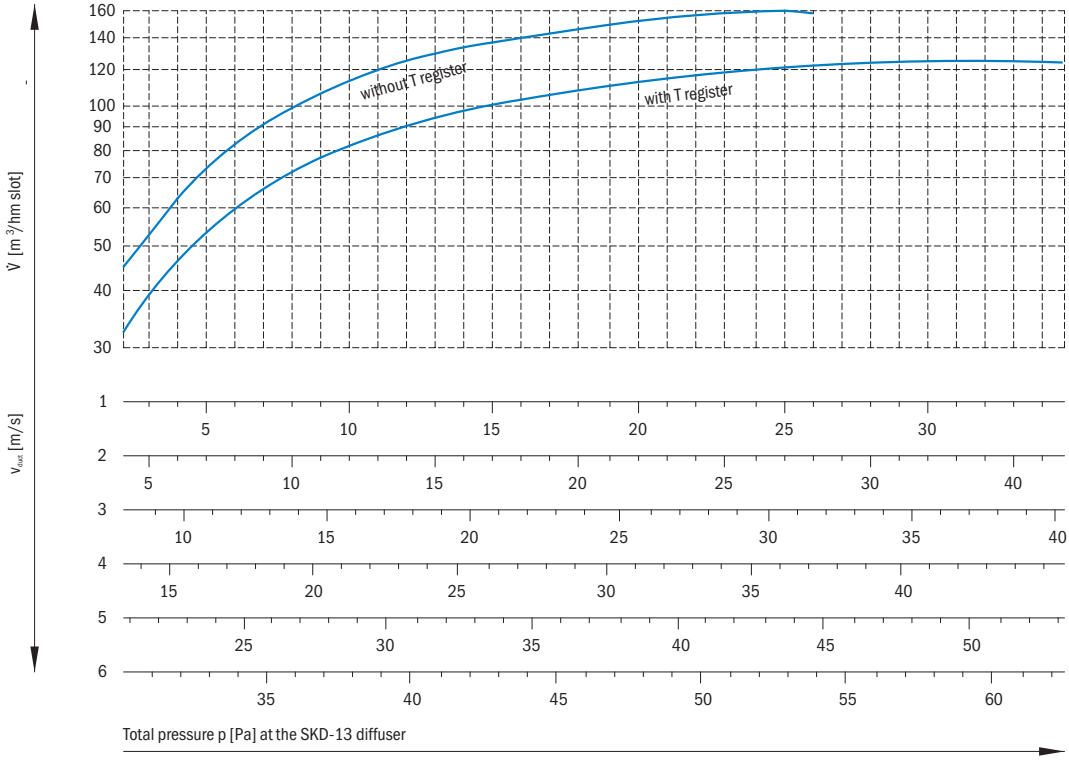
For determination of air velocity data at different throw distances and temperature differences, please use software for air distribution elements calculation KLIMA ADE.

| Pipe length $L_d$ [mm] (Slot length $L_r$ [mm]) | No. of slots | $L_{wa}$[dB(a)] | Recommended air flow volume [m³/h] | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 150, 160, 180 | 200, 224, 250 | 280, 300, 315, 355 | 400, 450 | 500, 560 | 630, 710, 800, 900 |
| **1000 (800)** | 2 | 26 | 128 | 128 | 128 | 128 | 128 | 128 |
| | 4 | 30 | 256 | 256 | 256 | 256 | 256 | 256 |
| | 6 | 34 | | | 384 | 384 | 384 | 384 |
| | 8 | 35 | | | | 512 | 512 | 512 |
| | 10 | 36 | | | | 640 | 640 | 640 |
| | 12 | 37 | | | | | 768 | 768 |
| | 14 | 38 | | | | | 896 | 896 |
| **1505 (2 x 500)** | 2 | 35 | 160 | 160 | 160 | 160 | 160 | 160 |
| | 4 | 38 | 320 | 320 | 320 | 320 | 320 | 320 |
| | 6 | 40 | | | 480 | 480 | 480 | 480 |
| | 8 | 41 | | | | 640 | 640 | 640 |
| | 10 | 46 | | | | 800 | 800 | 800 |
| | 12 | 46 | | | | | 960 | 960 |
| | 14 | 47 | | | | | | 1120 |
| **1755 (2 x 600)** | 2 | 30 | | 192 | 192 | 192 | | |
| | 4 | 32 | | 384 | 384 | 384 | | |
| | 6 | 33 | | | 576 | 576 | | |
| | 8 | 35 | | | | 768 | | |
| | 10 | 38 | | | | 960 | | |
| **2005 (2 x 800)** | 2 | 30 | | 256 | 256 | 256 | | |
| | 4 | 32 | | 512 | 512 | 512 | | |
| | 6 | 34 | | | 768 | 768 | | |
| | 8 | 37 | | | | 1024 | | |
| | 10 | 40 | | | | 1280 | | |

Other dimensions are available on request.

The recommended air flow is 80 m³/h m per meter of active slot length.

## Pressure drop determination diagram



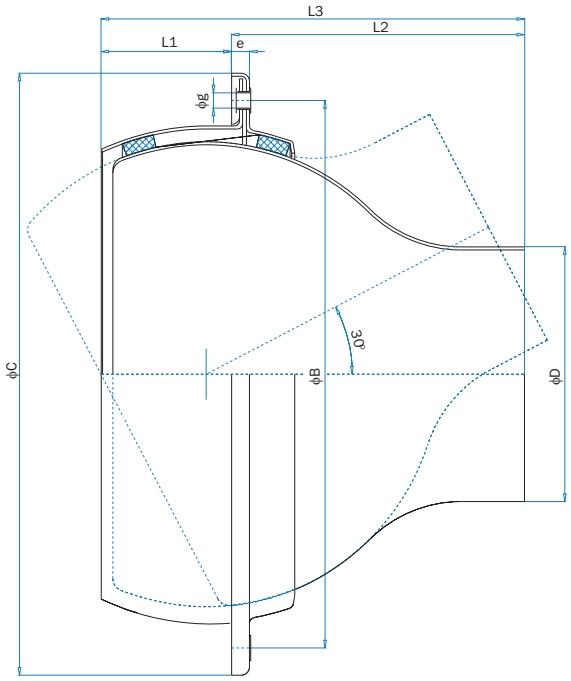

**v** air jet velocity in the duct

## Supply air nozzle VŠ-4

**Application**
VŠ-4 supply air nozzles are suitable for supplying either cold or warm air into rooms in applications requiring large throw distances and low noise levels. By arranging several nozzles in a block, the throw distance can be increased accordingly. Several installation methods are applicable.

**Description**
Supply air nozzles VŠ-4 are adjustable. The air jet injection can be adjusted manually within ±30° in all directions

Adjusting depends on temperature oscillation. VŠ-4 supply air nozzles are made of anodised sheet aluminium. On customer's request, they can be powder painted in any of the RAL scale colours.

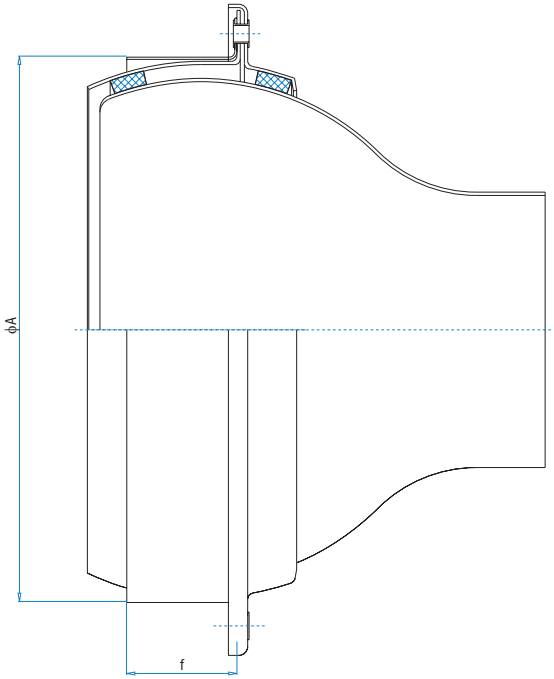



**Sizes and dimensions**

| Size | ΦD | ΦB | Φc | e | L1 | L2 | L3 | Φg | n | $A_{ef}$ (m²) |
|---|---|---|---|---|---|---|---|---|---|---|
| **80** | 80 | 175 | 196.5 | 7 | 43 | 96 | 139 | 6.5 | 3 | 0.004778 |
| **100** | 100 | 215 | 236.5 | 7 | 51 | 115 | 166 | 6.5 | 3 | 0.007543 |
| **125** | 125 | 265 | 286.5 | 7 | 52 | 142 | 194 | 6.5 | 3 | 0.011882 |
| **160** | 160 | 340 | 361.5 | 9 | 75 | 180 | 255 | 6.5 | 4 | 0.019607 |
| **220** | 220 | 425 | 446.5 | 9 | 95 | 219 | 314 | 6.5 | 4 | 0.037325 |

n – number of fixing boreholes

**VŠ-4/E**




| Size | ΦA | f |
|---|---|---|
| **80** | 158 | 40 |
| **100** | 198 | 40 |
| **125** | 248 | 40 |
| **160** | 313 | 40 |
| **220** | 398 | 65 |

**Installation methods**

- Mounting on a tube (marking **E**)

## Ordering key

**VŠ-4/ --- /R Size 125**

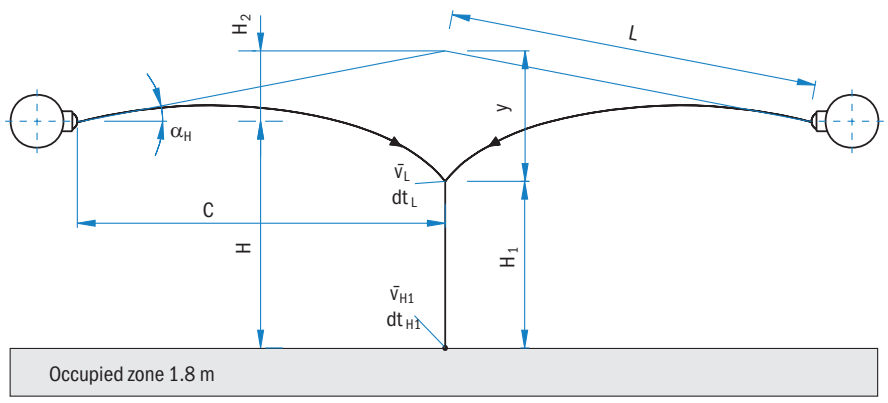
**Standard sizes** 80, 100, 125, 160, 220

**R** Manual adjustment

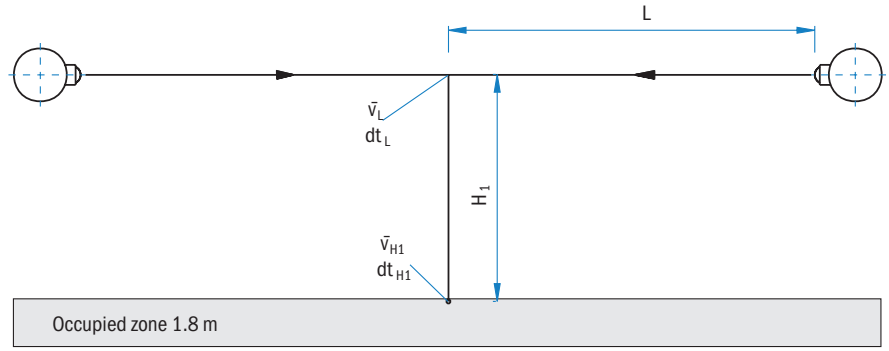
**---**

**E** Mounting on a tube

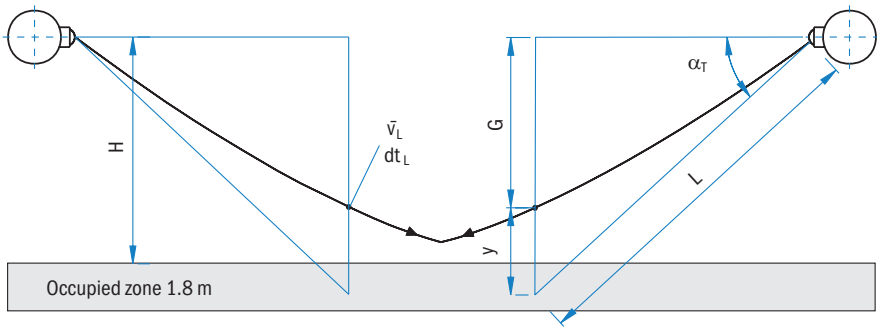
### Cooling




### Isothermal ventilation



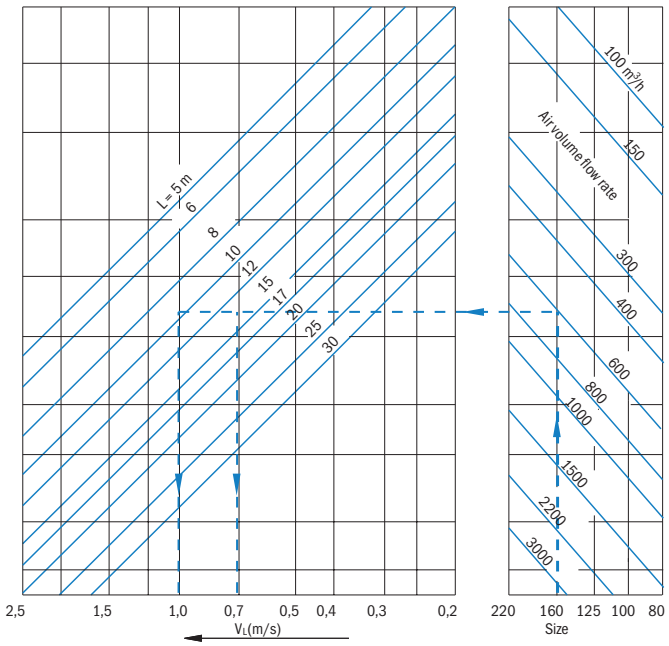

### Heating



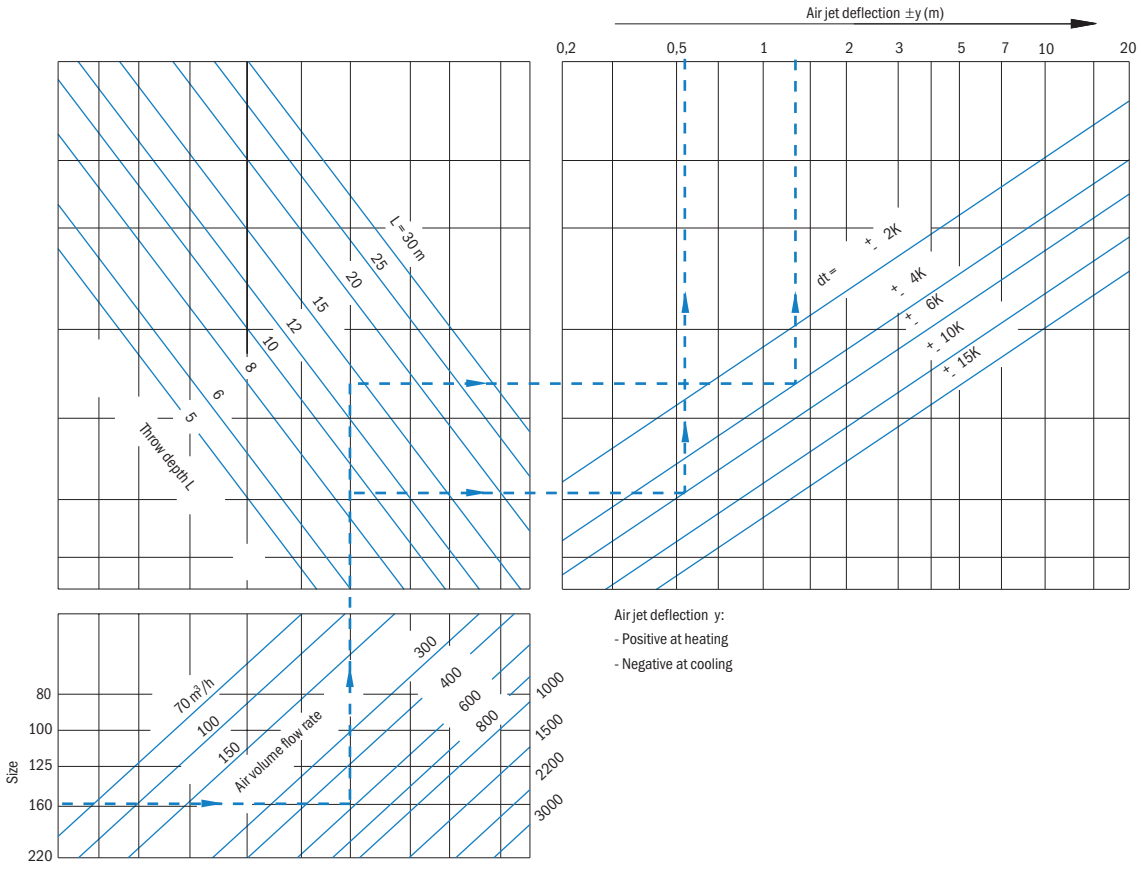

## Definition of symbols

| | |
|---|---|
| **L (m)** | Throw distance in isothermal condition |
| **$\alpha_H$ (°)** | Set angle in cooling mode |
| **$\alpha_T$ (°)** | Set angle in heating mode |
| **C (m)** | Horizontal distance between the nozzle and the two air jets collision point |
| **H (m)** | Height of the nozzle above the occupied zone |
| **$H_2$ (m)** | Virtual vertical distance between the nozzle and the two air jets collision point at isothermal air supply |
| **$H_{max}$ (m)** | Max. depth of air throw (only at vertical supply) |
| **$H_1$ (m)** | Vertical distance between the occupied zone and the two air jets collision point |
| **Y (m)** | Air jet deflection as a function of blow temperature difference |
| **G (m)** | vertical distance between the air jet deflection point and the nozzle |
| **$v_{H1}$ (m/s)** | Average air velocity in the occupied zone $H_1$ |
| **$v_L$ (m/s)** | Average air velocity at the two air jets collision point L |
| **$dt_z$ (K)** | Temperature difference between the supply air and the room air |
| **$dt_L$ (K)** | Temperature difference between the supply air at the distance L and the room air |
| **$dt_{H1}$ (K)** | Temperature difference between the supply air at the entry in the occupied zone and the room air |
| **$dp_t$ (Pa)** | Total air pressure drop |
| **$L_{WA}$ (dB(A))** | Sound power level |

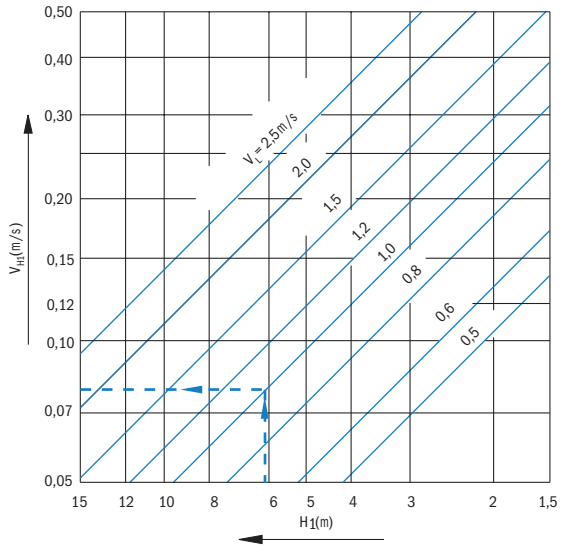
## Diagram 1: Velocity in the air jet core and throw depth



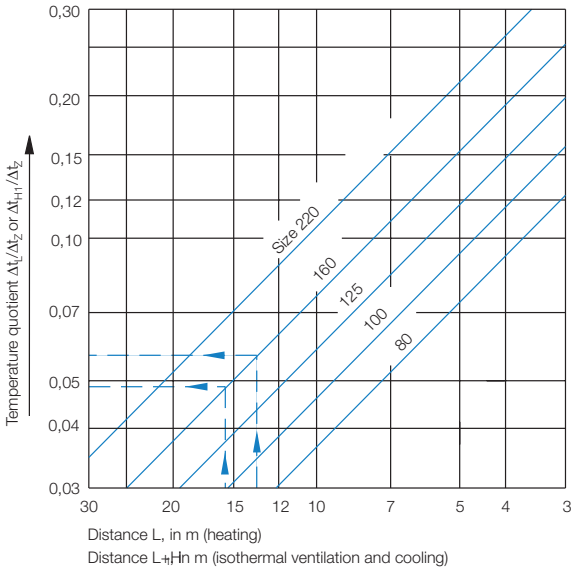

## Diagram 2: Air jet deflection



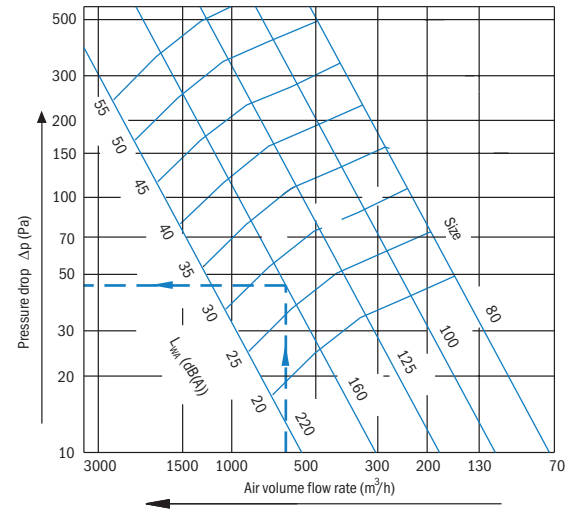
### Diagram 3: Velocity at the air jet axis



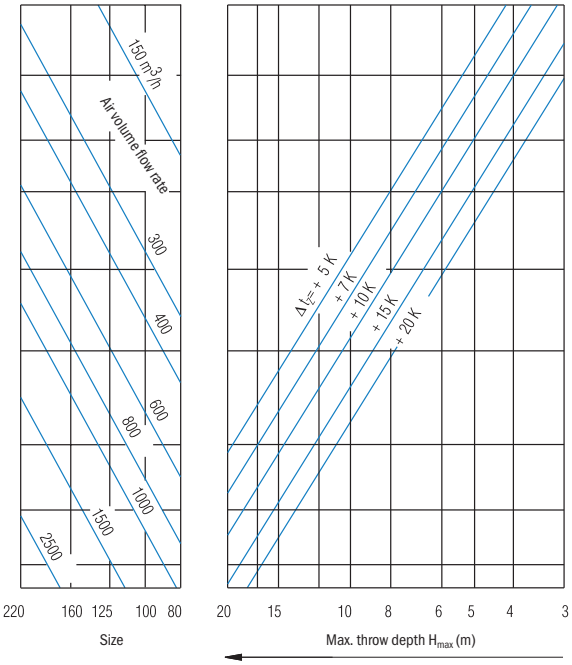

### Diagram 4: Temperature quotient




### Diagram 5: Pressure drops and sound levels




### Diagram 6: Maximum warm air throw depth at vertical supply




## Calculation example
with regard to different air supply angles

**Cooling** ($\alpha_H$)

a) Select air supply angle ($\alpha_H$):

b) Calculate distance L: $L = \frac{C}{\cos(\alpha_H)}$ (table 1)

c) Calculate height $H_2$: $H_2 = tg(\alpha_H) \times C$ (table 1)

d) Select velocity $v_L$ from diagram 1

e) Select air jet deflection y from diagram 2

f) Calculate height: $H_1$: $H_1 = H + H_2 - y$

g) Select velocity $v_{H1}$ from diagram 3.

h) Select temperature quotient from diagram 4 $\frac{\Delta t_{H1}}{\Delta t_Z}$ or $\frac{\Delta t_L}{\Delta t_Z}$ :

$\Delta t_{H1} = \frac{\Delta t_{H1}}{\Delta t_Z} \times \Delta t_Z$ $\quad \Delta t_L = \frac{\Delta t_L}{\Delta t_Z} \times \Delta t_Z$

## Calculation example
Isothermal ventilation

Apply diagram 1 and 3.

**Heating** ($\alpha_T$)

a) Select velocity $v_L$.

b) Select distance L from diagram 1.

c) Establish air jet deflection y from diagram 2.

d) Calculate air supply angle:

$\sin(\alpha_t) = \frac{G+y}{L}$ table (1)

e) Select temperature quotient from diagram 4 $\frac{\Delta t_{H1}}{\Delta t_Z}$ or $\frac{\Delta t_L}{\Delta t_Z}$ :

$\Delta t_{H1} = \frac{\Delta t_{H1}}{\Delta t_Z} \times \Delta t_Z$ $\quad \Delta t_L = \frac{\Delta t_L}{\Delta t_Z} \times \Delta t_Z$

**Note:**
In the case of the distance between nozzles smaller than 0,14 x C, velocity $v_L$ and $\Delta t_L$ are increased by a factor of ≈ 1,5

## Example

Two nozzles are installed at a distance of 18 m one from another and 7 m above the floor.

**Air flow rate:**

V =600 m³/h (per nozzle)

$\Delta t_z$ = -6K (summer)

$\Delta t_z$ = +4K (winter)

Selected: nozzle VŠ-4, size 160

**Cooling:** $(-\alpha_H) = 10°$

a) Distance L:$L = c/\cos\alpha = 9/0.985 = 9.14$ m (table 1)

b) Height $H_2$: $H_2 = tg(\alpha_H) \times 9 = 0.176 \times 9 = 1.578$ m (table 1)

c) Select velocity $v_L$ from diagram 1: $v_L = 1.05$ m/s

d) Establish air deflection y from diagram 2: y=-0.6 m

e) Calculate height $H_1$: $H_1 = H + H_2 - y \quad H_1 = 5.2+1.587-0.6=6.187$ m

f) Select velocity $v_{H1}$ from diagram 3: $v_{H1} = 0.08$ m/s

g) Select temperature quotient from diagram 4 $\Delta t_{H1}/\Delta t_Z$:
$\Delta t_{H1} = \Delta t_{H1} / \Delta t_Z \times \Delta t_Z = 0.048 \times (-6) = -0.288$ K

**Heating:** (α)

a) Select velocity $v_L$: $v_L = 0.71$ m/s

b) Establish distance L from diagram 1: L = 13.5 m

c) Establish air deflection y from diagram 2: y = +1.3 m

d) Calculate air supply angle ($\alpha_t$):
$\sin(\alpha_t) = G+y/L = 4+1.3/13.5 = 0.3926 \Rightarrow \alpha_t \approx 23°$

e) Select temperature quotient from diagram 4:

$$\Delta t_L = \frac{\Delta t_L}{\Delta t_Z} \times \Delta t_Z = 0{,}055 \times 4 = 0.22 \text{ K}$$

f) From diagram 5, sound power level $L_{WA}$ at the source can be established:

$L_{WA}$ = 27 dB(A)

$\Delta p_t$ = 43 Pa

**Table 1**

| $\alpha_H$ | $\cos(\alpha_H)$ | $tg(\alpha_H)$ | $\alpha_t$ | $\sin(\alpha_t)$ |
|---|---|---|---|---|
| **0** | 1 | 0 | **0** | 0 |
| **5** | 0.996 | 0.0875 | **5** | 0.087 |
| **10** | 0.985 | 0.176 | **10** | 0.174 |
| **15** | 0.966 | 0.268 | **15** | 0.260 |
| **20** | 0.940 | 0.364 | **20** | 0.342 |
| **25** | 0.906 | 0.466 | **25** | 0.423 |
| **30** | 0.866 | 0.577 | **30** | 0.500 |

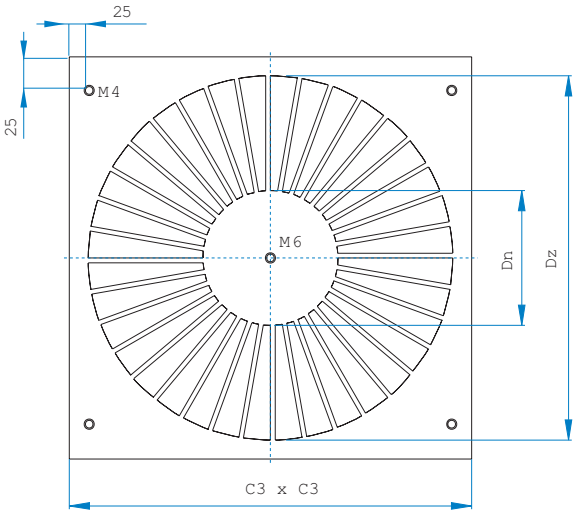
# Swirl diffusers OD-4

- Fixed slots
- Possible volume control damper in spigot
- Diffusing ring is an additional element, preventing the discharged air to flow over the diffuser face itself.

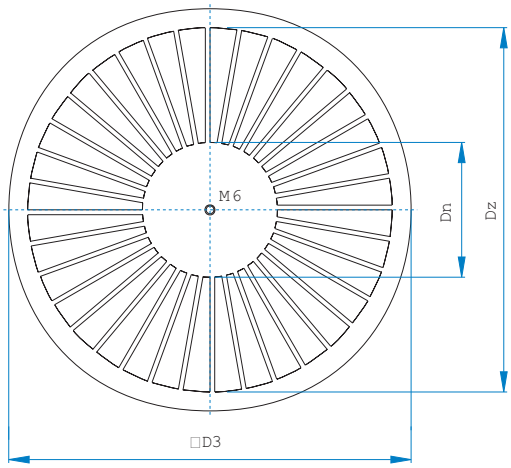
### Diffuser face fastening

Diffuser plate can be fastened with central screw OD-4/K1 or with four peripheral screws OD-4/K4. Diffuser plate OD-4/R1 is to be fastened with one central screw.

### OD-4/K




### OD-4/R

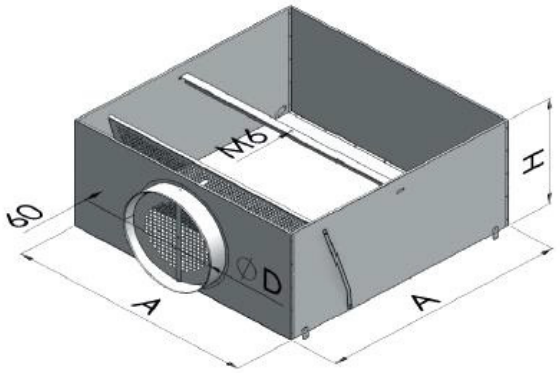



| Size | Dn | Dz | C3 | ΦD3 | $A_{ef}$ (m²) |
|---|---|---|---|---|---|
| **400** | 130 | 350 | 395 | 400 | 0.0138 |
| **500** | | | 495 | 500 | |
| **600** | | | 595 | 600 | |
| **625** | | | 620 | 625 | |
| **600D** | 200 | 540 | 595 | 600 | 0.0367 |
| **625D** | | | 620 | 625 | |
| **675D** | | | 670 | 675 | |

$A_{ef}$ – efective discharge area (m²)

## Square plenum box

| Designation | Size | A [mm] | ΦD [mm] | H [mm] |
|---|---|---|---|---|
| **K/Z/S/M/** | 400 | 390 | 198 | 250 |
| **K/Z/S/M/** | 500 | 390 | 198 | 250 |
| **K/Z/S/M/** | 600 | 390 | 198 | 250 |
| **K/Z/S/M/** | 625 | 390 | 198 | 250 |
| **K/Z/S/M/** | 600D | 590 | 248 | 300 |
| **K/Z/S/M/** | 625D | 590 | 248 | 300 |

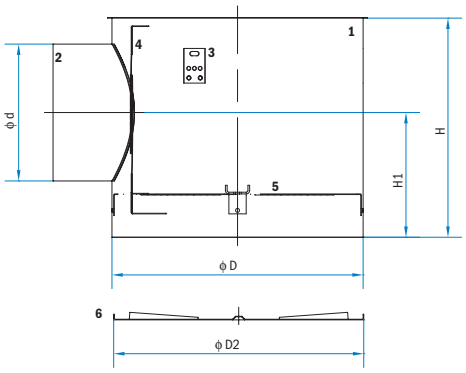


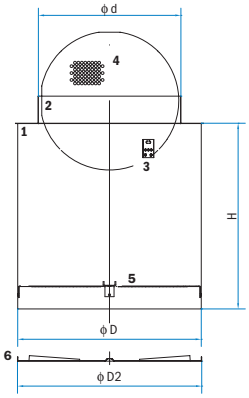

## Round plenum box

1. Plenum box
2. Inlet spigot
3. Suspension bracket
4. Volume control damper M
5. Dispersing plate (only for supply)
6. Diffuser OD-4

| Size | ΦD2 | ΦD | H | H1 | Φd |
|---|---|---|---|---|---|
| **400** | 400 | 370 | 285 | 164 | 198 |
| **500** | 500 | | | | |
| **600** | 600 | | | | |
| **625** | 625 | | | | |
| **600D** | 600 | 560 | 335 | 189 | 248 |
| **625D** | 625 | | | | |
| **675D** | 675 | | | | |

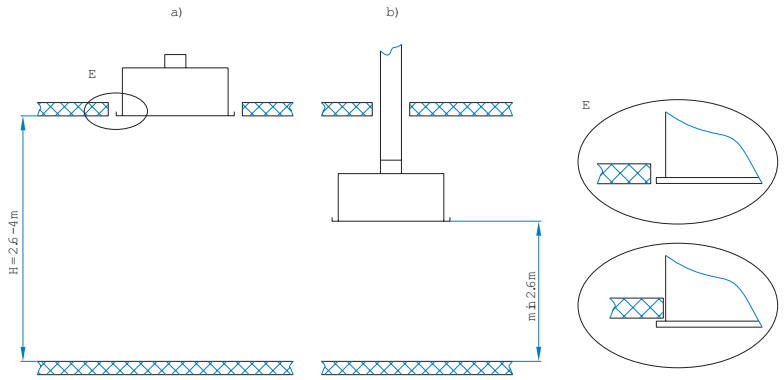
| Size | ΦD2 | ΦD | H | Φd |
|---|---|---|---|---|
| **400** | 400 | 370 | 280 | 198 |
| **500** | 500 | | | |
| **600** | 600 | | | |
| **625** | 625 | | | |
| **600D** | 600 | 560 | 330 | 248 |
| **625D** | 625 | | | |
| **675D** | 675 | | | |

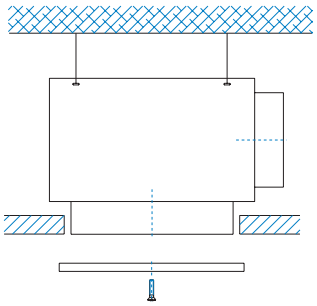


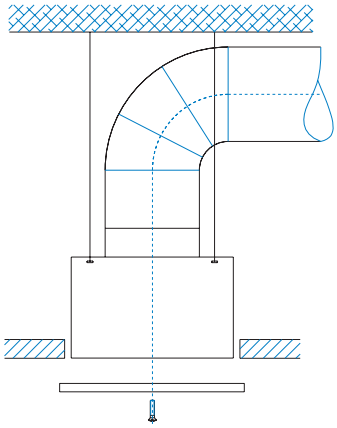



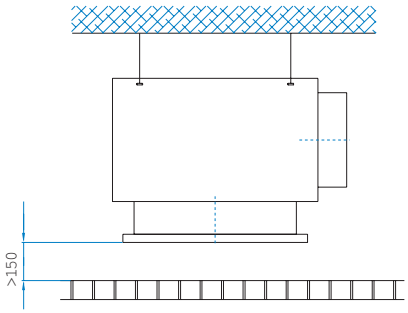
## Installation

a) into the ceiling
b) with extended tube under the ceiling








## Ordering key

**OD-4 K1 / Z / S / M / I Size**

1 2 3 4 5 6 7

1 Diffuser type

| | |
|---|---|
| **OD-4** | Swirl diffuser |

2 Diffuser plate type

| | |
|---|---|
| **K1** | Square diffuser plate, central fastening |
| **K4** | Square diffuser plate, fastening with four screws (available for diffuser plate only, without plenum box)* |
| **R1** | Circular diffuser plate, central fastening |

3 Plenum box

| | |
|---|---|
| **Z** | Square plenum box for air supply |
| **ZR** | Circular plenum box for air supply |

4 Spigot

| | |
|---|---|
| **S** | Side entry spigot |

5 Air regulation

| | |
|---|---|
| **M** | Volume control damper in entry spigot |

6 Insulation

| | |
|---|---|
| **I5** | 5 mm PE thermal insulation outside of ZR plenum box |
| **I6** | 6 mm PE thermal insulation outside of Z plenum box |
| **I9** | 9 mm synthetic rubber based sound & thermal insulation (-40°C - 105°C) outside of ZR plenum box |
| **I10** | 10 mm synthetic rubber based sound & thermal insulation (-40°C - 105°C) outside of Z plenum box |
| **I19** | 19 mm synthetic rubber based sound & thermal insulation (-40°C - 105°C) outside of ZR plenum box |

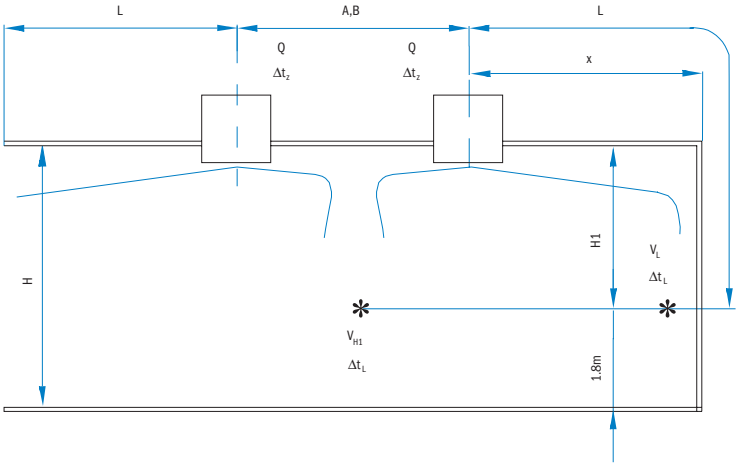
7 Dimensions

| | |
|---|---|
| **400** | Size |
| **500** | Size |
| **600** | Size |
| **600D** | Size |
| **625** | Size |
| **625D** | Size |
| **675D** | Size |

* When installing to the plenum box, diffuser plate is always K1, with central fastening. R1 is without plenum box.

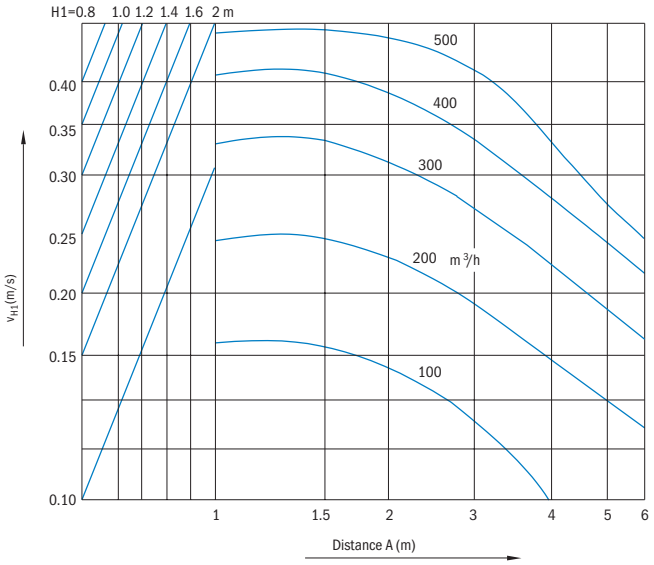
## Definition of symbols

| | |
|---|---|
| **Q (m³/h)** | Air flow |
| **x (m)** | Horizontal distance to the wall |
| **H (m)** | Room height |
| **H1 (m)** | Distance from ceiling to occupied zone |
| **L (m)** | Throw distance (L = H1 + x) |
| **$V_L$ (m/s)** | Air velocity at the throw distance L |
| **$\Delta t_z$ (K)** | Temperate difference between the supply and room air |
| **$\Delta t_L$ (K)** | Difference between the core and room air temperature |
| **$\Delta p_t$ (Pa)** | Pressure drop |
| **$L_{WA}$ (dB(A))** | Sound power level |
| **$V_{H1}$ (m/s)** | Air velocity at the H1 distance |
| **A, B (m)** | Distance between diffusers by length and by width |

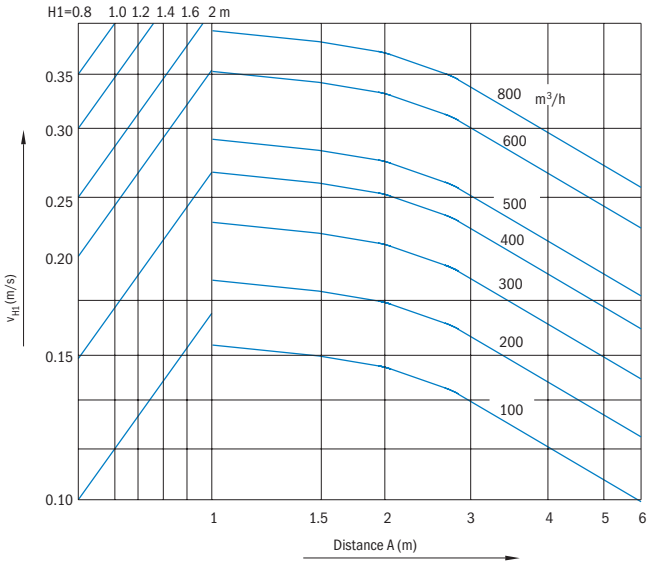



## Air velocity at the throw distances (for OD-4 without diffusion ring and with ceiling effect)

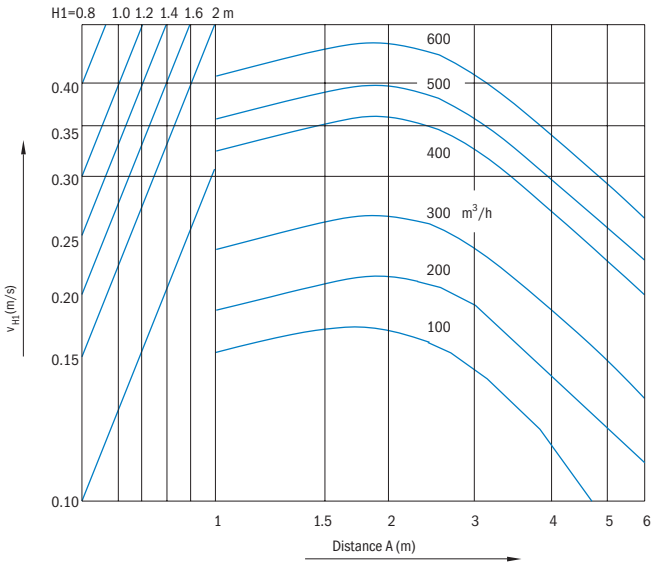
**OD-4 size 400,500,600,625**
B=2.5 ... 3.5 m



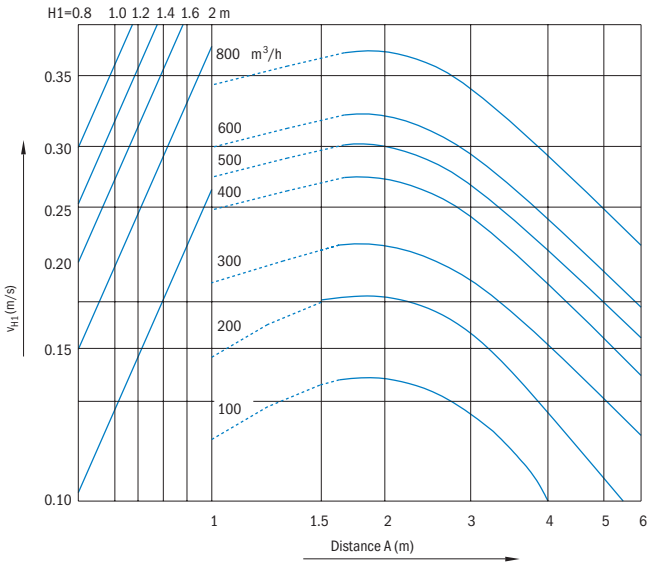

**OD-4 size 600D,625D,675D**
B=2.5 ... 3.5 m



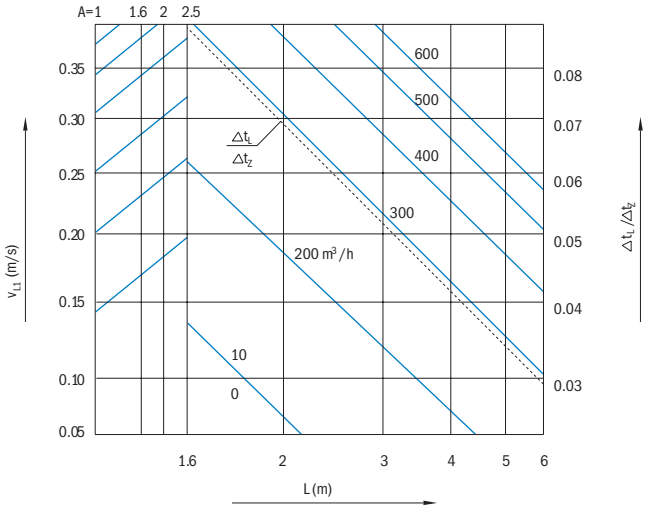

**OD-4 size 400,500,600,625**
B>4m



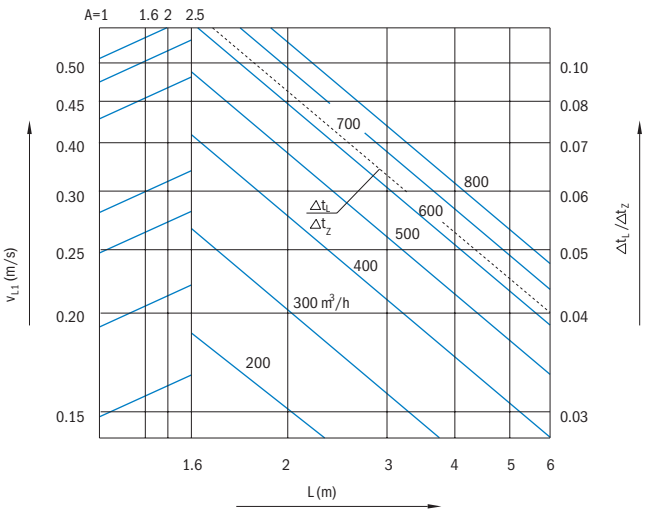

**OD-4 size 600D, 625D,675D**
B>4m



**OD-4 size 400,500,600,625**



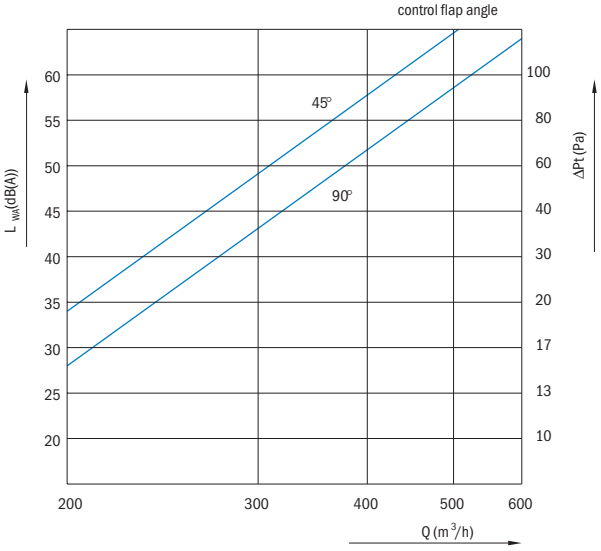

**OD-4 size 600D,625D, 675D**



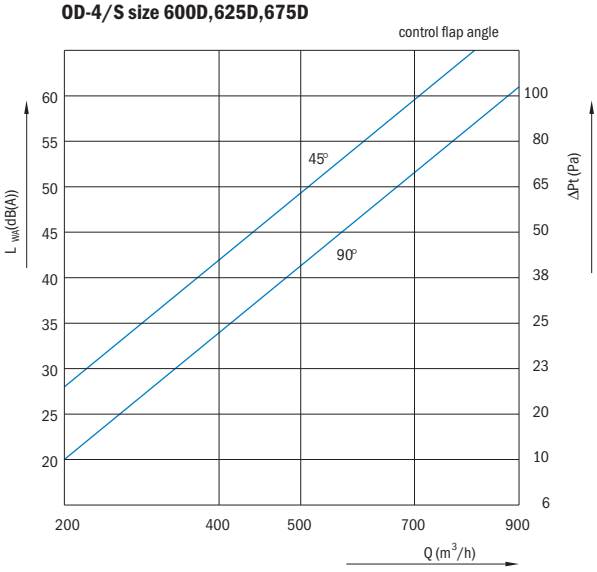

## Pressure drop and sound power level

Control flap angle: 90° – opened, 45° – half opened

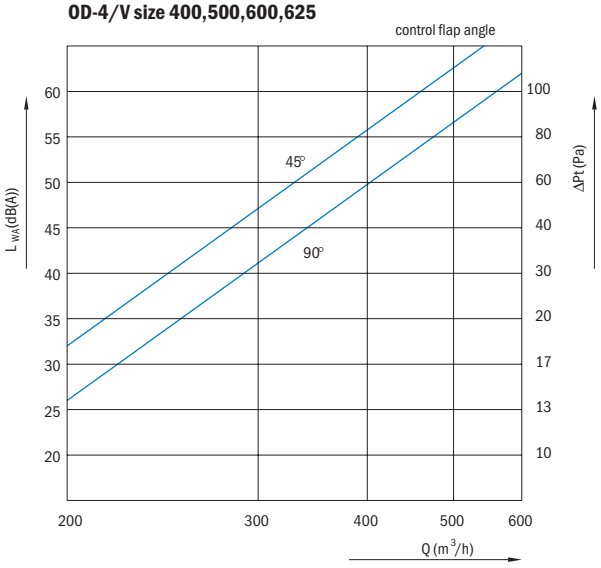
**OD-4/S size 400,500,600,625**



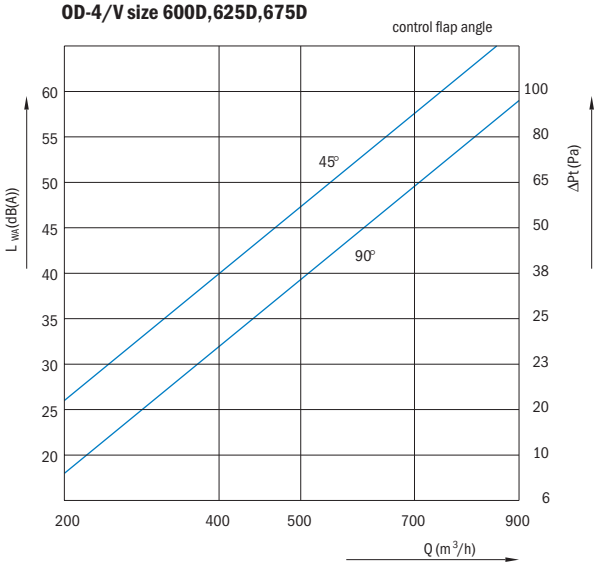

**OD-4/S size 600D,625D,675D**




**OD-4/V size 400,500,600,625**




**OD-4/V size 600D,625D,675D**



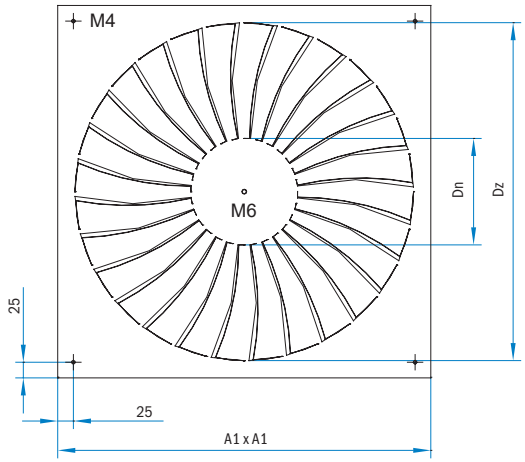
# Swirl diffuser OD-5

- Fixed grille
- For air supply or exhaust
- Recommended temperature difference between supplied and internal air in the room is between – 10 to 0 K
- Low static pressure drop and low noise level
- Recommended installation height up to 4.5 m
- Diffuser plate should be lined with the ceiling in order to establish the ceiling effect
- Square and circular diffuser plate

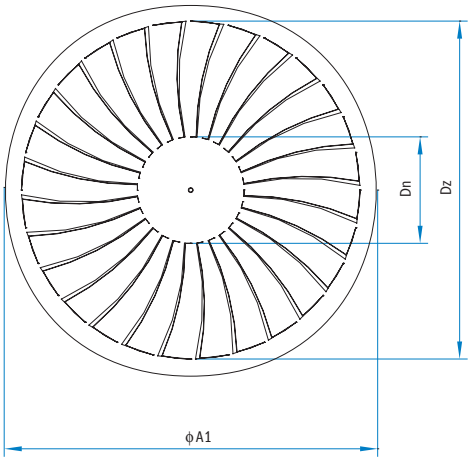
## Diffuser plate attachment

For square diffusers, central fastening OD-5/K1 or fastening with four screws on the edges OD-5/K4 can be selected. For circular diffusers, only the central fastening is provided. Diffusers are usually installed with the plenum box with side or top entry spigot. Plenum boxes with side or top inlet can be selected. If additional air flow regulation is required, the plenum box with the M volume control damper is recommended.

**OD-5/K**



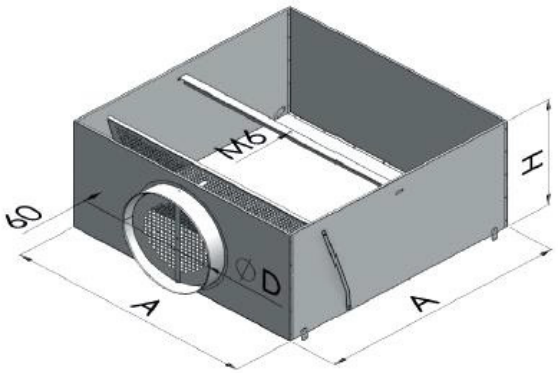

**OD-5/R**




| Size | Dn | Dz | A1xA1 | ΦA1 | $A_{ef}$ ($m^2$) |
|---|---|---|---|---|---|
| **300** | 84 | 254 | 295x295 | 300 | 0.0145 |
| **400** | 92 | 350 | 395x395 | 400 | 0.0301 |
| **500** | 150 | 450 | 495x495 | 500 | 0.0386 |
| **600** | 170 | 540 | 595x595 | 600 | 0.0580 |
| **625** | 170 | 540 | 620x620 | 625 | 0.0580 |

## Square plenum box

| Designation | Size | A [mm] | ΦD [mm] | H [mm] |
|---|---|---|---|---|
| **K/Z/S/M/** | 300 | 290 | 158 | 210 |
| **K/Z/S/M/** | 400 | 390 | 198 | 250 |
| **K/Z/S/M/** | 500 | 490 | 198 | 250 |
| **K/Z/S/M/** | 600 | 590 | 248 | 300 |
| **K/Z/S/M/** | 625 | 590 | 248 | 300 |

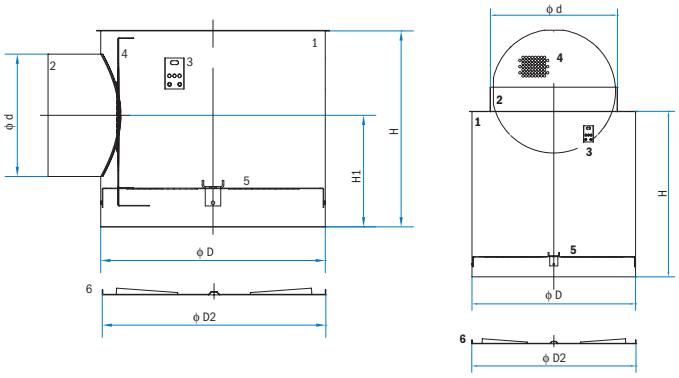



## Round plenum box

**1.** Plenum box
**2.** Inlet spigot
**3.** Suspension bracket
**4.** Volume control damper (M)
**5.** Dispersing plate (only for supply)
**6.** Swirl diffuser OD-5

| Size | ΦD2 | ΦD | H | H1 | Φd |
|---|---|---|---|---|---|
| **300** | 300 | 290 | 245 | 144 | 158 |
| **400** | 400 | 370 | 285 | 164 | 198 |
| **500** | 500 | 488 | 285 | 164 | 198 |
| **600** | 600 | 560 | 335 | 189 | 248 |
| **625** | 625 | 560 | 335 | 189 | 248 |

| Size | ΦD2 | ΦD | H | Φd |
|---|---|---|---|---|
| **300** | 300 | 290 | 245 | 158 |
| **400** | 400 | 370 | 280 | 198 |
| **500** | 500 | 488 | 280 | 198 |
| **600** | 600 | 560 | 330 | 248 |
| **625** | 625 | 560 | 330 | 248 |



## Ordering key

**OD-5 K1 / Z / S / M / I Size**

1 2 3 4 5 6

| 1 Diffuser type | |
|---|---|
| **OD-5** | Swirl diffuser |

| 2 Diffuser plate type | |
|---|---|
| **K1** | Square diffuser plate, central fastening |
| **K4** | Square diffuser plate, fastening with four screws (available for diffuser plate only, without plenum box)* |
| **R1** | Circular diffuser plate, central fastening |

| 3 Plenum box | |
|---|---|
| **Z** | Square plenum box for air supply |
| **ZR** | Circular plenum box for air supply |

| 4 Spigot | |
|---|---|
| **S** | Side entry spigot |

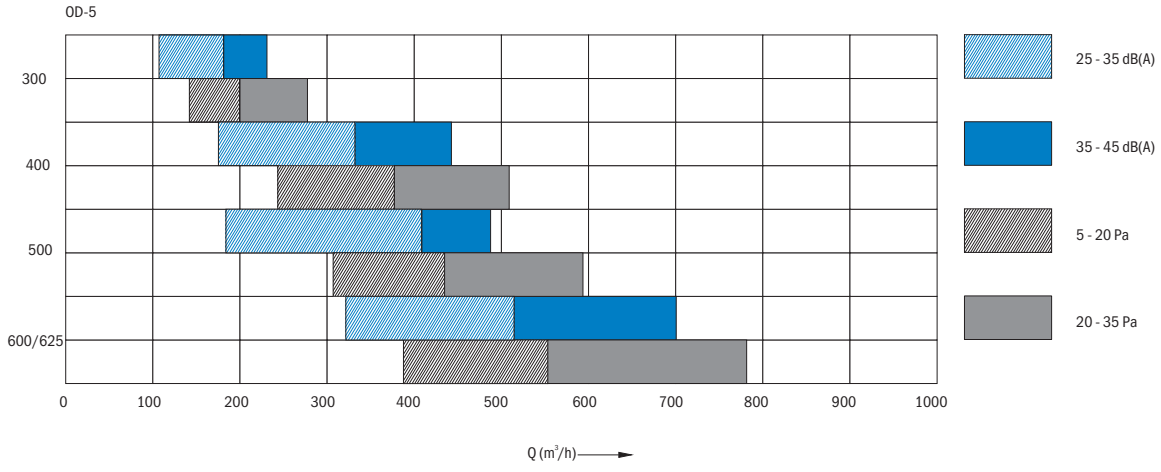
| 5 Air regulation | |
|---|---|
| **M** | Volume control damper in entry spigot |

| 6 Insulation | |
|---|---|
| **I5** | 5 mm PE thermal insulation outside of ZR plenum box |
| **I6** | 6 mm PE thermal insulation outside of Z plenum box |
| **I9** | 9 mm synthetic rubber based sound & thermal insulation (-40°C - 105°C) outside of ZR plenum box |
| **I10** | 10 mm synthetic rubber based sound & thermal insulation (-40°C - 105°C) outside of Z plenum box |
| **I19** | 19 mm synthetic rubber based sound & thermal insulation (-40°C - 105°C) outside of ZR plenum box |

| 7 Dimensions | |
|---|---|
| **300** | Size |
| **400** | Size |
| **500** | Size |
| **600** | Size |
| **625** | Size |

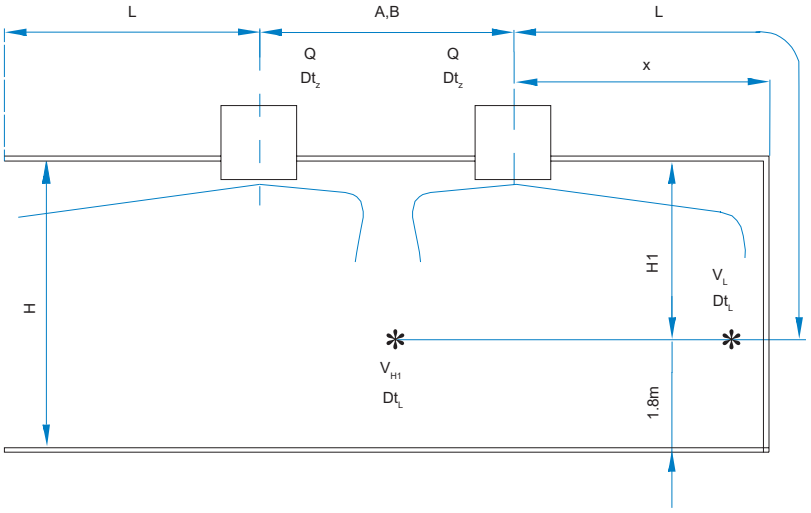
* When installing to the plenum box, diffuser plate is always K1, with central fastening. R1 is without plenum box.

## Fast selection diagram



## Definition of symbols

| | |
|---|---|
| **Q (m³/h)** | Air volume per diffuser |
| **x (m)** | Horizontal distance to wall |
| **H (m)** | Room height |
| **H1 (m)** | Ceiling to living zone distance |
| **L (m)** | Throw distance (L = H1+ x) |
| **$V_L$ (m/s)** | Air speed on the throw distance L |
| **$\Delta t_z$ (K)** | Difference between room temperature and supply air temperature |
| **$\Delta t_L$ (K)** | Difference between room temperature and air flow temperature on distance L |
| **$\Delta p_t$ (Pa)** | Pressure drop |
| **$L_{WA}$ (dB(A))** | Sound power level |
| **$V_{H1}$ (m/s)** | Air speed on distance H1 |
| **A, B (m)** | Distance between two diffusers (length and width) |




### Quick selection table: ΔT = -10K

| Size | Q (m³/h) | 150 | 200 | 250 | 300 | 400 | 500 | 600 | 700 | 800 | 900 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Q(l/s) | 42 | 56 | 69 | 83 | 111 | 139 | 167 | 194 | 222 | 250 |
| 300 | H1=1m: $v_{H1}$ (m/s) | 0.16 | 0.23 | 0.29 | 0.44 | / | | | | | |
| | H1=1.5m: $v_{H1}$ (m/s) | / | 0.10 | 0.14 | 0.22 | / | | | | | |
| | L=3m: $v_{L1}$ (m/s) | 0.14 | 0.19 | 0.24 | 0.28 | 0.38 | | | | | |
| | L=3.5m: $v_{L1}$ (m/s) | 0.12 | 0.16 | 0.20 | 0.24 | 0.32 | | | | | |
| | Δp (Pa) | 14.3 | 26.0 | 39.7 | 55.8 | 96.5 | | | | | |
| | $L_{WA}$ (dB(A)) | 26.6 | 34.3 | 40.9 | 46.8 | 52.7 | | | | | |
| 400 | H1=1m: $v_{H1}$ (m/s) | | / | 0.27 | 0.33 | 0.47 | / | | | | |
| | H1=1.5m: $v_{H1}$ (m/s) | | / | 0.13 | 0.16 | 0.24 | 0.31 | | | | |
| | L=3m: $v_{L1}$ (m/s) | | 0.14 | 0.18 | 0.21 | 0.28 | / | | | | |
| | L=3.5m: $v_{L1}$ (m/s) | | 0.12 | 0.15 | 0.18 | 0.24 | 0.3 | | | | |
| | Δp (Pa) | | 7.1 | 11.9 | 17.2 | 29.5 | 44.5 | | | | |
| | $L_{WA}$(dB(A)) | | 19.3 | 24.1 | 28.9 | 36.5 | 44.0 | | | | |
| 500 | H1=1m: $v_{H1}$ (m/s) | | / | / | 0.20 | 0.29 | 0.38 | 0.48 | | | |
| | H1=1.5m: $v_{H1}$ (m/s) | | / | / | / | 0.14 | 0.19 | 0.24 | | | |
| | L=3m: $v_{L1}$ (m/s) | | 0.11 | 0.14 | 0.17 | 0.23 | 0.29 | 0.34 | | | |
| | L=3.5m: $v_{L1}$ (m/s) | | / | 0.12 | 0.15 | 0.20 | 0.24 | 0.29 | | | |
| | Δp (Pa) | | / | / | 10.8 | 20.7 | 32.1 | 45.2 | | | |
| | $L_{WA}$(dB(A)) | | 14.6 | 19.4 | 24.6 | 32.6 | 39.7 | 45.8 | | | |
| 600 | H1=1m: $v_{H1}$ (m/s) | | | / | / | 0.22 | 0.30 | 0.38 | 0.45 | 0.52 | |
| | H1=1.5m: $v_{H1}$ (m/s) | | | / | / | / | 0.14 | 0.21 | 0.23 | 0.27 | |
| | L=3m: $v_{L1}$ (m/s) | | | 0.14 | 0.17 | 0.23 | 0.30 | 0.34 | 0.40 | 0.45 | |
| | L=3.5m: $v_{L1}$ (m/s) | | | 0.12 | 0.14 | 0.19 | 0.24 | 0.29 | 0.34 | 0.39 | |
| | Δp (Pa) | | | / | / | 10.5 | 18.0 | 26.1 | 35.0 | 44.7 | |
| | $L_{WA}$(dB(A)) | | | 16.1 | 19.6 | 26.0 | 32.6 | 37.7 | 41.7 | 45.2 | |
| 625 | H1=1m: $v_{H1}$ | | | | | 0.22 | 0.30 | 0.38 | 0.45 | / | / |
| | H1=1.5m: $v_{H1}$ | | | | | / | 0.14 | 0.19 | 0.23 | 0.27 | 0.35 |
| | L=3m: $v_{L1}$ (m/s) | | | | | 0.23 | 0.28 | 0.34 | 0.40 | 0.45 | 0.51 |
| | L=3.5m: $v_{L1}$ (m/s) | | | | | 0.19 | 0.24 | 0.29 | 0.34 | 0.39 | 0.45 |
| | Δp (Pa) | | | | | 10.5 | 18.0 | 26.1 | 35.0 | 44.7 | 55.2 |
| | $L_{WA}$(dB(A)) | | | | | 26.0 | 32.6 | 37.7 | 41.7 | 45.2 | 48.5 |

## Quick selection table: ΔT = -5K

| Size | Q (m³/h) | 150 | 200 | 250 | 300 | 400 | 500 | 600 | 700 | 800 | 900 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Q(l/s) | 42 | 56 | 69 | 83 | 111 | 139 | 167 | 194 | 222 | 250 |
| 300 | H1=1m: $v_{H1}$ (m/s) | 0.16 | 0.23 | 0.30 | 0.45 | / | | | | | |
| | H1=1.5m: $v_{H1}$ (m/s) | / | 0.10 | 0.15 | 0.23 | / | | | | | |
| | L=3m: $v_{L1}$ (m/s) | 0.14 | 0.19 | 0.24 | 0.29 | 0.38 | | | | | |
| | L=3.5m: $v_{L1}$ (m/s) | 0.12 | 0.16 | 0.21 | 0.25 | 0.33 | | | | | |
| | Δp (Pa) | 14.2 | 24.9 | 40.7 | 55.6 | 98.0 | | | | | |
| | $L_{WA}$ (dB(A)) | 26.6 | 33.8 | 41.3 | 46.8 | 52.8 | | | | | |
| 400 | H1=1m: $v_{H1}$ (m/s) | | / | 0.29 | 0.34 | 0.49 | 0.60 | / | | | |
| | H1=1.5m: $v_{H1}$ (m/s) | | / | 0.14 | 0.17 | 0.25 | 0.32 | / | | | |
| | L=3m: $v_{L1}$ (m/s) | | 0.15 | 0.18 | 0.22 | 0.29 | 0.36 | 0.43 | | | |
| | L=3.5m: $v_{L1}$ (m/s) | | 0.13 | 0.16 | 0.19 | 0.25 | 0.30 | 0.37 | | | |
| | Δp (Pa) | | 7.1 | 12.2 | 17.1 | 29.9 | 43.7 | 62.8 | | | |
| | $L_{WA}$(dB(A)) | | 19.3 | 24.4 | 28.9 | 36.8 | 43.7 | 49.0 | | | |
| 500 | H1=1m: $v_{H1}$ (m/s) | | | | 0.21 | 0.30 | 0.39 | 0.49 | / | | |
| | H1=1.5m: $v_{H1}$ (m/s) | | | | 0.10 | 0.15 | 0.20 | 0.25 | / | | |
| | L=3m: $v_{L1}$ (m/s) | | | | 0.18 | 0.23 | 0.29 | 0.35 | 0.41 | | |
| | L=3.5m: $v_{L1}$ (m/s) | | | | 0.15 | 0.20 | 0.25 | 0.30 | 0.35 | | |
| | Δp (Pa) | | | | 10.7 | 20.7 | 31.5 | 45.2 | 60.2 | | |
| | $L_{WA}$(dB(A)) | | | | 24.5 | 32.6 | 39.3 | 45.8 | 49.3 | | |
| 600 | H1=1m: $v_{H1}$ (m/s) | | | | / | 0.24 | 0.31 | 0.39 | 0.47 | 0.54 | 0.61 |
| | H1=1.5m: $v_{H1}$ (m/s) | | | | / | 0.12 | 0.16 | 0.21 | 0.24 | 0.28 | 0.32 |
| | L=3m: $v_{L1}$ (m/s) | | | | 0.18 | 0.24 | 0.29 | 0.35 | 0.41 | 0.46 | 0.52 |
| | L=3.5m: $v_{L1}$ (m/s) | | | | 0.16 | 0.21 | 0.25 | 0.30 | 0.35 | 0.40 | 0.45 |
| | Δp (Pa) | | | | / | 10.5 | 17.6 | 26.1 | 35.0 | 44.2 | 55.0 |
| | $L_{WA}$(dB(A)) | | | | 19.6 | 26.0 | 32.3 | 37.7 | 41.7 | 45.0 | 48.5 |
| 625 | H1=1m: $v_{H1}$ | | | | | 0.24 | 0.31 | 0.39 | 0.47 | 0.54 | 0.61 |
| | H1=1.5m: $v_{H1}$ | | | | | 0.12 | 0.16 | 0.21 | 0.24 | 0.28 | 0.32 |
| | L=3m: $v_{L1}$ (m/s) | | | | | 0.24 | 0.29 | 0.35 | 0.41 | 0.47 | 0.52 |
| | L=3.5m: $v_{L1}$ (m/s) | | | | | 0.21 | 0.25 | 0.30 | 0.35 | 0.40 | 0.45 |
| | Δp (Pa) | | | | | 10.7 | 17.6 | 26.1 | 35.0 | 44.7 | 55.0 |
| | $L_{WA}$(dB(A)) | | | | | 26.2 | 32.3 | 37.7 | 41.7 | 45.2 | 48.5 |

## Quick selection table: ΔT = 0K

| Size | Q (m³/h) | 150 | 200 | 250 | 300 | 400 | 500 | 600 | 700 | 800 | 900 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Q(l/s) | 42 | 56 | 69 | 83 | 111 | 139 | 167 | 194 | 222 | 250 |
| 300 | H1=1m: $v_{H1}$ (m/s) | 0.16 | 0.23 | 0.30 | 0.45 | / | | | | | |
| | H1=1.5m: $v_{H1}$ (m/s) | / | 0.10 | 0.15 | 0.23 | / | | | | | |
| | L=3m: $v_{L1}$ (m/s) | 0.15 | 0.19 | 0.24 | 0.29 | 0.38 | | | | | |
| | L=3.5m: $v_{L1}$ (m/s) | 0.13 | 0.16 | 0.21 | 0.25 | 0.33 | | | | | |
| | Δp (Pa) | 14.3 | 24.9 | 40.7 | 55.6 | 96.5 | | | | | |
| | $L_{WA}$ (dB(A)) | 26.6 | 33.8 | 41.3 | 46.8 | 52.7 | | | | | |
| 400 | H1=1m: $v_{H1}$ (m/s) | | / | 0.29 | 0.34 | 0.48 | 0.61 | / | | | |
| | H1=1.5m: $v_{H1}$ (m/s) | | / | 0.14 | 0.18 | 0.25 | 0.32 | / | | | |
| | L=3m: $v_{L1}$ (m/s) | | 0.15 | 0.18 | 0.22 | 0.29 | 0.36 | 0.43 | | | |
| | L=3.5m: $v_{L1}$ (m/s) | | 0.13 | 0.16 | 0.19 | 0.25 | 0.31 | 0.37 | | | |
| | Δp (Pa) | | 7.1 | 11.9 | 17.2 | 29.5 | 44.5 | 62.8 | | | |
| | $L_{WA}$(dB(A)) | | 19.3 | 24.1 | 28.9 | 36.5 | 44.0 | 49.0 | | | |
| 500 | H1=1m: $v_{H1}$ (m/s) | | | | 0.22 | 0.30 | 0.39 | 0.49 | / | | |
| | H1=1.5m: $v_{H1}$ (m/s) | | | | 0.11 | 0.15 | 0.20 | 0.26 | / | | |
| | L=3m: $v_{L1}$ (m/s) | | | | 0.18 | 0.24 | 0.29 | 0.35 | 0.41 | | |
| | L=3.5m: $v_{L1}$ (m/s) | | | | 0.16 | 0.20 | 0.25 | 0.30 | 0.35 | | |
| | Δp (Pa) | | | | 10.8 | 20.7 | 32.1 | 45.0 | 60.2 | | |
| | $L_{WA}$(dB(A)) | | | | 24.6 | 32.6 | 39.7 | 45.8 | 49.3 | | |
| 600 | H1=1m: $v_{H1}$ (m/s) | | | | / | 0.24 | 0.32 | 0.40 | 0.47 | 0.55 | 0.61 |
| | H1=1.5m: $v_{H1}$ (m/s) | | | | / | 0.13 | 0.17 | 0.21 | 0.24 | 0.29 | 0.33 |
| | L=3m: $v_{L1}$ (m/s) | | | | 0.19 | 0.24 | 0.29 | 0.36 | 0.41 | 0.47 | 0.53 |
| | L=3.5m: $v_{L1}$ (m/s) | | | | 0.16 | 0.21 | 0.25 | 0.31 | 0.35 | 0.41 | 0.45 |
| | Δp (Pa) | | | | / | 10.5 | 17.6 | 26.1 | 35.0 | 44.7 | 55.2 |
| | $L_{WA}$(dB(A)) | | | | 19.6 | 26.0 | 32.3 | 37.7 | 41.7 | 45.2 | 48.5 |
| 625 | H1=1m: $v_{H1}$ | | | | | 0.24 | 0.31 | 0.39 | 0.48 | 0.55 | 0.61 |
| | H1=1.5m: $v_{H1}$ | | | | | 0.13 | 0.16 | 0.21 | 0.25 | 0.29 | 0.33 |
| | L=3m: $v_{L1}$ (m/s) | | | | | 0.24 | 0.29 | 0.36 | 0.41 | 0.47 | 0.53 |
| | L=3.5m: $v_{L1}$ (m/s) | | | | | 0.21 | 0.25 | 0.31 | 0.36 | 0.41 | 0.45 |
| | Δp (Pa) | | | | | 10.5 | 17.6 | 26.1 | 35.0 | 44.7 | 55.2 |
| | $L_{WA}$(dB(A)) | | | | | 26.0 | 32.3 | 37.7 | 41.7 | 45.2 | 48.5 |

## Example

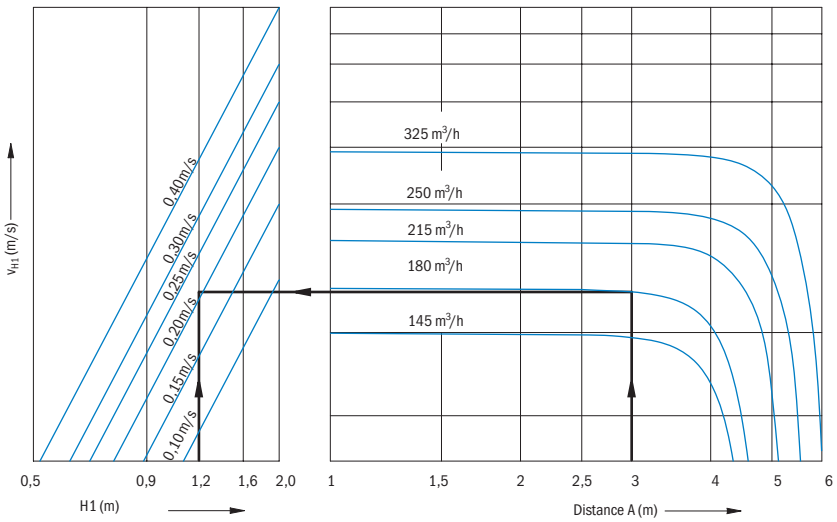
A = 3 m
B = 3 m
H = 3 m
Q = 180 m³/h

H1 = H – 1,8
H1 = 1,2 m

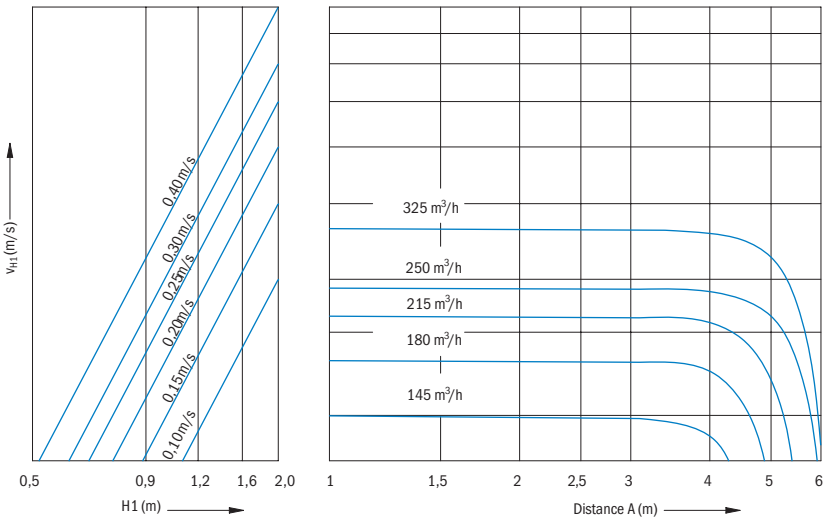
$V_{H1}$ = 0,21 m/s
Δp = 21 Pa
$L_{WA}$ = 32 dB(A)

### 0D-5 size 300

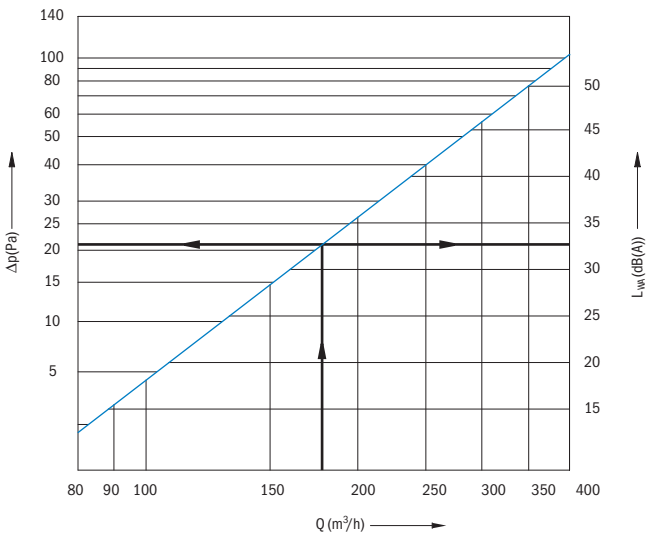
**B = 3m**




**B ≥ 4m**

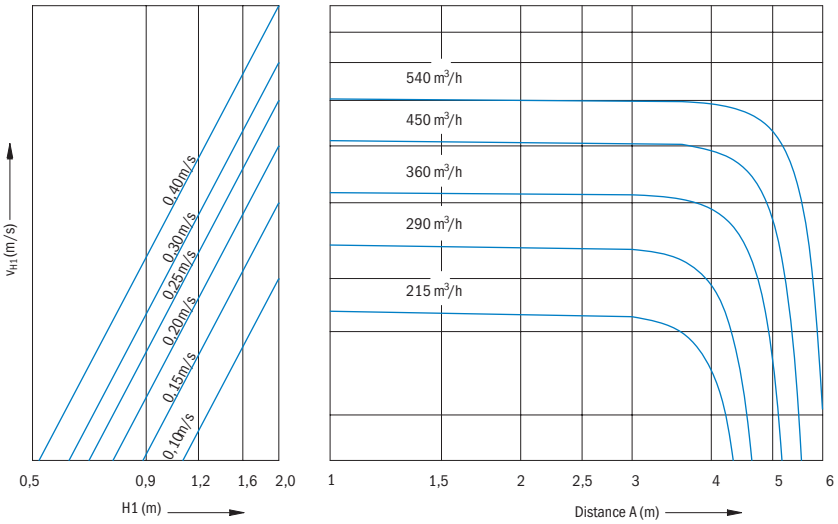



**Static pressure drop and sound power level**

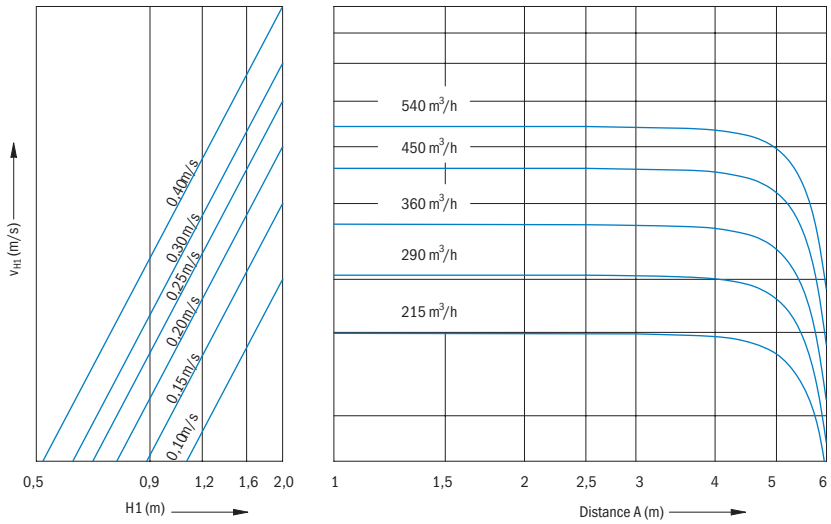


## OD-5 size 400

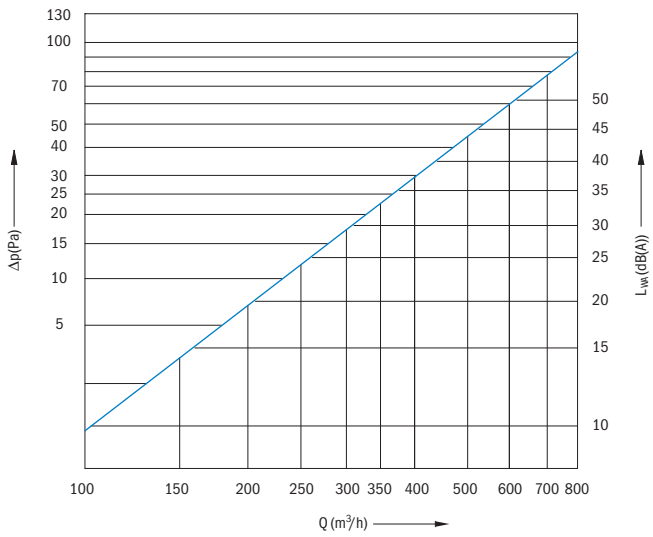
### B = 3m




### B ≥ 4m

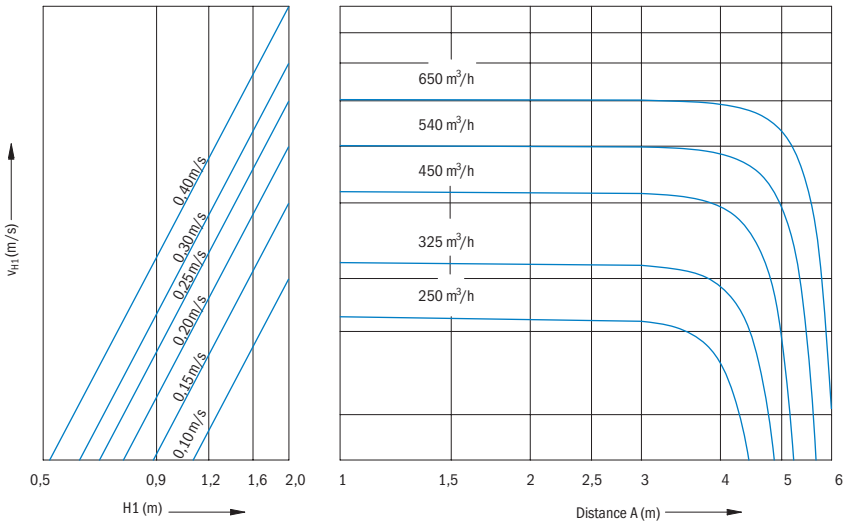



### Static pressure drop and sound power level

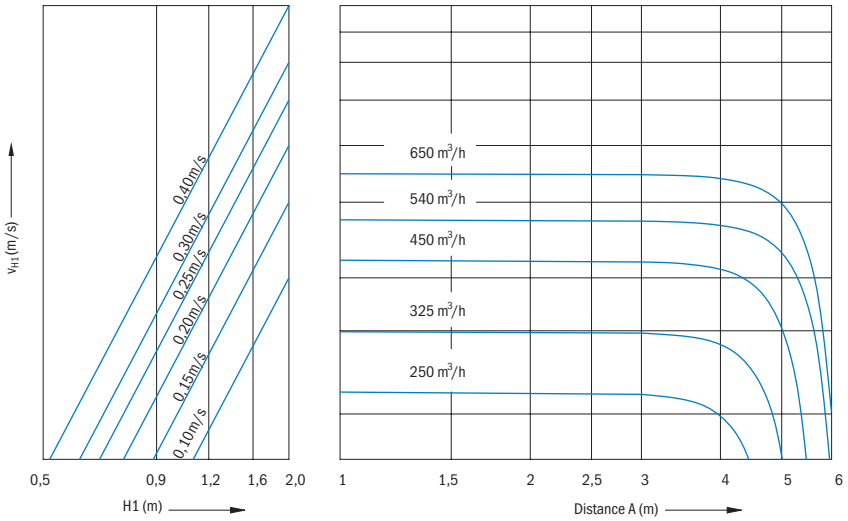


## 0D-5 size 500

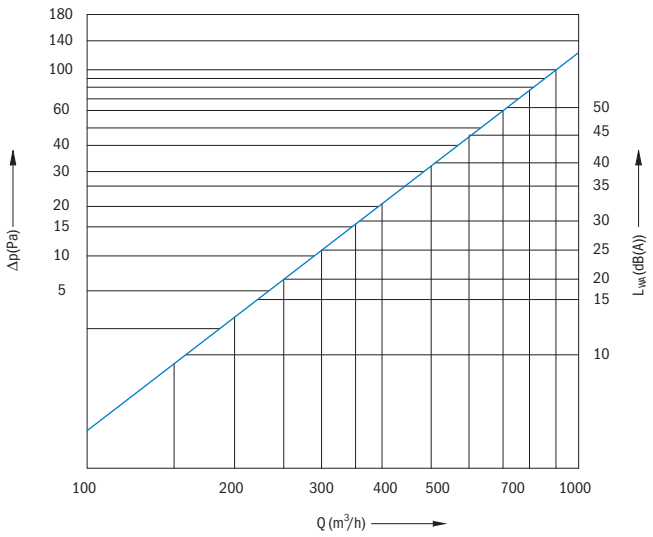
### B = 3m




### B ≥ 4m

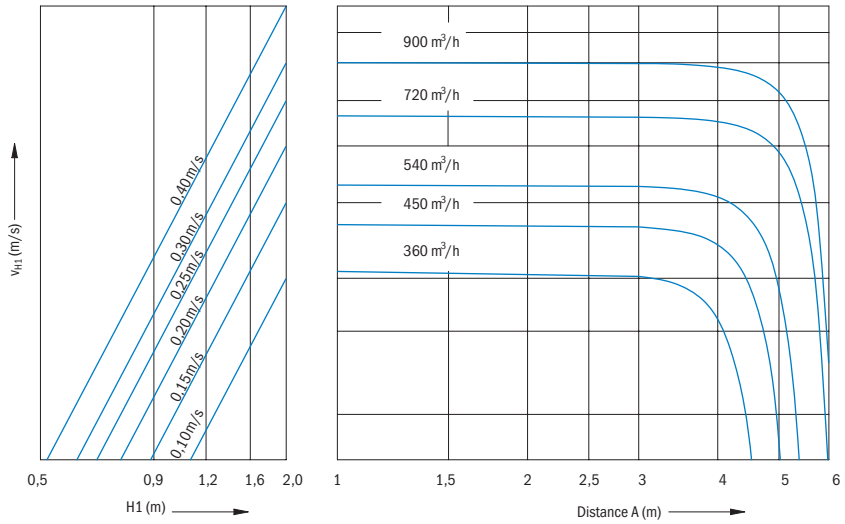



### Static pressure drop and sound power level

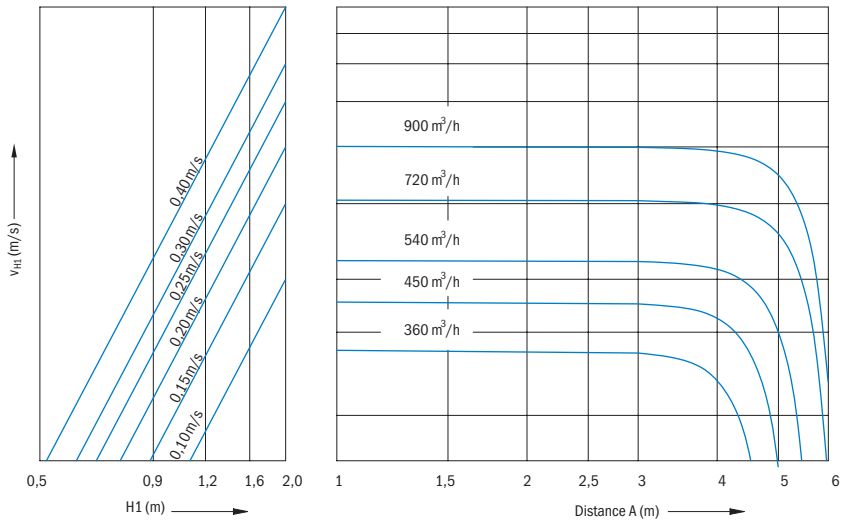


## OD-5 size 600 and 625

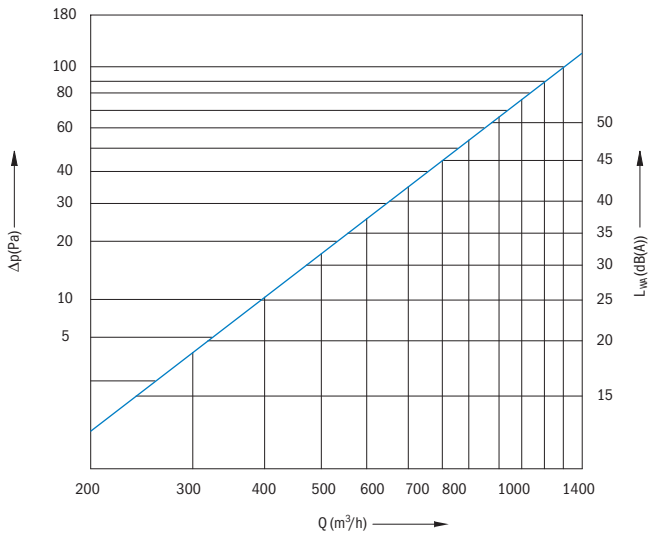
### B = 3m



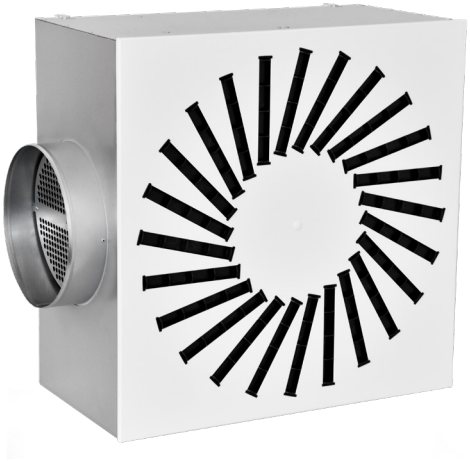

### B ≥ 4m




### Static pressure drop and sound power level



# Swirl diffuser OD-8

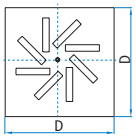


- Square or round front plate with radial deflector arrangement
- Plastic deflectors
- Possible volume control damper in spigot
- Foam sealing on the flange

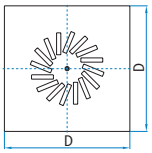
## Front plate shapes and dimensions

OD-8 K

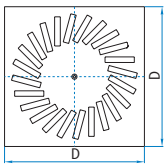
300/8



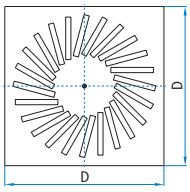

400/16, 500/16, 600/16, 625/16



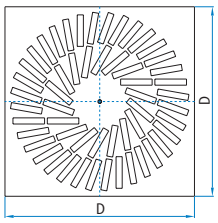

500/24




600/24, 625/24

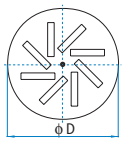



625/54

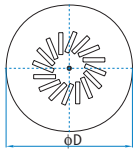



OD-8 R

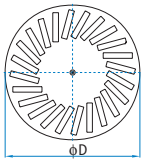
300/8



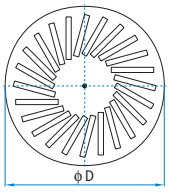

400/16, 500/16, 600/16, 625/16



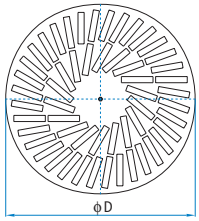

500/24



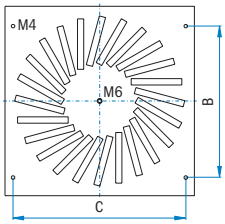

600/24, 625/24




625/54



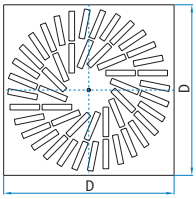

## Fastening with four screws K4



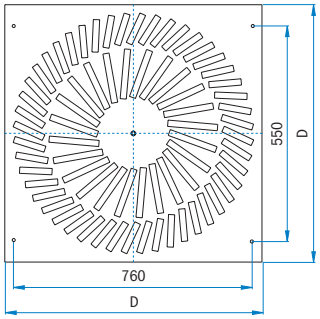

**OD-8K1 1x M6 in the center**
**OD-8K4 4x M4 on the flange**

OD-8 K

600/48

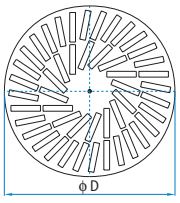



800/72, 825/72

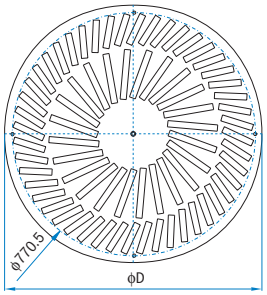



OD-8 R

600/48




800/72, 825/72

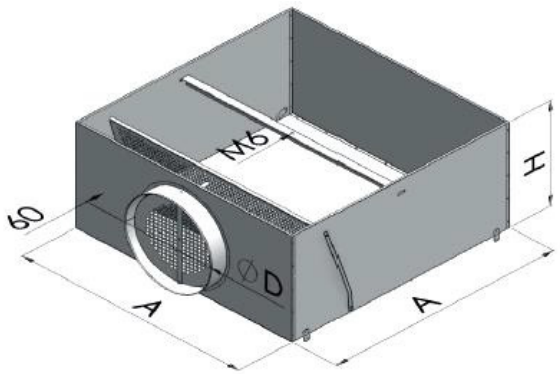



| Size | ΦD | D | B | C | $A_{ef}$ (m²) |
|---|---|---|---|---|---|
| **300/8** | 300 | 295 | 245 | 245 | 0.009464 |
| **400/16** | 400 | 395 | 345 | 345 | 0.018928 |
| **500/16** | 500 | 495 | 445 | 445 | |
| **600/16** | 600 | 595 | 545 | 545 | |
| **625/16** | 625 | 620 | 570 | 570 | |
| **500/24** | 500 | 495 | 445 | 445 | 0.028392 |
| **600/24** | 600 | 595 | 460 | 560 | 0.044928 |
| **625/24** | 625 | 620 | 460 | 560 | |
| **600/48** | 600 | 595 | 460 | 560 | 0.056784 |
| **625/54** | 625 | 620 | 460 | 580 | 0.063882 |
| **800/72** | 800 | 795 | 550 | 760 | 0.101712 |
| **825/72** | 825 | 820 | 550 | 760 | |

$A_{ef}$ – efective discharge area (m²)

## Square plenum box

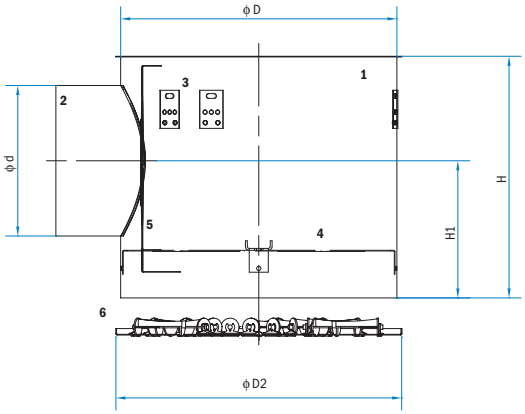
| Designation | Size | A [mm] | ΦD [mm] | H [mm] |
|---|---|---|---|---|
| K/Z/S/M/ | 300/8 | 290 | 158 | 210 |
| K/Z/S/M/ | 400/16 | 390 | 198 | 250 |
| K/Z/S/M/ | 500/16 | 390 | 198 | 250 |
| K/Z/S/M/ | 600/16 | 390 | 198 | 250 |
| K/Z/S/M/ | 625/16 | 390 | 198 | 250 |
| K/Z/S/M/ | 500/24 | 490 | 198 | 250 |
| K/Z/S/M/ | 600/24 | 590 | 248 | 300 |
| K/Z/S/M/ | 625/24 | 590 | 248 | 300 |
| K/Z/S/M/ | 600/48 | 590 | 248 | 300 |
| K/Z/S/M/ | 625/54 | 615 | 248 | 300 |
| K/Z/S/M/ | 800/72 | 790 | 313 | 365 |
| K/Z/S/M/ | 825/72 | 790 | 313 | 365 |



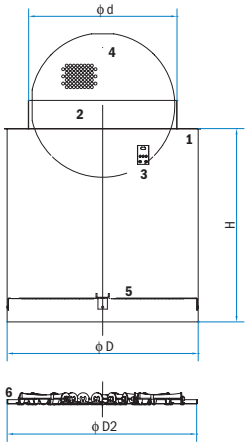

## Round plenum box

| Size | ΦD | ΦD2 | Φd | H | H1 |
|---|---|---|---|---|---|
| 300/8R | 290 | 300 | 158 | 245 | 144 |
| 400/16R | 370 | 400 | 198 | 285 | 164 |
| 500/16R | | 500 | 198 | | |
| 600/16R | | 600 | 198 | | |
| 625/16R | | 625 | 198 | | |
| 500/24R | 488 | 500 | 198 | 285 | 164 |
| 600/24R | 560 | 600 | 248 | 335 | 189 |
| 625/24R | | 625 | 248 | | |
| 600/48R | 590 | 600 | 248 | 335 | 189 |
| 625/54R | 610 | 625 | 248 | 335 | 189 |
| 800/72R | 790 | 800 | 313 | 400 | 221 |
| 825/72R | | 825 | 313 | | |

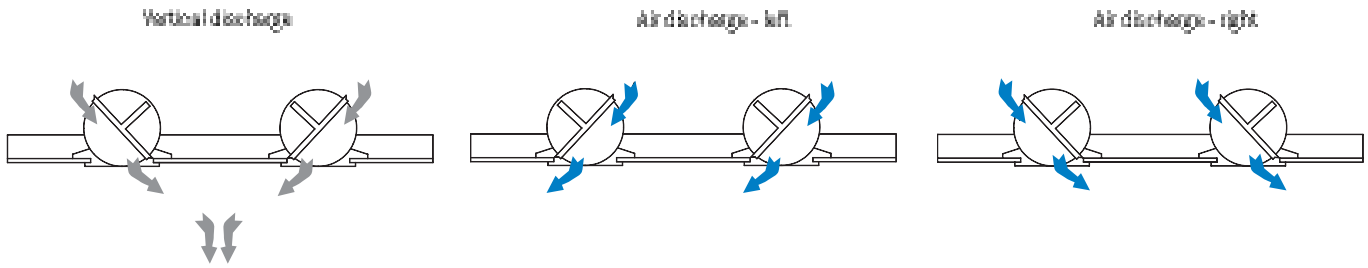
1. Plenum box
2. Inlet spigot
3. Suspension bracket
4. Dispersing plate (only for supply)
5. Volume control damper (M)
6. Diffuser OD-8



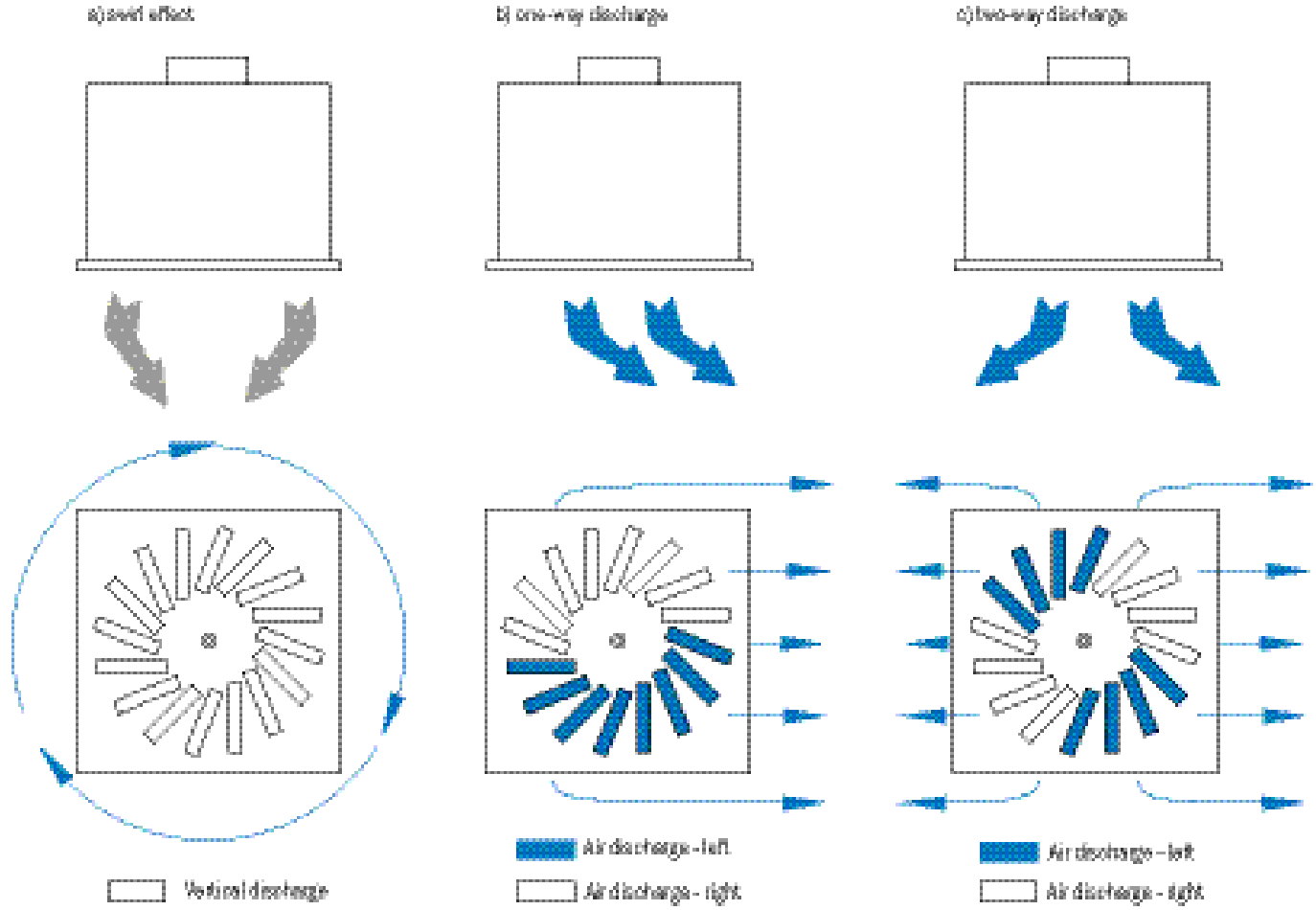

| Size | ΦD | ΦD2 | Φd | H |
|---|---|---|---|---|
| 300/8R | 290 | 300 | 158 | 245 |
| 400/16R | 370 | 400 | 198 | 280 |
| 500/16R | | 500 | 198 | |
| 600/16R | | 600 | 198 | |
| 625/16R | | 625 | 198 | |
| 500/24R | 488 | 500 | 198 | 280 |
| 600/24R | 560 | 600 | 248 | 330 |
| 625/24R | | 625 | 248 | |
| 600/48R | 590 | 600 | 248 | 330 |
| 625/54R | 610 | 625 | 248 | 330 |
| 800/72R | 790 | 800 | 313 | 395 |
| 825/72R | | 825 | 313 | |



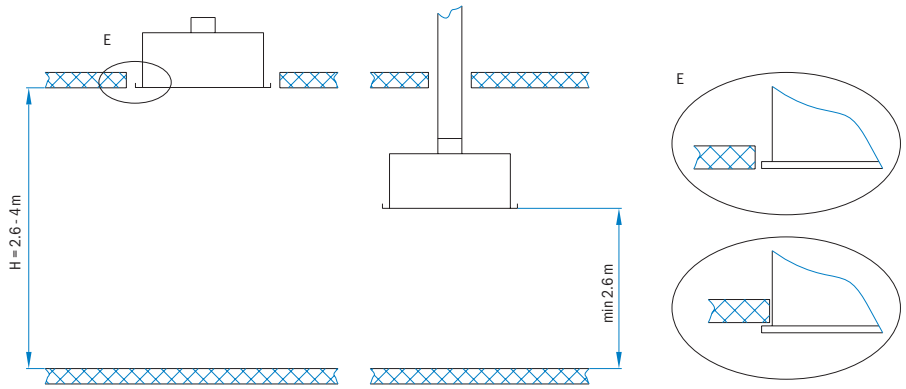
## Direction of deflectors and discharge




## Air jet direction




## Installation



## Ordering key

**OD-8 K1 / Z / S / M / I Size**

1 2 3 4 5 6

1 Diffuser type

| | |
|---|---|
| **OD-8** | Swirl diffuser |

2 Diffuser plate type

| | |
|---|---|
| **K1** | Square diffuser plate, central fastening |
| **K4** | Square diffuser plate, fastening with four screws (for 800/72, 825/; other sizes when ordering diffusers plate only) |
| **R1** | Circular diffuser plate, central fastening only |
| **R4** | Circular diffuser plate, fastening with five screws (for 800/72, 825/; other sizes when ordering diffusers plate only) |

3 Plenum box

| | |
|---|---|
| **Z** | Square plenum box for air supply with black plastic deflectors and perforated dispersion plate |
| **ZW** | Square plenum box for air supply with white plastic deflectors and perforated dispersion plate |
| **A** | Square plenum box for air exhaust **without** plastic deflectors and with perforated dispersion plate |
| **ZR** | Circular plenum box for air supply |

4 Spigot

| | |
|---|---|
| **S** | Side entry spigot |
| **V** | Vertical entry spigot - only on reqest |

5 Air regulation

| | |
|---|---|
| **M** | Volume control damper in entry spigot |

6 Insulation

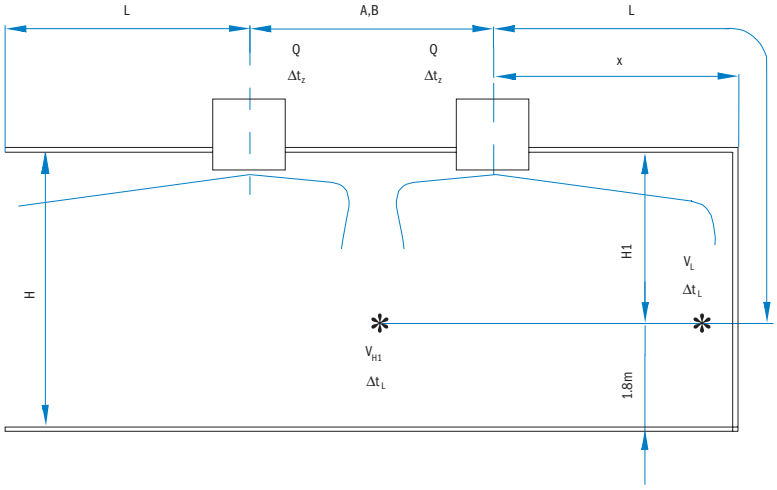
| | |
|---|---|
| **I5** | 5 mm PE thermal insulation outside of ZR plenum box |
| **I6** | 6 mm PE thermal insulation outside of Z plenum box |
| **I9** | 9 mm synthetic rubber based sound & thermal insulation (-40°C - 105°C) outside of ZR plenum box |
| **I10** | 10 mm synthetic rubber based sound & thermal insulation (-40°C - 105°C) outside of Z plenum box |
| **I19** | 19 mm synthetic rubber based sound & thermal insulation (-40°C - 105°C) outside of ZR plenum box |

7 Dimensions

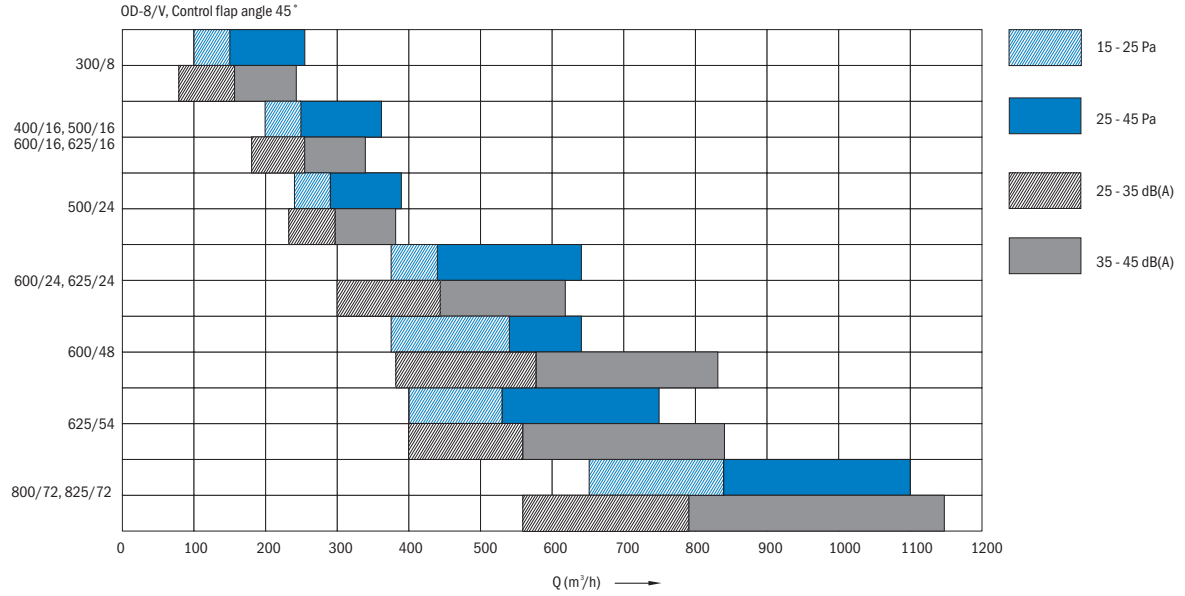
| | |
|---|---|
| **300/8** | |
| **400/16** | |
| **500/16** | |
| **600/16** | |
| **500/24** | |
| **600/24** | |
| **625/24** | |
| **600/48** | |
| **625/54** | |
| **800/72** | with K4 and R4 plate types only: 4 screws along the edge and 1 screw centrally |
| **825/72** | with K4 and R4 plate types only: 4 screws along the edge and 1 screw centrally |

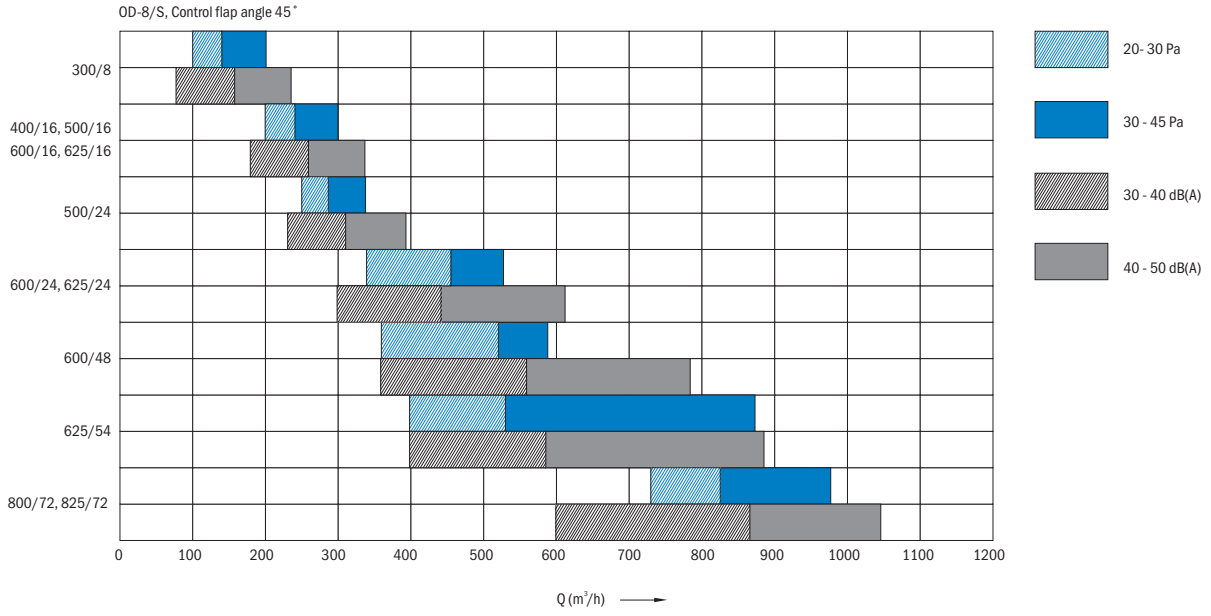
## Definition of symbols

| | |
|---|---|
| **Q (m³/h)** | Air flow |
| **x (m)** | Horizontal distance to wall |
| **H (m)** | Room height |
| **H1 (m)** | Distance from ceilling to occupied zone |
| **L (m)** | Throw distance (L = H1+ x) |
| **$V_L$ (m/s)** | Air velocity at the throw distance L |
| **$\Delta t_z$ (K)** | Temperate difference between the supply and room air |
| **$\Delta t_L$ (K)** | Difference between the core and room air temperature |
| **$\Delta p_t$ (Pa)** | Pressure drop |
| **$L_{WA}$ (dB(A))** | Sound power level |
| **$V_{H1}$ (m/s)** | Air velocity at the H1 distance |
| **A, B (m)** | Distance between two diffusers bylength and width |



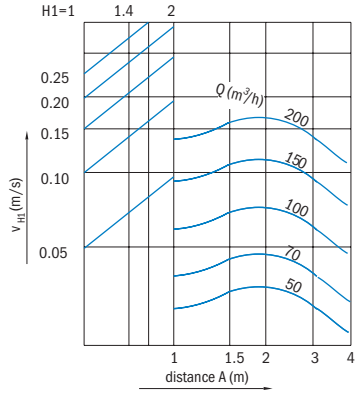

## Fast selection diagram



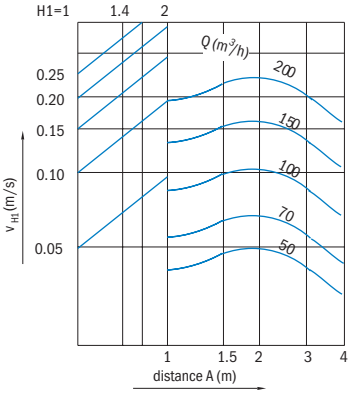



## Air velocity at the throw distances and temperature quotient (with ceiling effect)

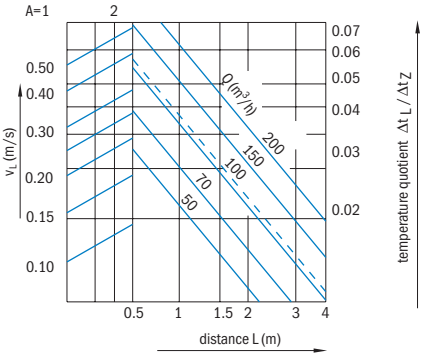
### 300/8
B>4m



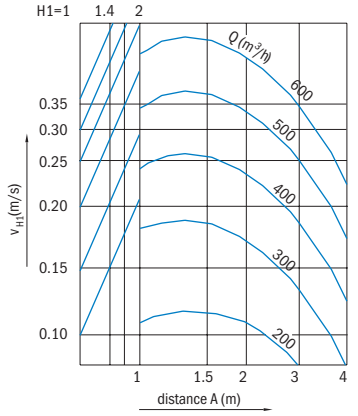

### 300/8
B=2.5 ... 3.5m



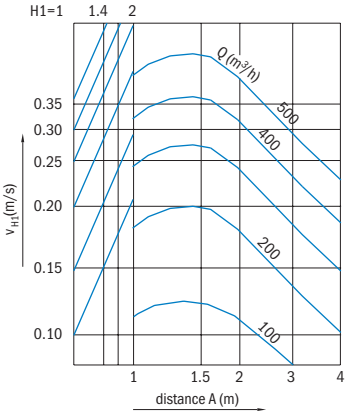

### 300/8



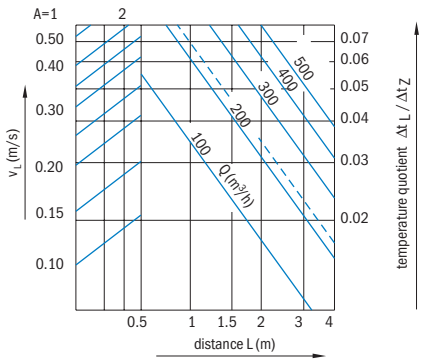

### 400/16,500/16,600/16,625/16
B>4m



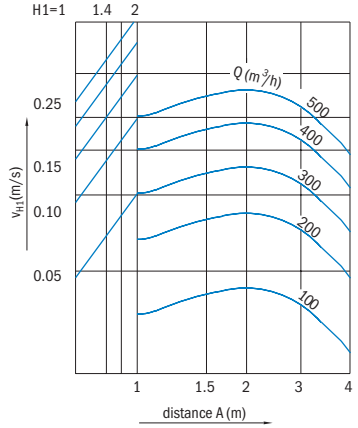

### 400/16,500/16,600/16,625/16
B=2.5 ... 3.5m



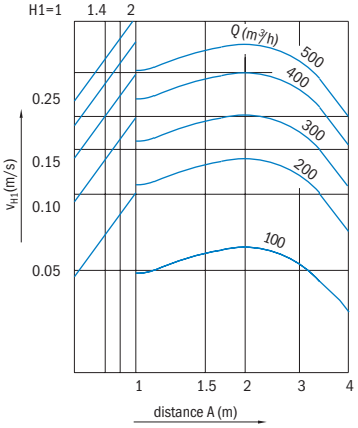

### 400/16,500/16,600/16,625/16



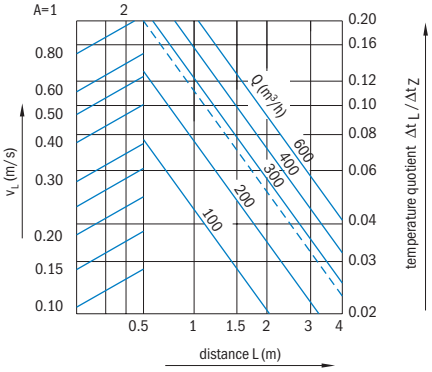

### 500/24
B>4m



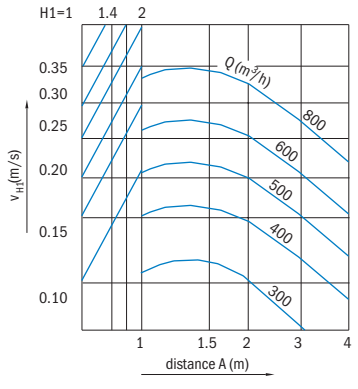

### 500/24
B=2.5 ... 3.5m



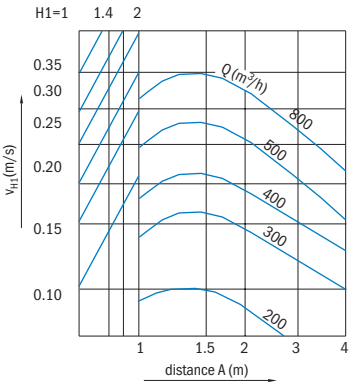

### 500/24



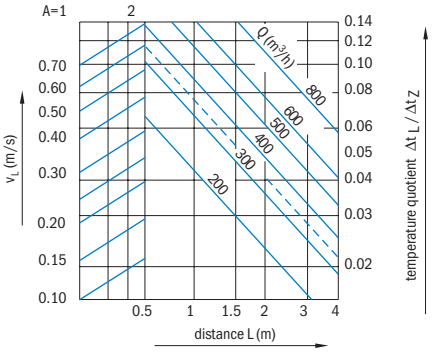

### 600/24,625/24
B>4m




### 600/24,625/24
B=2.5 ... 3.5m

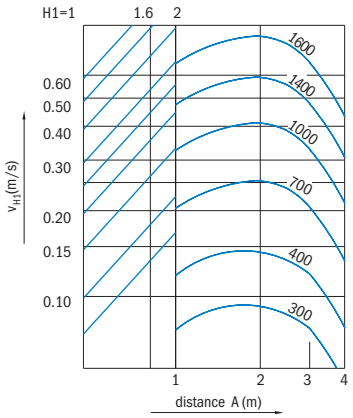



### 600/24,625/24

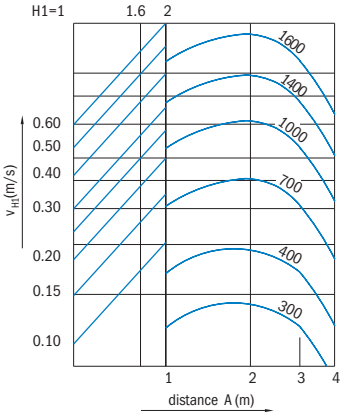


## Air velocity at the throw distance and temperature quotient (with ceiling effect)

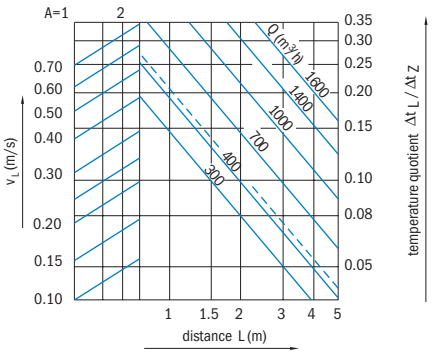
**600/48**
B>4m



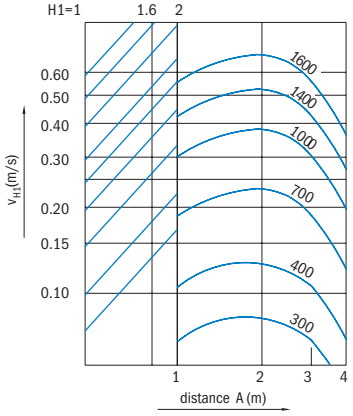

**600/48**
B=2.5 ... 3.5m



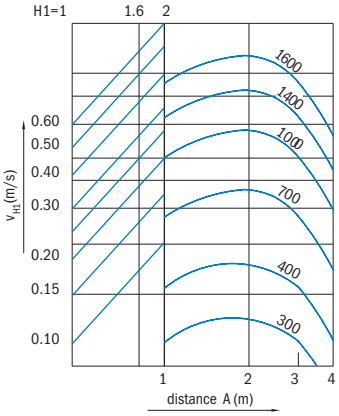

**600/48**



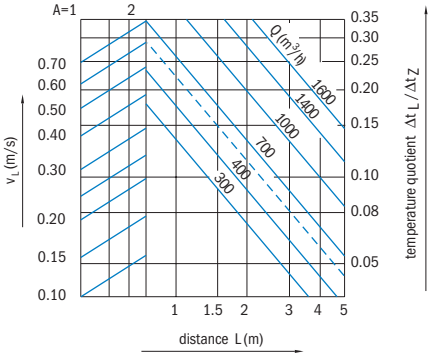

**625/54**
B>4m



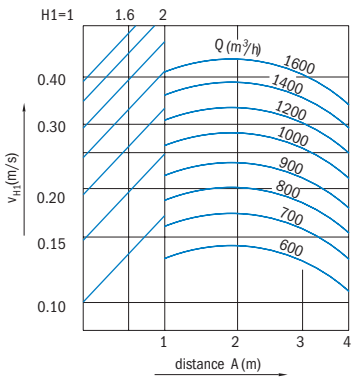

**625/54**
B=2.5 ... 3.5m



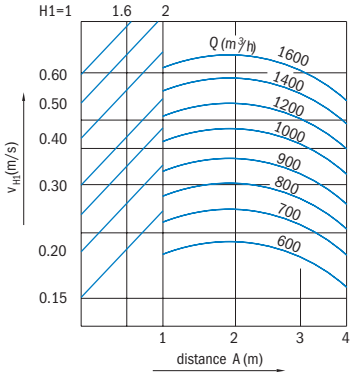

**625/54**



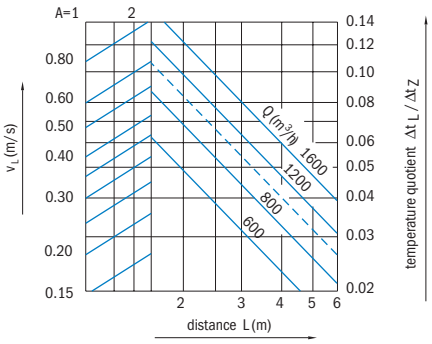

**800/72, 825/72**
B>4m




**800/72, 825/72**
B=2.5 ... 3.5m

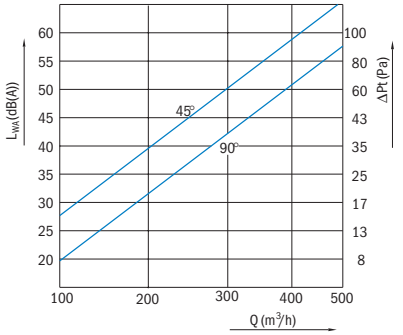



**800/72, 825/72**

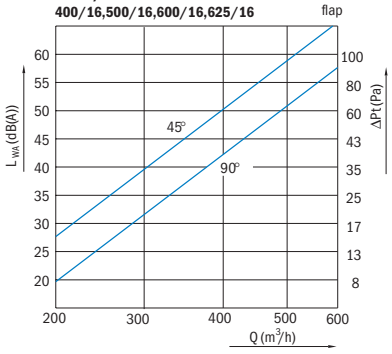


## **Pressure drop and sound power level diagrams** (Control flap angle: 90° – opened, 45° – half opened)

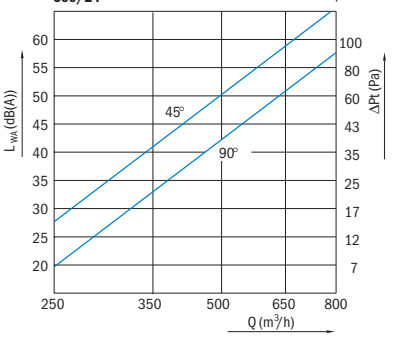
**OD-8/V**
**300/8**



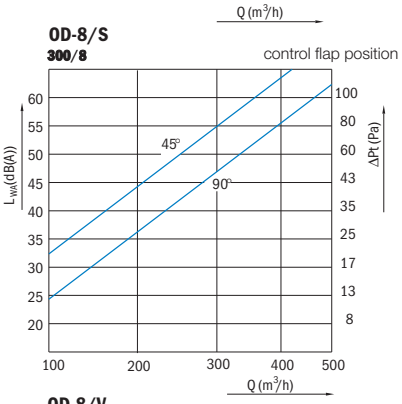

**OD-8/V**
**400/16,500/16,600/16,625/16**



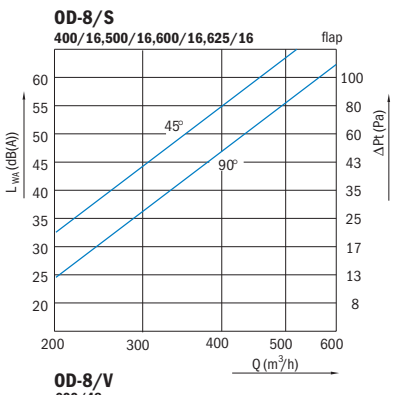

**OD-8/V**
**500/24**



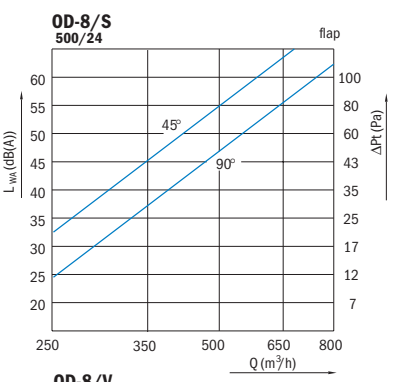

**OD-8/S**
**300/8**



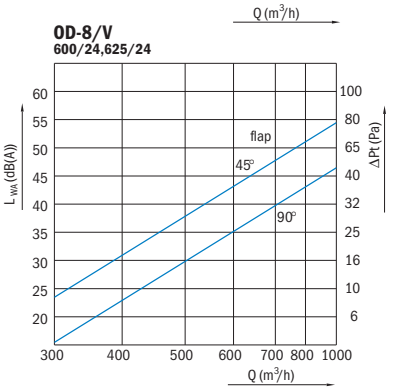

**OD-8/S**
**400/16,500/16,600/16,625/16**



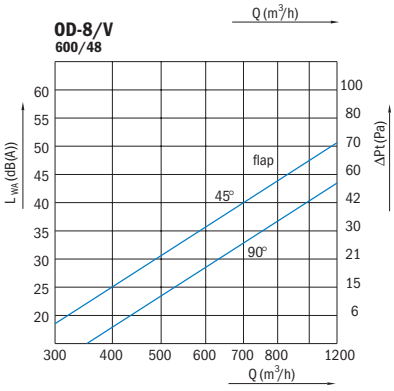

**OD-8/S**
**500/24**



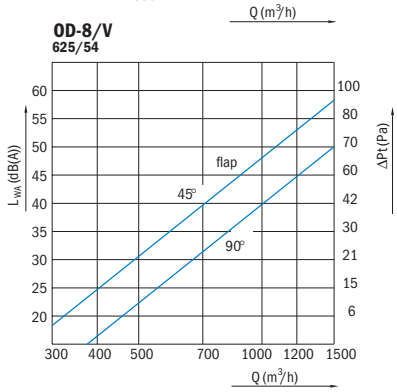

**OD-8/V**
**600/24,625/24**



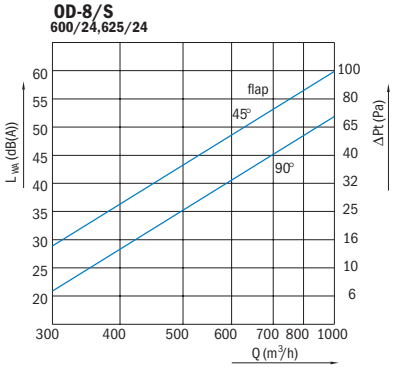

**OD-8/V**
**600/48**



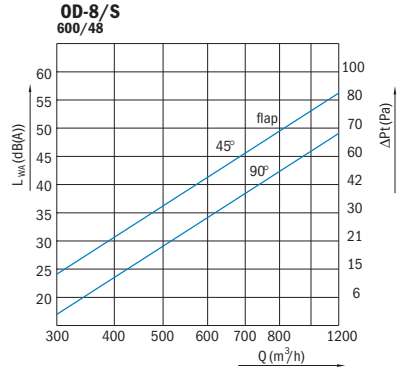

**OD-8/V**
**625/54**



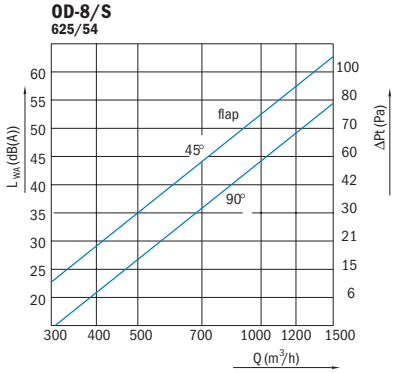

**OD-8/S**
**600/24,625/24**



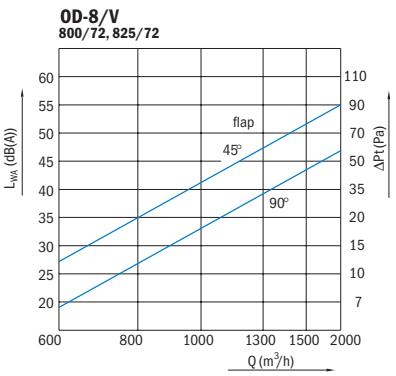

**OD-8/S**
**600/48**



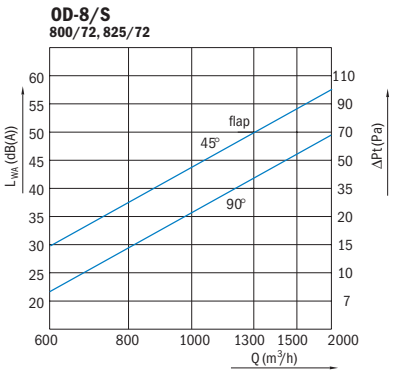

**OD-8/S**
**625/54**




**OD-8/V**
**800/72, 825/72**



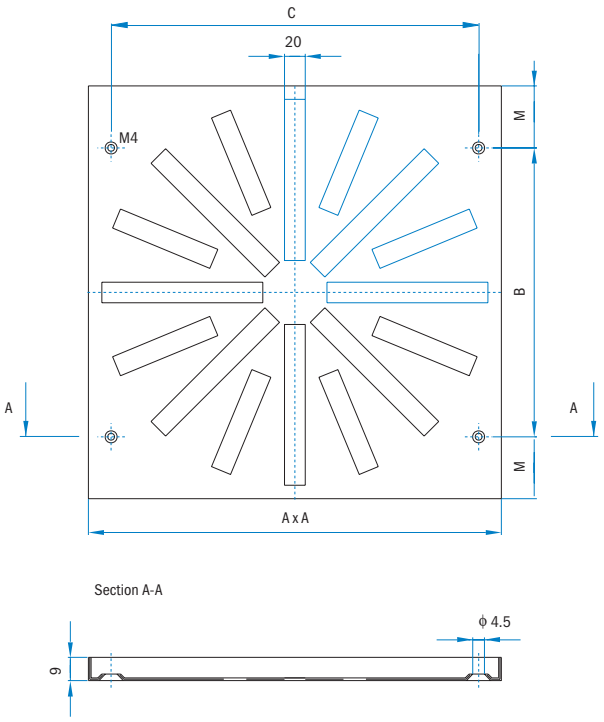

**OD-8/S**
**800/72, 825/72**



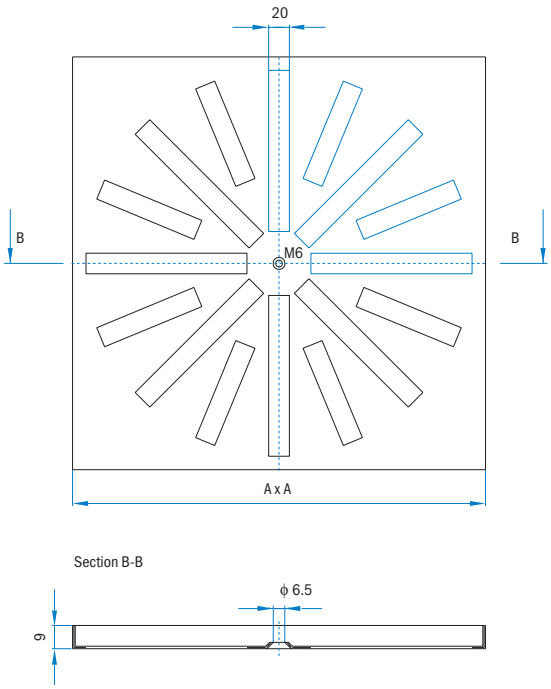
# Swirl diffuser OD-9

- Square or round front mask
- Square or radial deflector arrangement
- Plastic deflectors
- Possible volume control damper in spigot
- Foam sealing on the flange

## Fastening of the plate




**Fastening with four screws (4xM4)**



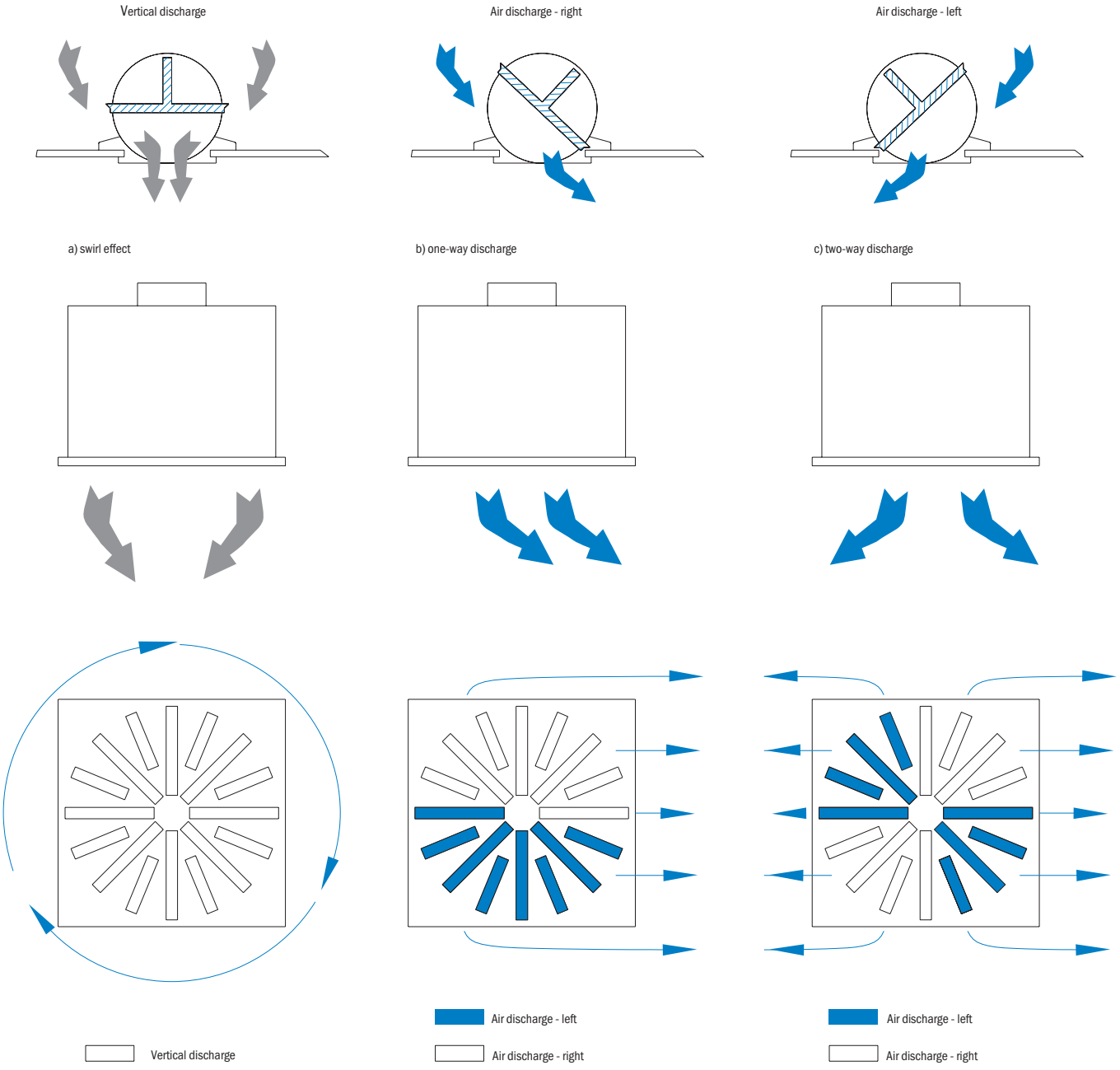

**Central fastening (1xM6)**

Fastening with four screw is recommended by sizes 600 and 625. For size 800, fastening with five screws is always applied (4xM4 + 1xM6).

| Size | A | M | B | C | $A_{ef}$/K | $A_{ef}$/R |
|---|---|---|---|---|---|---|
| **310** | 305 | 59 | 190 | 270 | 0.0192 | 0.0120 |
| **400** | 395 | 64 | 270 | 360 | 0.0248 | 0.0248 |
| **500** | 495 | 64 | 370 | 460 | 0.0517 | 0.0392 |
| **600** | 595 | 69 | 460 | 560 | 0.0718 | 0.0565 |
| **625** | 620 | 81.5 | 460 | 560 | 0.0718 | 0.0565 |
| **800** | 795 | 124 | 550 | 760 | 0.1359 | 0.0938 |

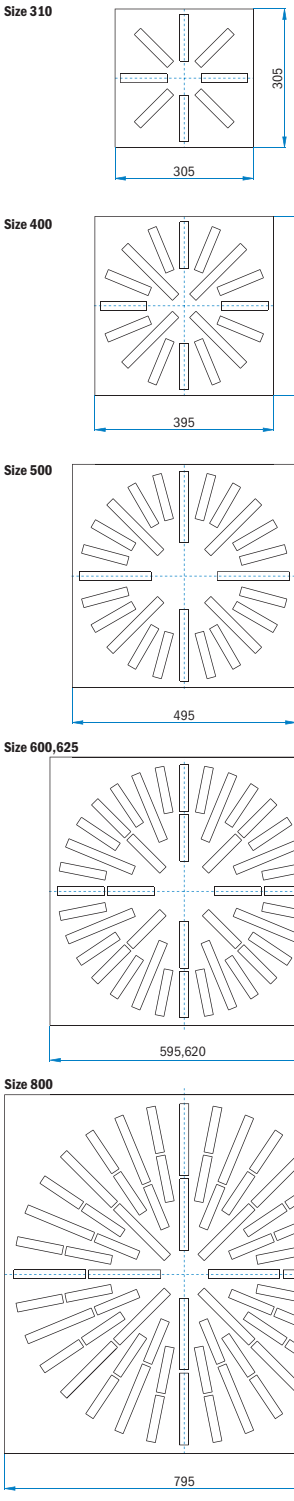
$A_{ef}$ – efective discharge area (m²)

## Discharge direction and air jet shape

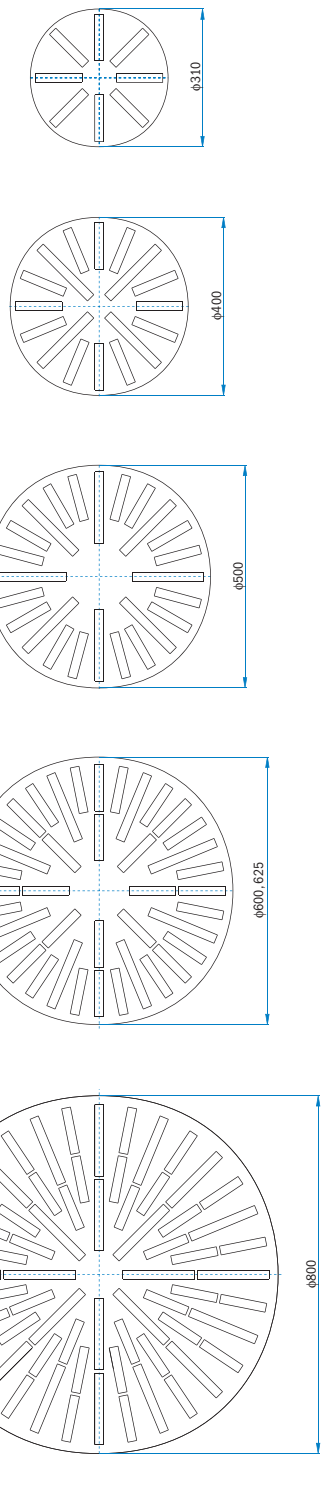


## Diffuser face forms and blades arrangement

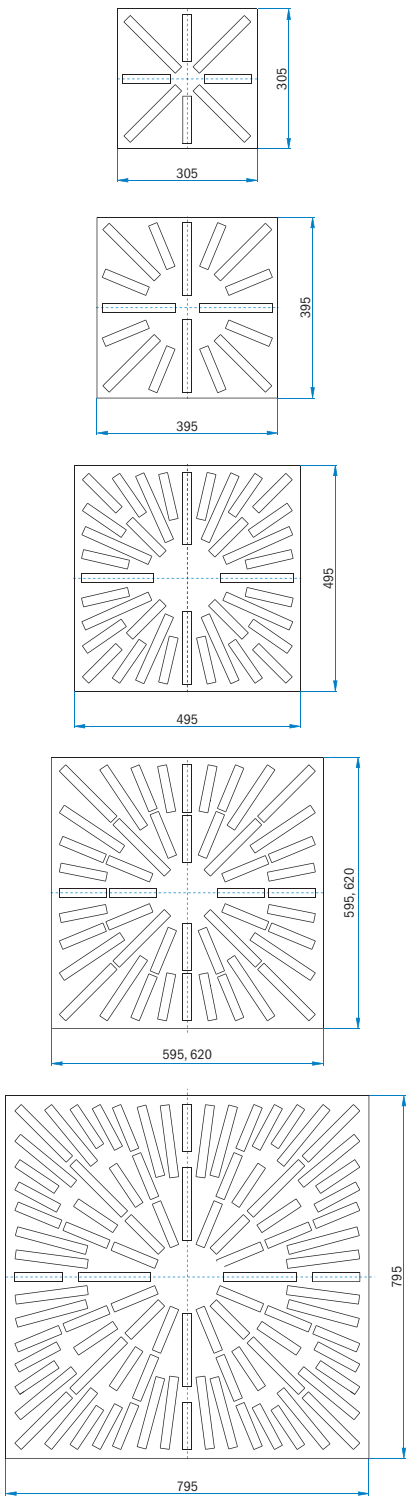
### OD-9/KR




### OD-9/RR

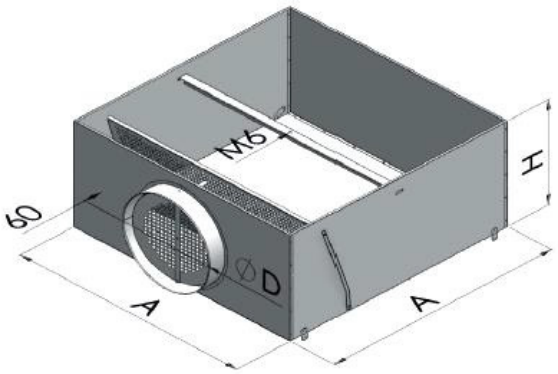



### OD-9/KK



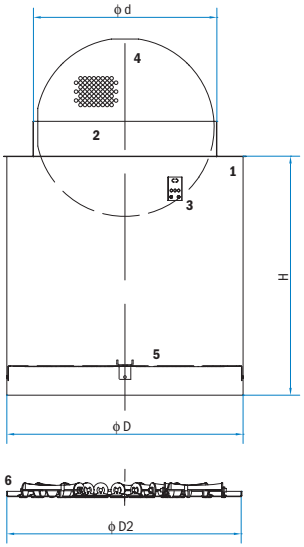
## Square plenum box

| Designation | Size | A [mm] | ΦD [mm] | H [mm] |
|---|---|---|---|---|
| **K/Z/S/M/** | 310 | 290 | 158 | 210 |
| **K/Z/S/M/** | 400 | 390 | 198 | 250 |
| **K/Z/S/M/** | 500 | 490 | 248 | 300 |
| **K/Z/S/M/** | 600 | 590 | 248 | 300 |
| **K/Z/S/M/** | 625 | 590 | 248 | 300 |
| **K/Z/S/M/** | 800 | 790 | 313 | 365 |

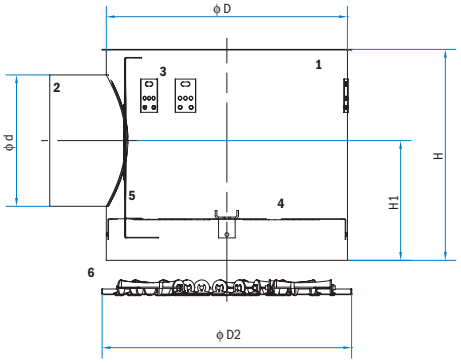



## Round plenum box

**1.** Plenum box
**2.** Inlet spigot
**3.** Suspension bracket
**4.** Dispersing plate (only for supply)
**5.** Volume control damper
**6.** Diffuser OD-9




| Size | ΦD2 | ΦD | H | Φd |
|---|---|---|---|---|
| **310 RR,KR** | 310 | 290 | 245 | 158 |
| **400 RR,KR** | 400 | 390 | 280 | 198 |
| **500 RR,KR** | 500 | 488 | 330 | 248 |
| **600 RR,KR** | 600 | 590 | 330 | 248 |
| **625 RR,KR** | 625 | 590 | 330 | 248 |
| **800 RR,KR** | 800 | 790 | 395 | 313 |




| Size | ΦD2 | ΦD | H | H1 | Φd |
|---|---|---|---|---|---|
| **310 RR,KR** | 310 | 290 | 245 | 144 | 158 |
| **400 RR,KR** | 400 | 390 | 285 | 164 | 198 |
| **500 RR,KR** | 500 | 488 | 335 | 189 | 248 |
| **600 RR,KR** | 600 | 590 | 335 | 189 | 248 |
| **625 RR,KR** | 625 | 590 | 335 | 189 | 248 |
| **800 RR,KR** | 800 | 790 | 400 | 211 | 313 |

## Ordering key

**OD-9 KR1 / ZR / S / M / I5 400**

1 2 3 4 5 6 7

1 Diffuser type

| | |
|---|---|
| **OD-9** | Swirl diffuser |

2 Diffuser plate type

| | |
|---|---|
| **KK1** | Square diffuser plate, square blade arrangement, central fastening |
| **KK4** | Square diffuser plate, square blade arrangement fastening with four screws |
| **KR1** | Square diffuser plate, radial blade arrangement, central fastening |
| **KR4** | Square diffuser plate, radial blade arrangement, fastening with four screws |
| **RR1** | Circular diffuser plate, central fastening |
| **RR4** | Circular diffuser plate, fastening with five screws (for size 800 only), without plenum box |

3 Plenum box

| | |
|---|---|
| **Z** | Square plenum box for air supply with black plastic deflectors and perforated dispersion plate |
| **ZW** | Square plenum box for air supply with white plastic deflectors and perforated dispersion plate |
| **A** | Square plenum box for air exhaust **without** plastic deflectors and with perforated dispersion plate |
| **ZR** | Circular plenum box for air supply (only KR1 and RR1) |

4 Spigot

| | |
|---|---|
| **S** | Side entry spigot |
| **V** | Vertical entry spigot - only on reqest |

5 Air regulation

| | |
|---|---|
| **M** | Volume control damper in entry spigot |

6 Insulation

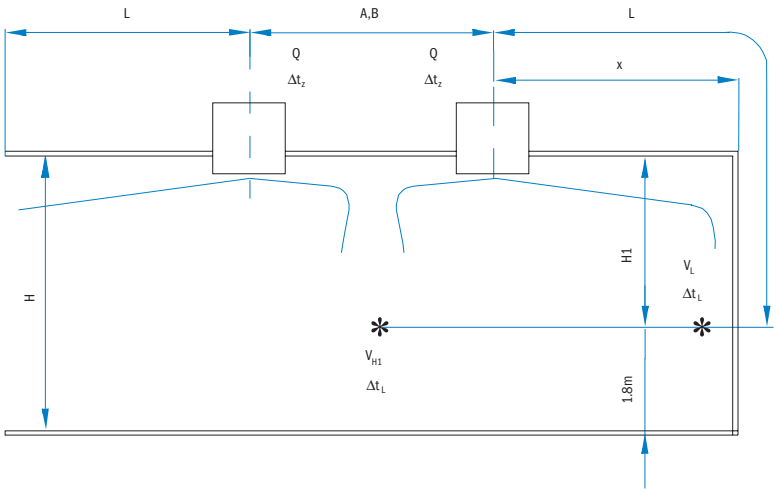
| | |
|---|---|
| **I5** | 5 mm PE thermal insulation outside of ZR plenum box |
| **I6** | 6 mm PE thermal insulation outside of Z plenum box |
| **I9** | 9 mm synthetic rubber based sound & thermal insulation (-40°C - 105°C) outside of ZR plenum box |
| **I10** | 10 mm synthetic rubber based sound & thermal insulation (-40°C - 105°C) outside of Z plenum box |
| **I19** | 19 mm synthetic rubber based sound & thermal insulation (-40°C - 105°C) outside of ZR plenum box |

7 Dimensions

| | |
|---|---|
| **310** | plenum bow for size is not available! |
| **400** | KK4, KR4 versions available when ordering diffusers only, without plenum box |
| **500** | KK4, KR4 versions available when ordering diffusers only, without plenum box |
| **600** | |
| **625** | |
| **800** | with KK4, KR4, RR4 plate types only, fastening with 5 screws: 4 along the edge and 1 centrally |

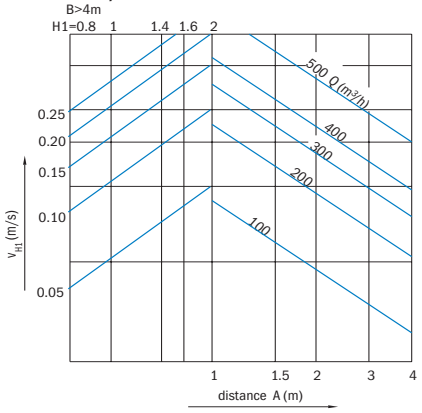
## Definition of symbols

| | |
|---|---|
| **Q (m³/h)** | Air flow |
| **x (m)** | Horizontal distance to wall |
| **H (m)** | Room height |
| **H1 (m)** | Distance from ceilling to occupied zone |
| **L (m)** | Throw distance (L = H1+ x) |
| **$V_L$ (m/s)** | Air velocity at the throw distance L |
| **$\Delta t_z$ (K)** | Temperate difference between the supply and room air |
| **$\Delta t_L$ (K)** | Difference between the core and the room air temperature |
| **$\Delta p_t$ (Pa)** | Pressure drop |
| **$L_{WA}$ (dB(A))** | Sound power level |
| **$V_{H1}$ (m/s)** | Air velocity at the H1 distance |
| **A, B (m)** | Distance between two diffusers byl ength and width |

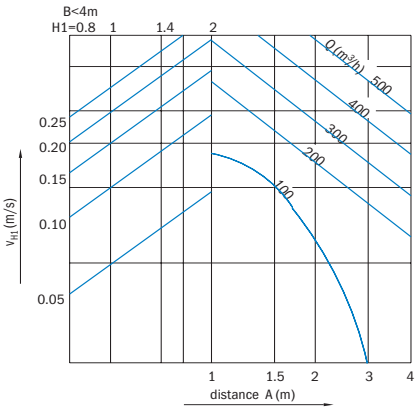


## Air velocity at the throw distances and temperature quotient (with ceiling effect)

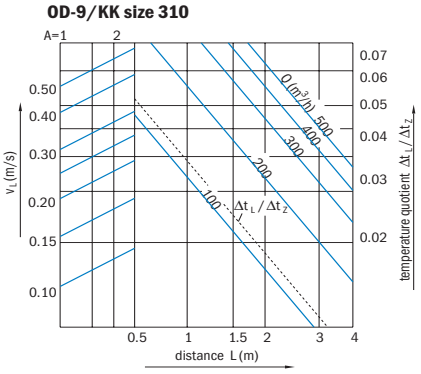
### OD-9/KK size 310



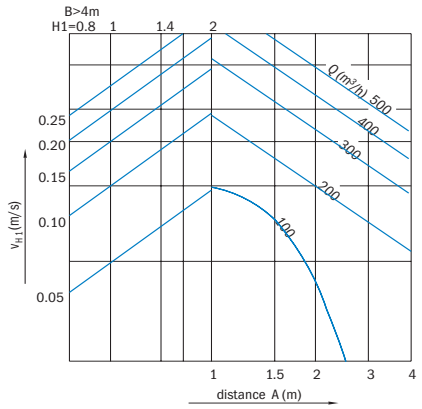

### OD-9/KR, RR size 310



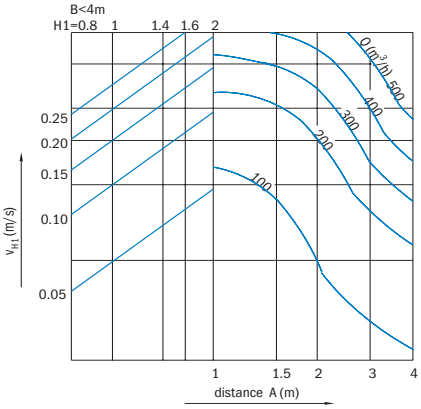

### OD-9/KK size 310



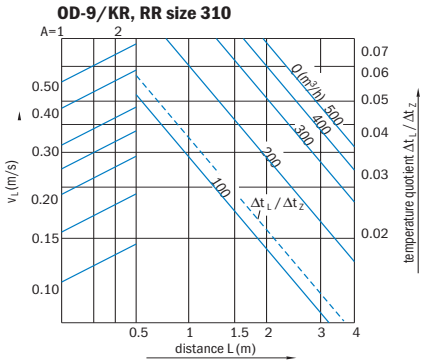

### OD-9/KR, RR size 310



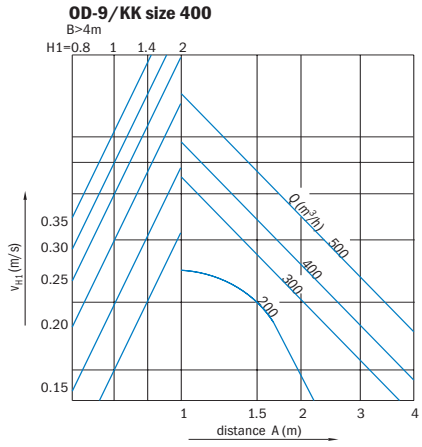

### OD-9/KK size 310




### OD-9/KR, RR size 310




### OD-9/KK size 400

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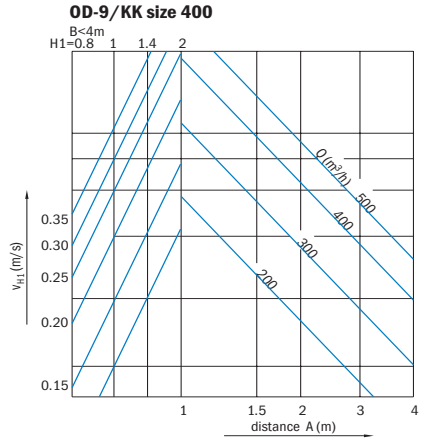
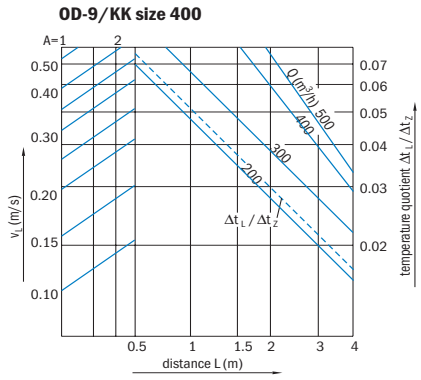
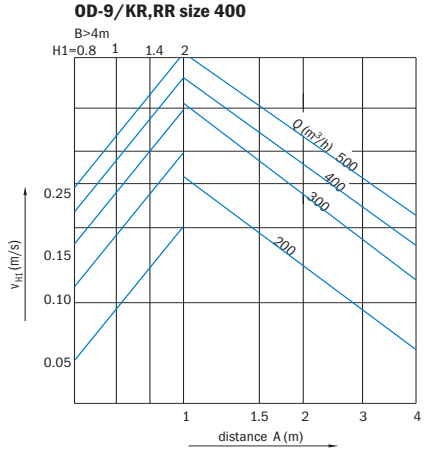



### OD-9/KK size 400




### OD-9/KR,RR size 400

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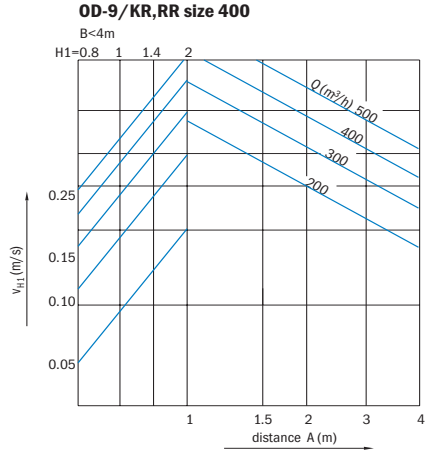
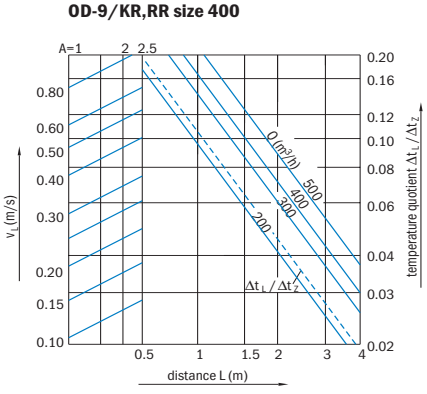


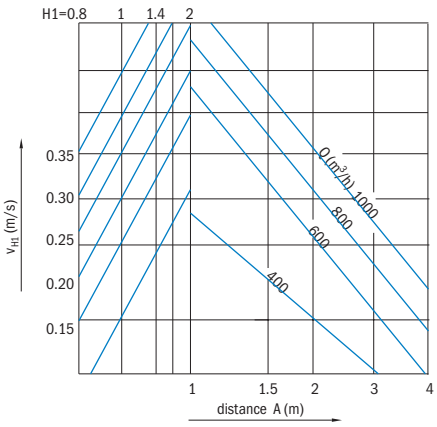

### OD-9/KR,RR size 400



## Air velocity at the throw distances and temperature quotient (with ceiling effect)

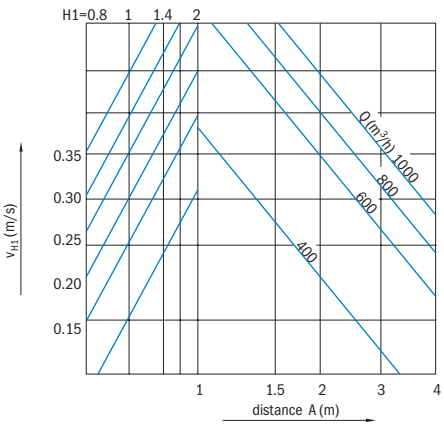
### OD-9/KK size 500

B>4m




### OD-9/KK size 500

B<4m

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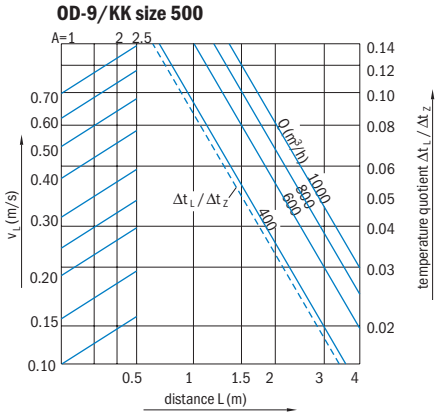
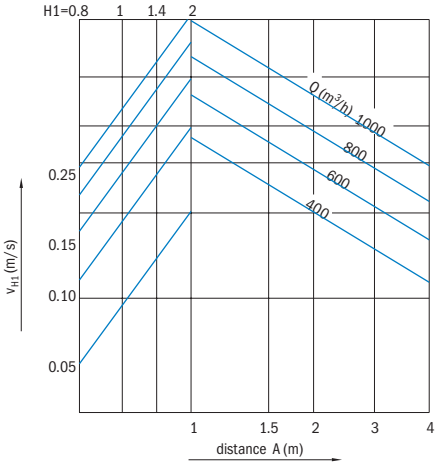


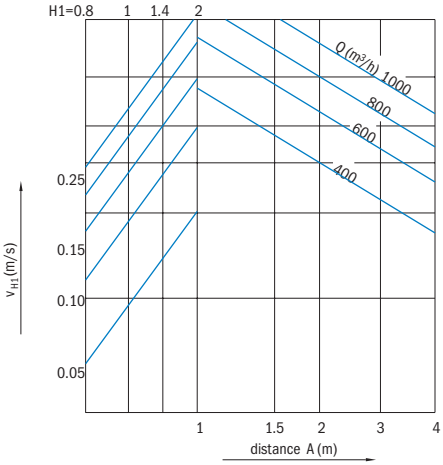

### OD-9/KR,RR size 500

B>4m

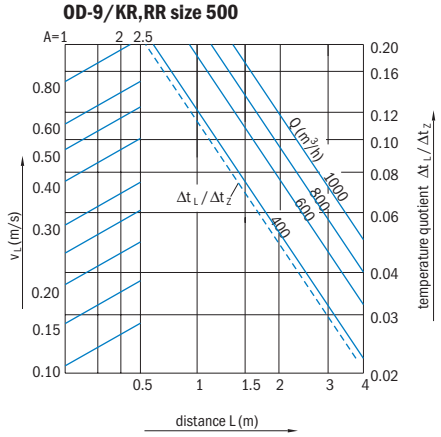



### OD-9/KR.RR size 500

B<4m

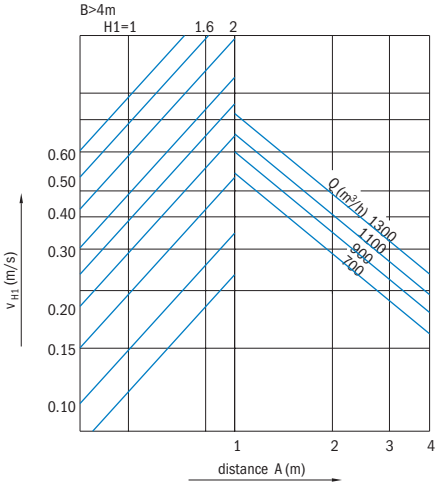



### OD-9/KR,RR size 500



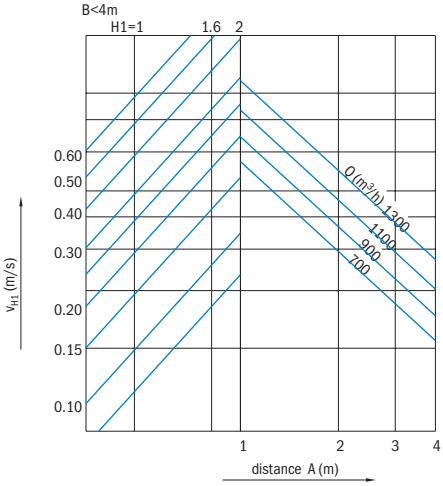

### OD-9/KK size 600

B>4m

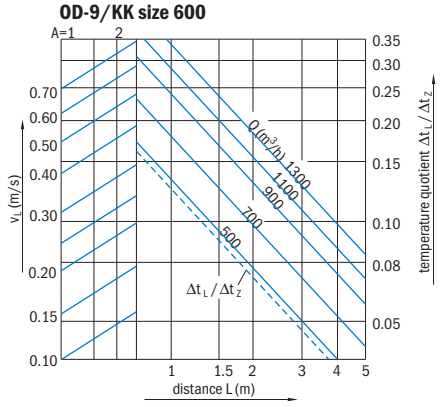



### OD-9/KK size 600

B<4m



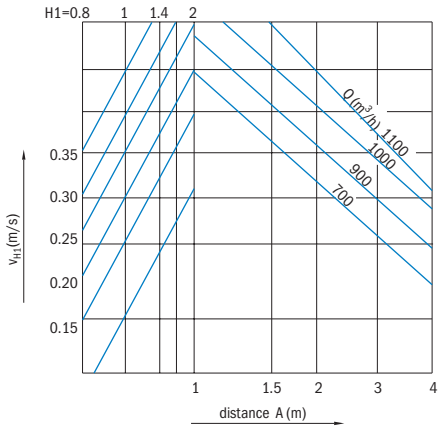

### OD-9/KK size 600



## Air velocity at the throw distances and temperature quotient (with ceiling effect)

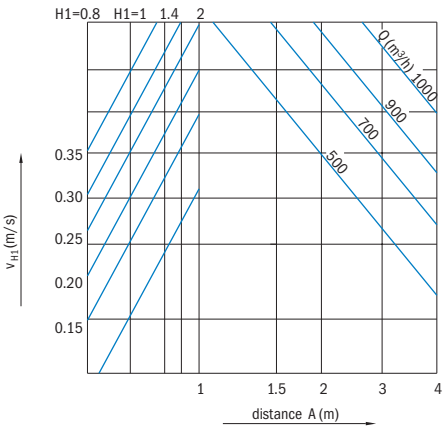
**OD-9/KR,RR size 600**

B>4m

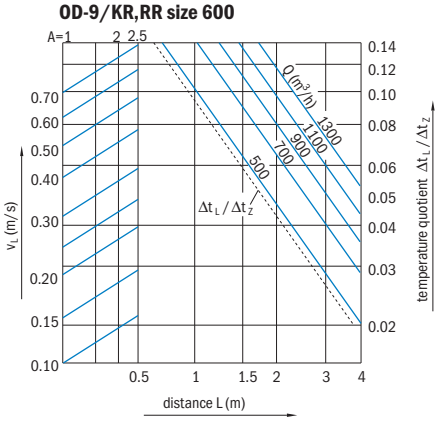



**OD-9/KR,RR size 600**

B<4m

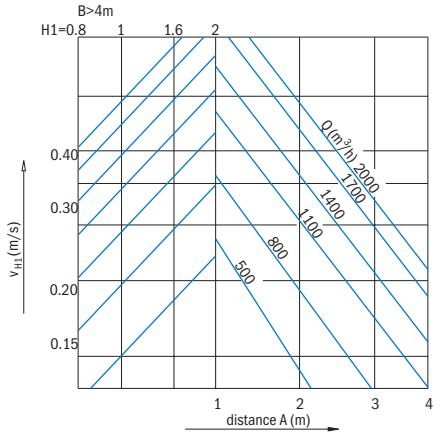



**OD-9/KR,RR size 600**



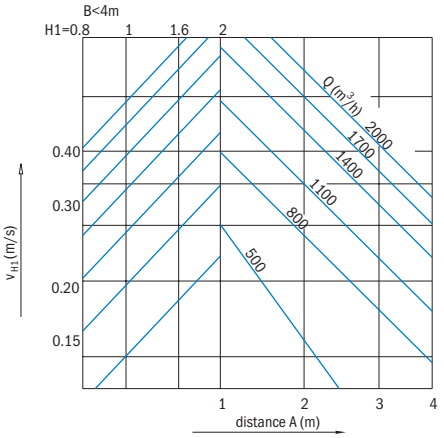

**OD-9/KK size 800**

B>4m

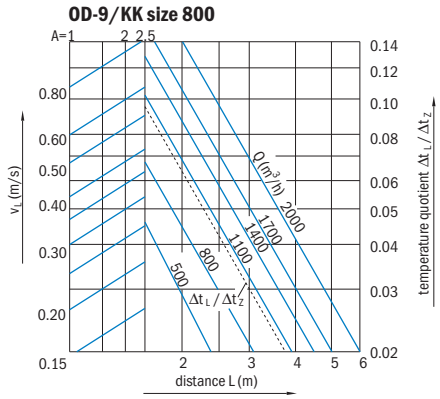



**OD-9/KK size 800**

B<4m

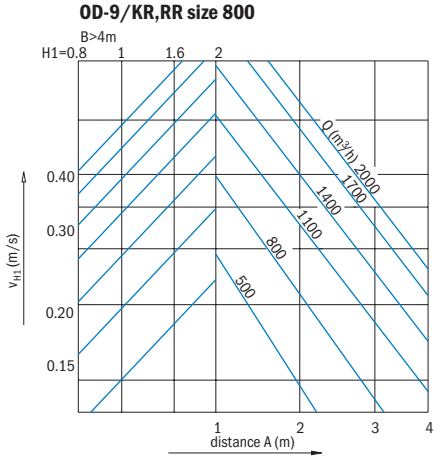



**OD-9/KK size 800**



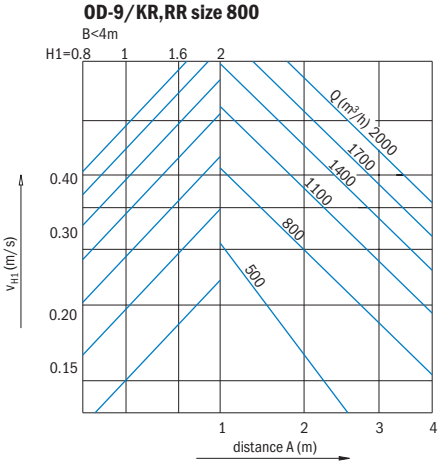

**OD-9/KR,RR size 800**

B>4m

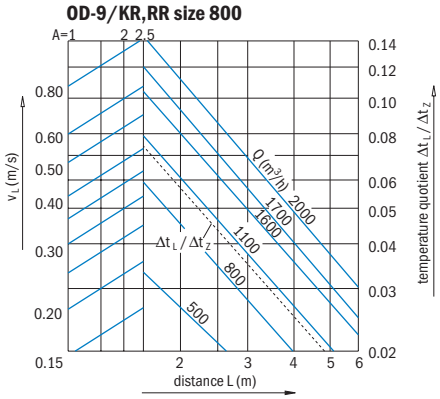



**OD-9/KR,RR size 800**

B<4m



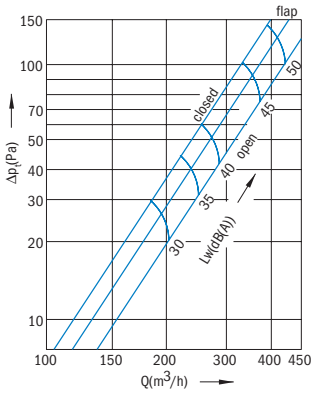

**OD-9/KR,RR size 800**



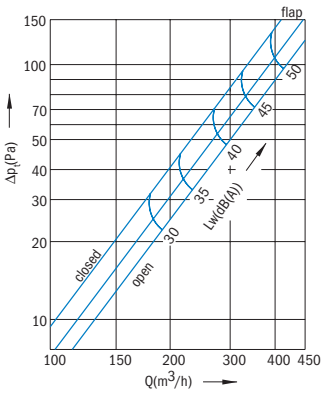
## Pressure drop and sound power level

Control flap angle: 90° – opened, 45° – half opened

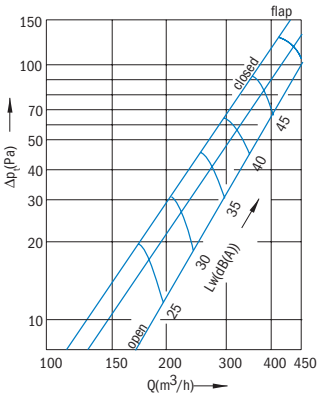
**OD-9/K size 310**



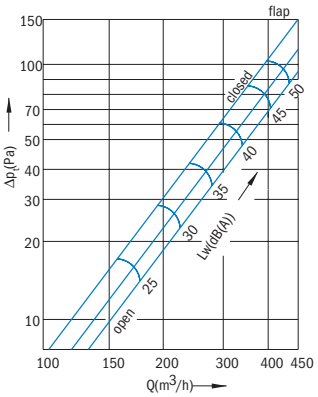

**OD-9/R size 310**



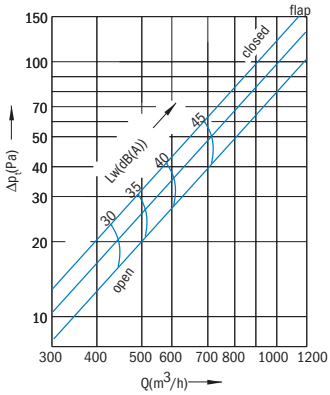

**OD-9/K size 400**



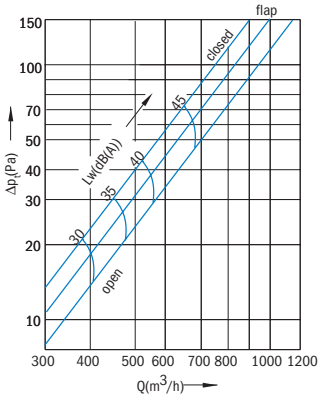

**OD-9/R size 400**



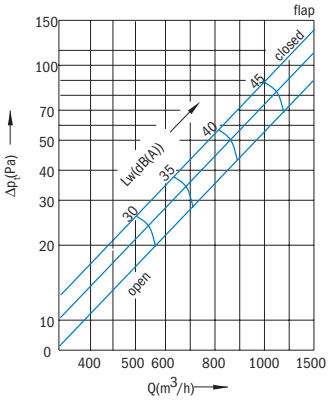

**OD-9/K size 500**



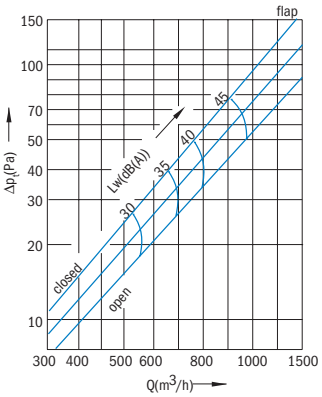

**OD-9/R size 500**



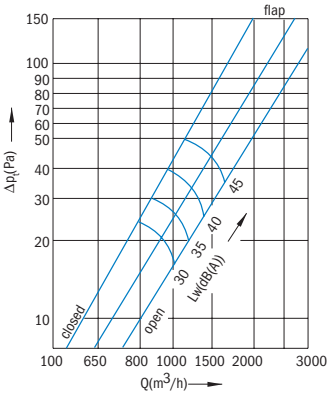

**OD-9/K size 600, 625**



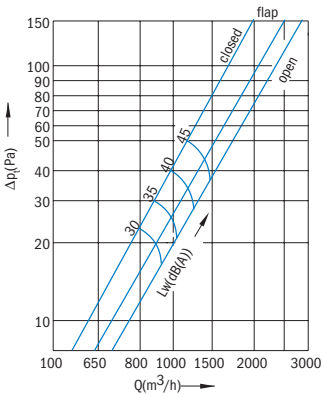

**OD-9/R size 600, 625**




**OD-9/K size 800**



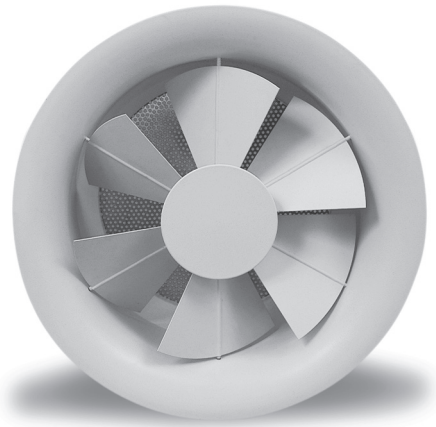

**OD-9/R size 800**



# Variable swirl diffusers OD-11

## Application

Diffuser is designed for air conditioning of rooms with floor to ceiling highs of 3 to 10 m and high induction requirements. It is suitable for large temperature difference between supply and room air.



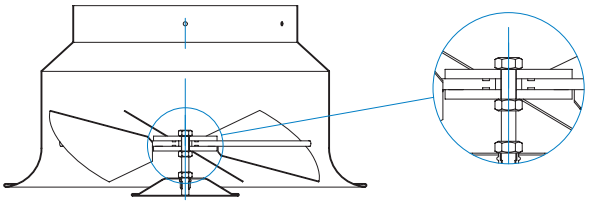
## Description

Diffuser is made of housing which has a diffusing funnel mounted at the bottom. The direction of the discharged air is altered via the separately adjustable blades. The shape of the diffuser's inner part allows "Coanda" effect.

Housing consists of sheet aluminium and blades of pickled sheet steel. Complete diffuser is powder painted in RAL 9010 or any colour upon customer's request.

## Individually adjustable blades OD-11

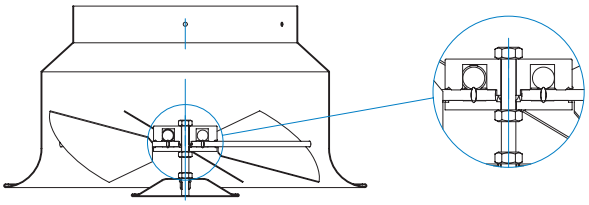
Use of the individually adjustable blades is recommended when the ventilation system is designed for the specific mode of operation and the blades can be adjusted during the diffuser installation.



## Variable swirl diffuser OD-11V

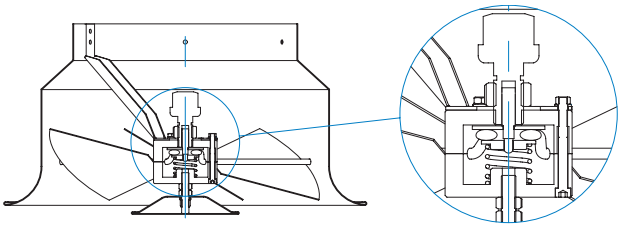
Version OD-11V has centrally adjustable blades. Blades can be manually adjustable or by the means of electric motor installed

on the outer side of the diffuser or by thermostat regulation. Diffuser is capable of altering discharge direction.



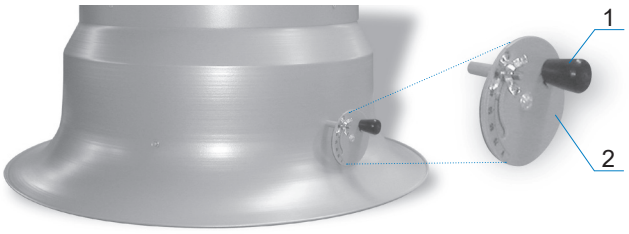
## Variable swirl diffuser with the thermostat regulation OD-11V/TR

OD-11V/TR diffuser has a basic implementation of OD-11V upgraded thermostatically controlled. Automatic continuous regulation operates as a function of the temperature of air flowing through the diffuser. With additional configuration before installation to ensure optimum operation of the demands of comfort in the room.



## Regulation with the OD-11V/…/RR handle

Regulation with this handle enables manual blade angle adjustment if the diffuser placement allows acess to the handle. This type of regulation is suitable for buildings with a lower number of diffusers when the ventilation system is designed for both summer and winter operation.




**1.**handle
**2.**fixing screw

## Description

The ADT-2 differential thermostat with continuous analogue output is a controller that, based on the duct air temperature and room temperature signals, automatically adjusts the angle of OD-11V blades as required. One ADT-2 can operate up to 10 OD-11V units.

## Operation

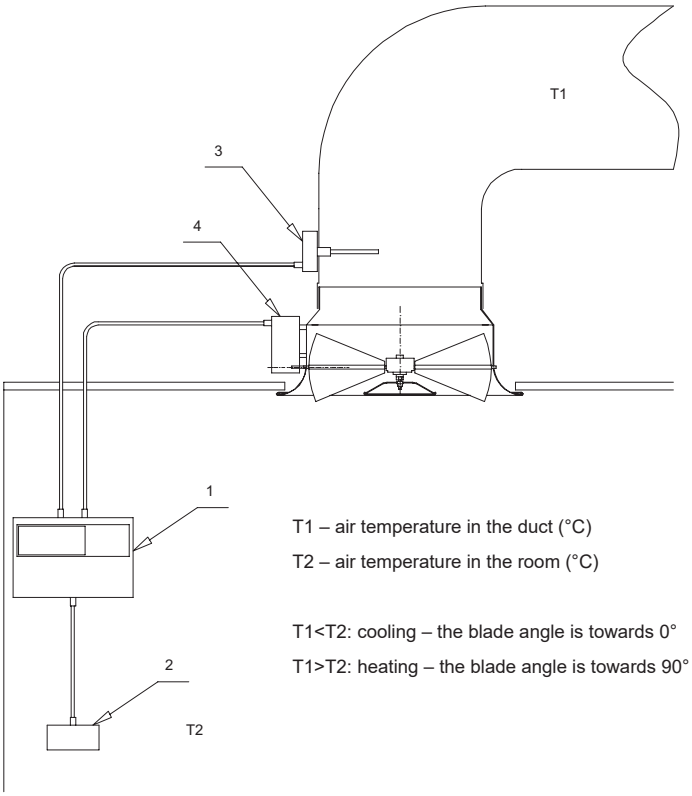
The controller compares the selected temperature curve, which is set according to the OD-11V position, desired mode of operation, etc, with data received from temperature sensors located in the air supply duct and in the room. Taking into account the desired temperature difference, the controller generates a continuous analogue 0-10V DC output signal, which is then transmitted to the OD-11V electric motor drive. Comparing the temperature, the controller automatically recognises the heating or cooling mode and sets the OD-11V accordingly. In the case the duct air temperature is higher than the roo temperature, the controller switches the OD-11V to the heating mode, i.e. to the vertical supply of warm air into the room. In the case the duct air temperature is lower than the room temperature, the controller automatically infers that the system is in the room cooling mode and accordingly generates a signal to set the OD-11V to the cooling mode.


## Advantage

Applying ADT-2, the need for manual switching of a large number of OD-11V units to the proper operational mode is avoided, since the controller switches the units automatically. In this way, the efficiency of room air conditioning is enhanced as well.

## ADT-2 differential thermostat

**1.** controller
**2.** room temperature sensor
**3.** duct temperature sensor
**4.** compact actuator (B3, B6, B9)

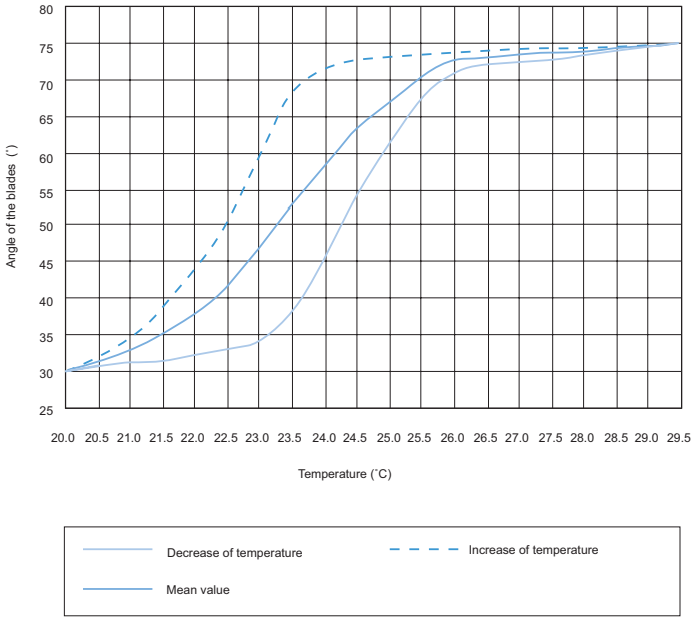



T1 – air temperature in the duct (°C)
T2 – air temperature in the room (°C)

T1<T2: cooling – the blade angle is towards 0°
T1>T2: heating – the blade angle is towards 90°

## Operation

At OD-11V/TR diffuser, centrally adjustable blades can be adjusted automatically with the thermostat regulation. Thermostat perceives temperature of the supply air and automatically adjusts the blades angle. No additional power supply and controls are required, so no additional wiring installation is needed. Blade angle according to the supply air temperature is shown in the chart below. A hysteresis behavior of the thermostatic head in both cooling and heating mode is shown in the chart. After the temperature is stabilized, angle of the blades is adjusted to the medium value in about 15 minutes.



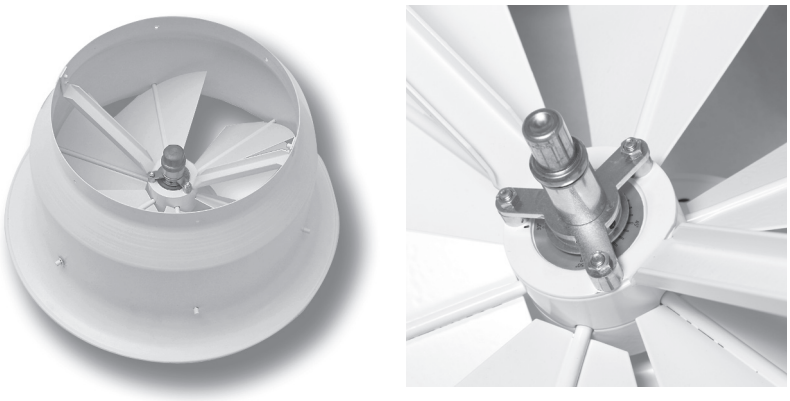

## Size

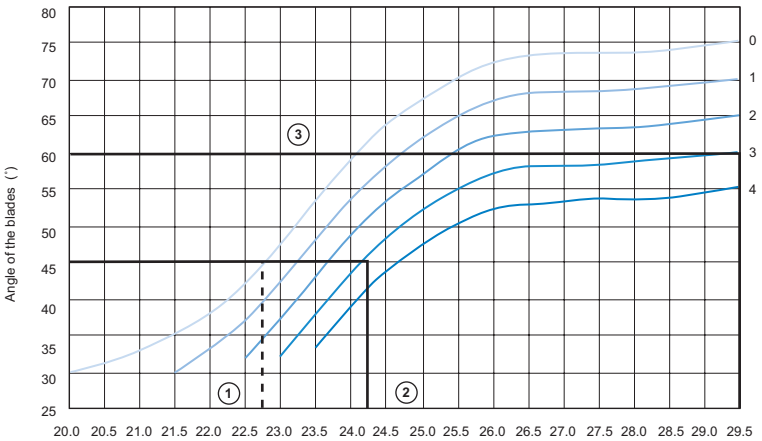
OD-11V/TR diffuser can be made in sizes 200, 250, 315, 400, 500, 630 and 800 (sizes 125 and 160 are not available).

## Regulation of the initial and final blade angle

OD-11V/TR allows the regulation of the initial and final blade angle. During the selection of appropriate diffuser for certain room conditions with the Klima ADE software package, exact angles are calculated according to the installation height of the diffuser, supplied air quantity and the temperature difference between supplied and room temperature. Calculation is based on air flow speed of 0.2 m/s in the living area.

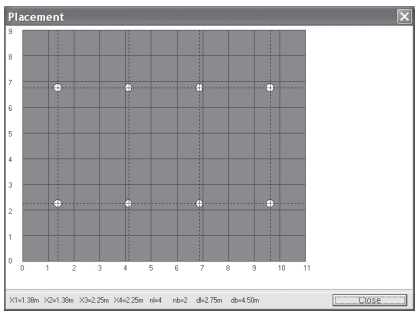
Initial blade angle is preadjusted with the special nut in the range between 30 and 50°. Automatic opening of the blades is initiated, when the temperature reaches limit value, shown in the chart according to the preadjusted angle and number of used spacers. When initial angle of 45° is preadjusted without additional spacers and final angle is 75°, blade opening temperature is between 22.5 and 23 °C (designation 1 in diagram). Final blade angle is adjusted by adding spacers below thermostatic head. Default preassembled spacer allow complete opening of the blades until 75°. By each added spacer, final angle is reduced for 5°.Adding of spacers also change the thermostatic head characteristics (average values according to the number of added spacers are shown in the chart).

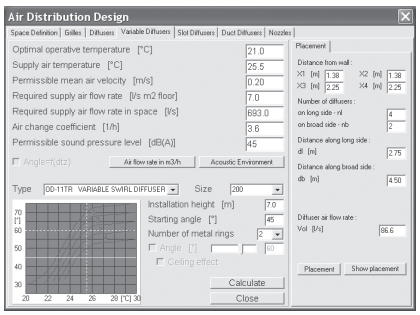


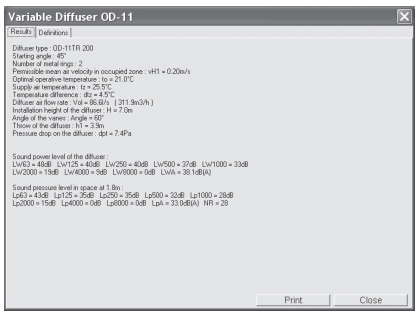



| Nr. of spacers added | 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| Final blade angle | 75° | 70° | 65° | 60° | 55° |

## Calculation example of initial and final blade angle for the OD-11V/TR diffuser with the Klima ADE 5.4 software package



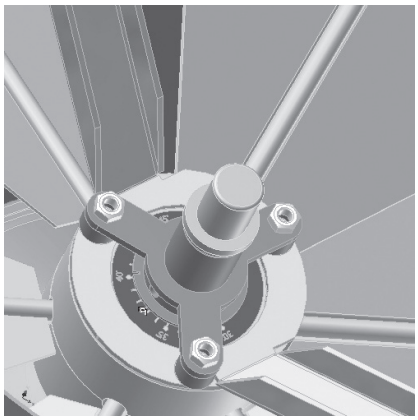



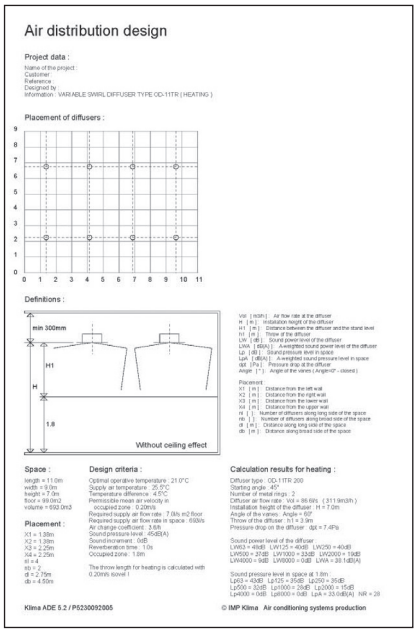

**Input data:**
Air quantity
Air temperature
Room size
Diffuser size

## Calculation

Result of the calculation:
minimum angle in
the cooling mode = 45°

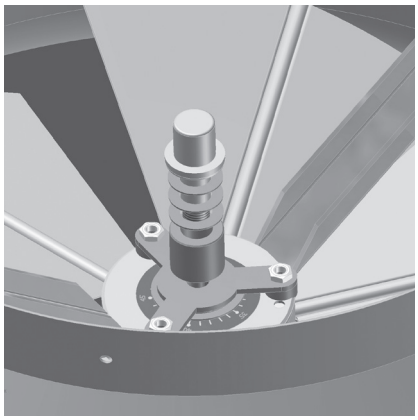
Angle adjustment (designation 2 in diagram):





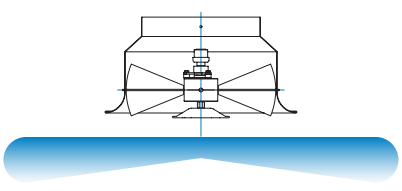

Result of the calculation:
maximum angle in
the heating mode = 60°

Angle adjustment (designation 3 in diagram):

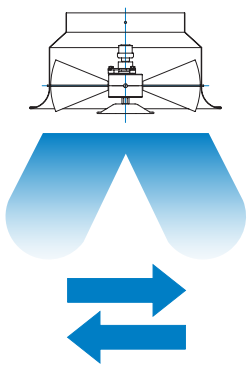


for 60° three spacers should be used

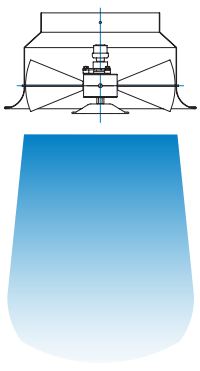
Summer: cooling



Transitionalperiod: automatic adjustment of blade angle
to the supply air temperature



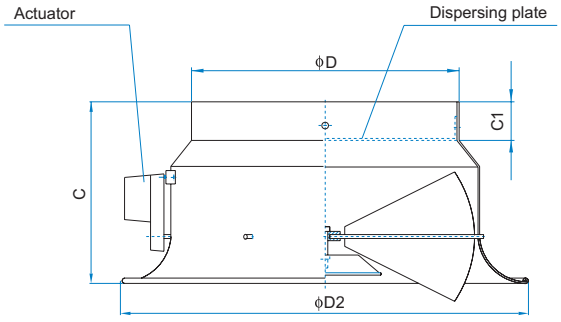
Winter: heating



## Dimensions

| Size | ΦD | ΦD2 | C | C1 | $A_{ef}$ ($m^2$) |
|---|---|---|---|---|---|
| **125** | 125 | 205 | 130 | 40 | 0.012 |
| **160** | 160 | 250 | 155 | 40 | 0.020 |
| **200** | 200 | 310 | 174 | 40 | 0.030 |
| **250** | 250 | 400 | 200 | 40 | 0.048 |
| **315** | 315 | 480 | 240 | 40 | 0.077 |
| **400** | 400 | 615 | 265 | 55 | 0.125 |
| **500** | 500 | 790 | 320 | 60 | 0.195 |
| **630** | 630 | 940 | 380 | 80 | 0.310 |
| **800** | 800 | 1142 | 555 | 75 | 0.503 |

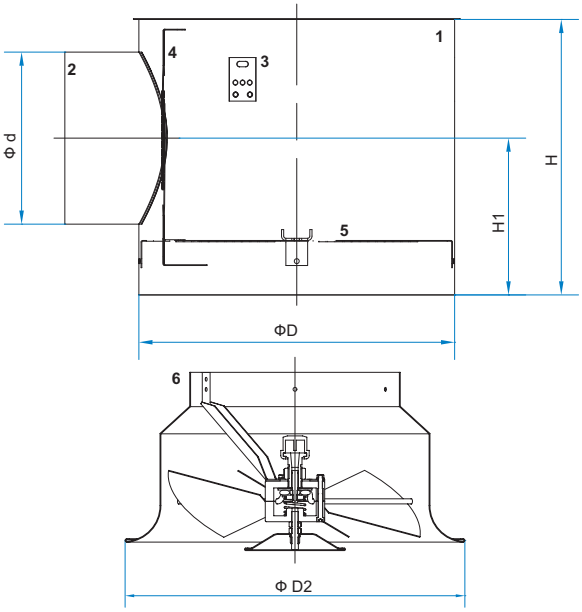
$A_{ef}$ – efective discharge area ($m^2$)




## Round plenum box

**1.**Plenum box
**2.**Inlet spigot
**3.**Suspension bracket
**4.**Volume control damper M
**5.**Dispersing plate
**6.**Diffuser OD-11, OD-11V, OD-11V/TR

| Size | ΦD | H | H1 | Φd |
|---|---|---|---|---|
| **125** | 128 | 250 | 154 | 98 |
| **160** | 183 | 250 | 166 | 123 |
| **200** | 204 | 245 | 144 | 158 |
| **250** | 254 | 285 | 164 | 198 |
| **315** | 319 | 335 | 189 | 248 |
| **400** | 404 | 400 | 221 | 313 |
| **500** | 504 | 400 | 221 | 313 |
| **630** | 634 | 535 | 289 | 448 |
| **800** | 804 | 585 | 314 | 498 |



## Ordering key

| OD-11 | - | / | P | / | - | / | ZR | / | M | / | I | Size |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | 8 |

### 1 Diffuser type

| | |
|---|---|
| **OD-11** | Variable swirl diffuser |

### 2 Adjustment

| | |
|---|---|
| **V** | Centrally adjustable (for versions with regulation only) |

### 3 Dispersing plate

| | |
|---|---|
| **P** | Dispersing plate (not installed, if the plenum box is used for installation) |

### 4 Diffuser regulation

| | |
|---|---|
| **TR** | Termoststst regulation |
| **R** | Manual control |
| **B1** | Actuator Belimo LM 24A |
| **B2** | Actuator Belimo LM 230A |
| **B3** | Actuator Belimo LM 24A-SR |
| **B4** | Actuator Belimo NM 24A (for size 630) |
| **B5** | Actuator Belimo NM 230A (for size 630) |
| **B6** | Actuator Belimo NM 24A-SR (for size 630) |
| **B7** | Actuator Belimo SM 24A (for size 800) |
| **B8** | Actuator Belimo SM 230 (for size 800) |
| **B9** | Actuator Belimo SM 24-SR (for size 800) |

### 5 Plenum box

| | |
|---|---|
| **ZR** | Circular plenum box for air supply |

### 6 Air volume regulation

| | |
|---|---|
| **M** | Volume control damper in entry spigot |

### 7 Insulation

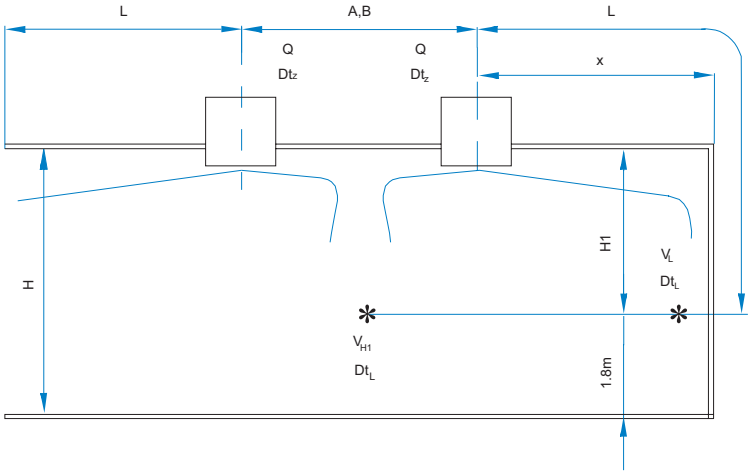
| | |
|---|---|
| **I5** | 5 mm PE thermal insulation outside of plenum box |
| **I9** | 9 mm synthetic rubber based sounf & thermal insulation (-40° - 105°C) outside of plenum box |
| **I19** | 19 mm synthetic rubber based sounf & thermal insulation (-40° - 105°C) outside of plenum box |

### 8 Dimension

| | |
|---|---|
| **125** | minimum size for OD-11V/TR is 200 |
| **160** | minimum size for OD-11V/TR is 200 |
| **200** | |
| **250** | |
| **315** | |
| **400** | |
| **500** | |
| **630** | |
| **800** | |

## Definition of symbols

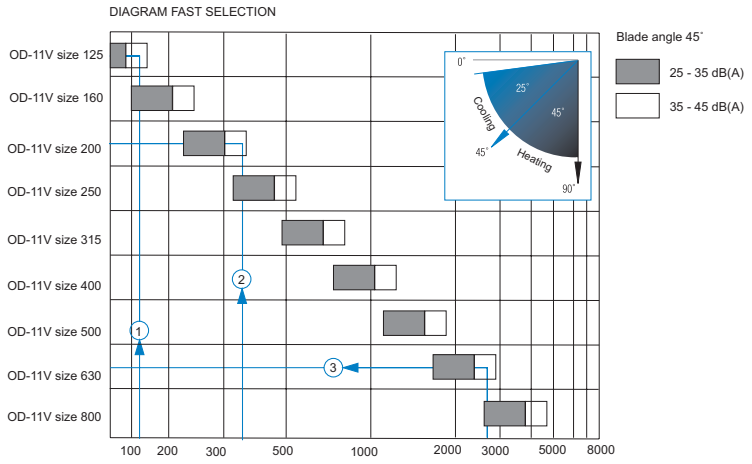
| | |
|---|---|
| **Q (m³/h)** | Air flow |
| **x (m)** | Horizontal distance to the wall |
| **H (m)** | Room height |
| **H1 (m)** | Distance from ceiling to occupied zone |
| **L (m)** | Throw distance (L=H1+x) |
| **$V_L$ (m/s)** | Air velocity at the throw distance L |
| **$\Delta t_z$ (K)** | Temperate difference between the supply and room air |
| **$\Delta t_L$ (K)** | Difference between the core and room air temperature |
| **$\Delta p_t$ (Pa)** | Pressure drop |
| **$L_{WA}$ (dB(A))** | Sound power level |
| **$V_{H1}$ (m/s)** | Air velocity at the H1 distance |
| **A, B (m)** | Distance between diffusers by length and by width |




## Diagram for fast selection

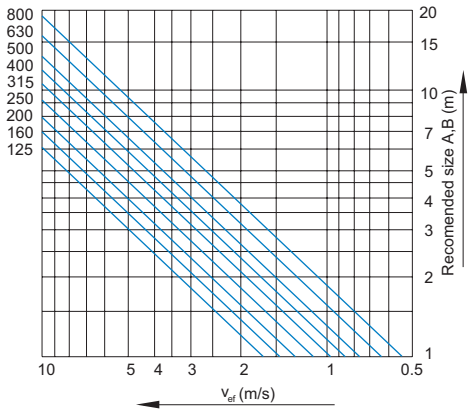
### Corections

In the case of the diffuser installation in the ceiling, the velocity Vh at the level A/2+H is to be multiplied with a factor of 1.4 (due to the Coanda effect).
The above applies to the cases of heating and cooling operation with blade opening angles less than 30°.




Examples for selection 1, 2 and 3: see the following pages.

### Diffuser size as a function of distance between units and effective velocity



## Blade opening angle during heating and cooling operation

# Calculation

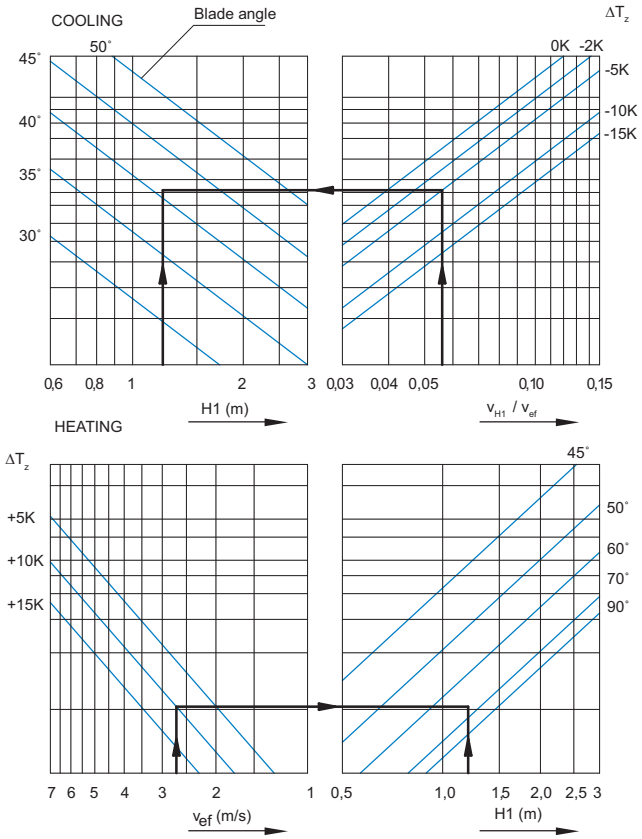
**Example 1 (cooling)**
Q = 160 m³/h
H = 3 m
H1 = H-1.8 = 3-1.8 = 1.2 m
vH1 = 0.2 m/s
$\Delta T_z$ = -5 K
Recommended size: 125

$v_{ef}$ = Q/($A_{ef}$×3600) = 160/(0,012×3600)
$v_{ef}$ = 3.6 m/s
$v_{H1}/v_{ef}$ = 0.2/3.6 = 0,056
Blade angle: 41°

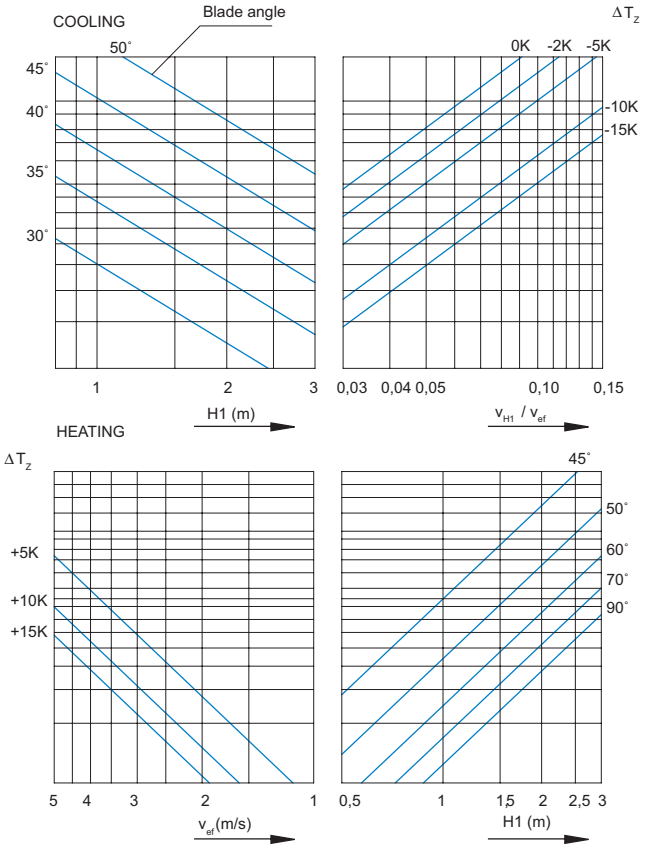
**Example 1 (heating)**
Q = 160 m³/h
H = 3m → H1 = 1,2 m
$v_{H1}$ = 0.2 m/s
$\Delta T_z$ = 10 K
Recommended size: 125

$v_{ef}$ = 2.7 m/s
Blade angle: 66 °

### OD-11V 125




### OD-11V 160



## Blade opening angle during heating and cooling operation

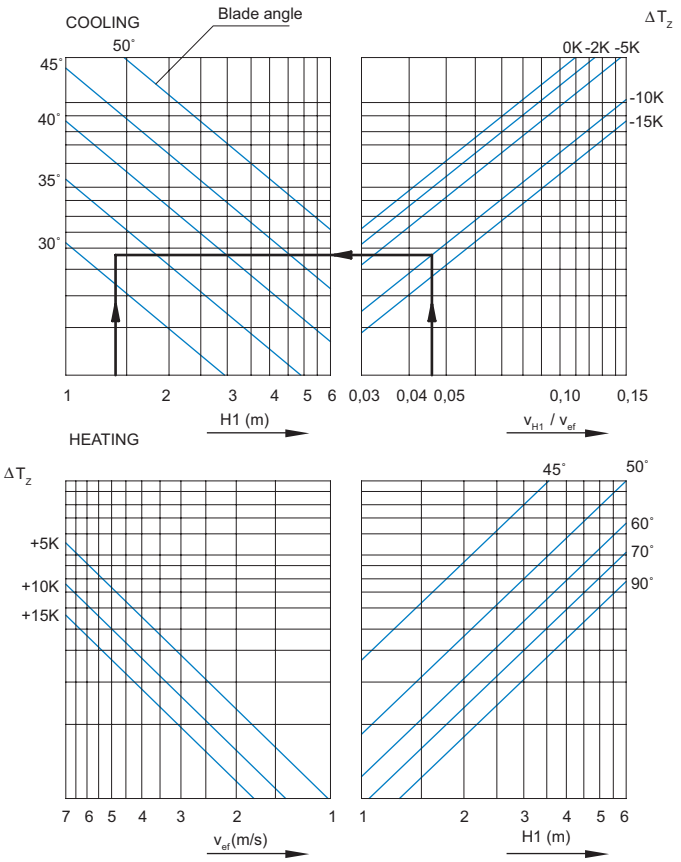
# Calculation

**Example 2 (cooling)**
Q = 350 m³/h
H1 = 1.4 m
$v_{H1}$ = 0.15 m/s
$\Delta T_z$ = -10 K
Recommended size: 200

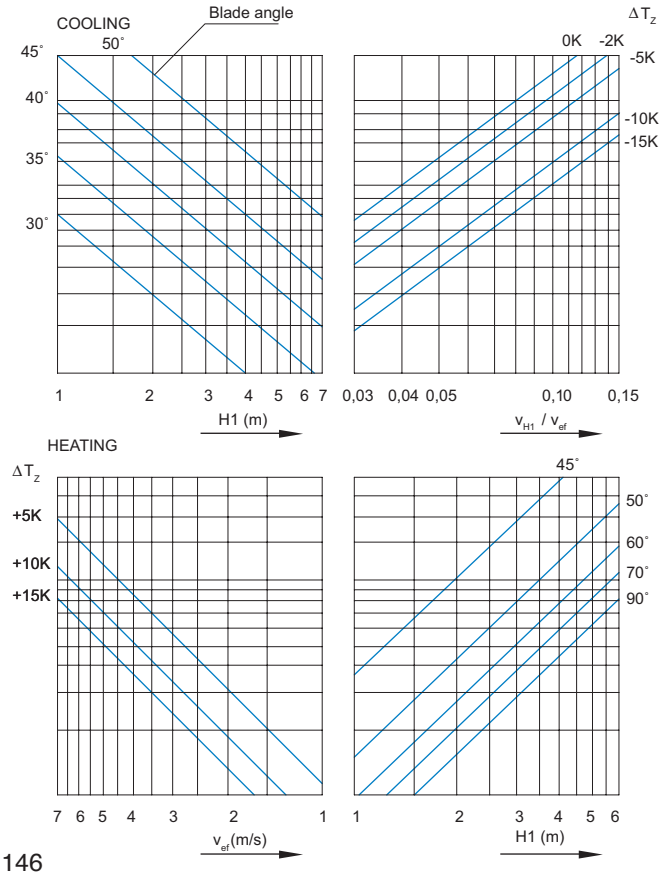
$v_{ef}$ = Q/(Aef ×3600) = 350/(0,031×3600)
$v_{ef}$ = 3.13 m/s
$v_{H1}/v_{ef}$ = 0.15/3.24 = 0.046
Blade angle: 32°

((Blade angle 32° → Coanda effect)
H1 = 1.4×1.4 = 1,96 m
H = H1+1.8 = 1.96+1.8 = 3.67 m
or
H = 1.4 → $v_{H1}$ = 0.15×1.4 = 0.25 m/s

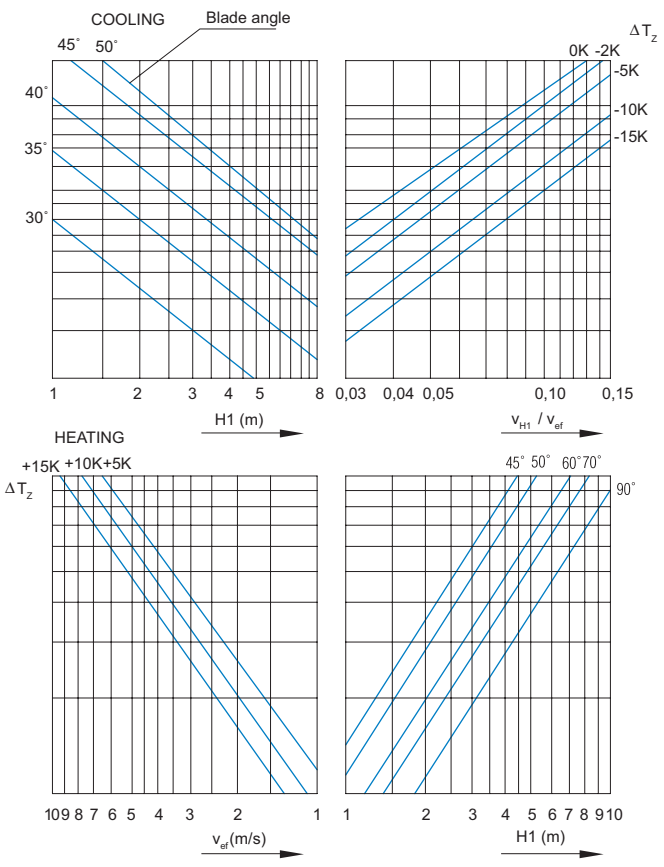
### OD-11V 200



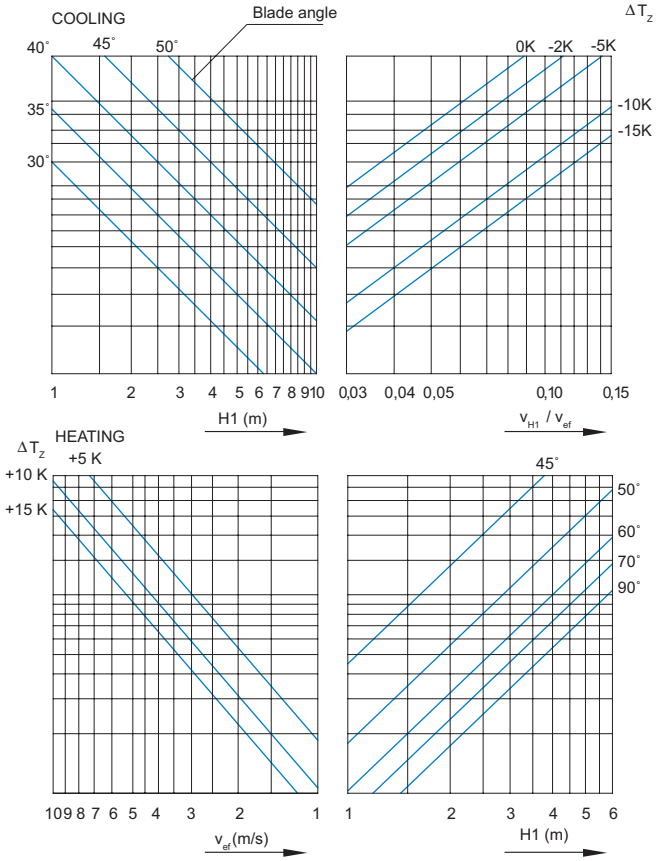

### OD-11V 250



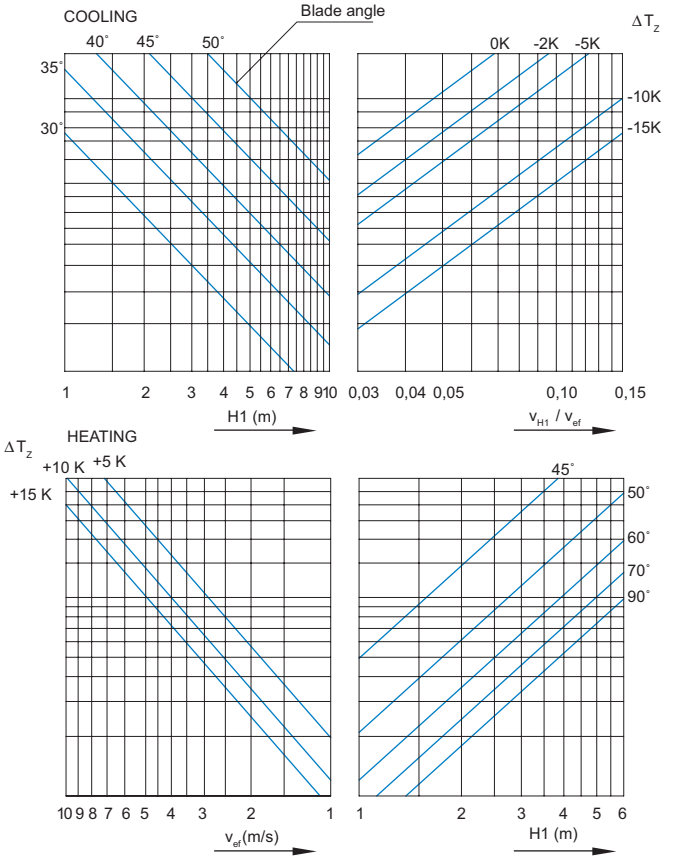

### OD-11V 315



## OD-11V 400




## OD-11V 500

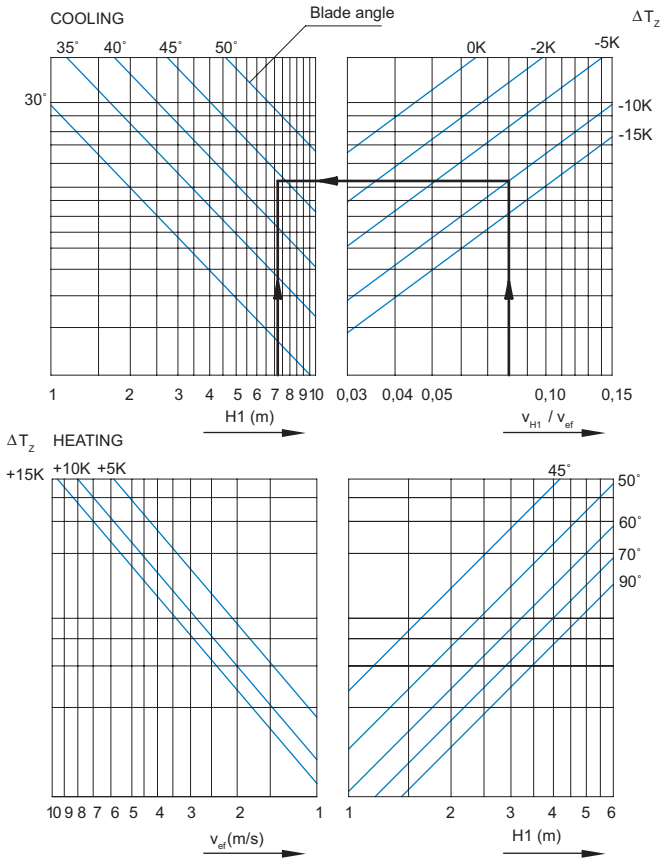



## Calculation

**Example 3 (cooling)**
Q = 2700 m³/h
$v_{H1}$ = 0.2 m/s
$\Delta t_z$ = -10 K
H = 9 m → H1 = 9-1.8 = 7.2 m
Recommended size: 630

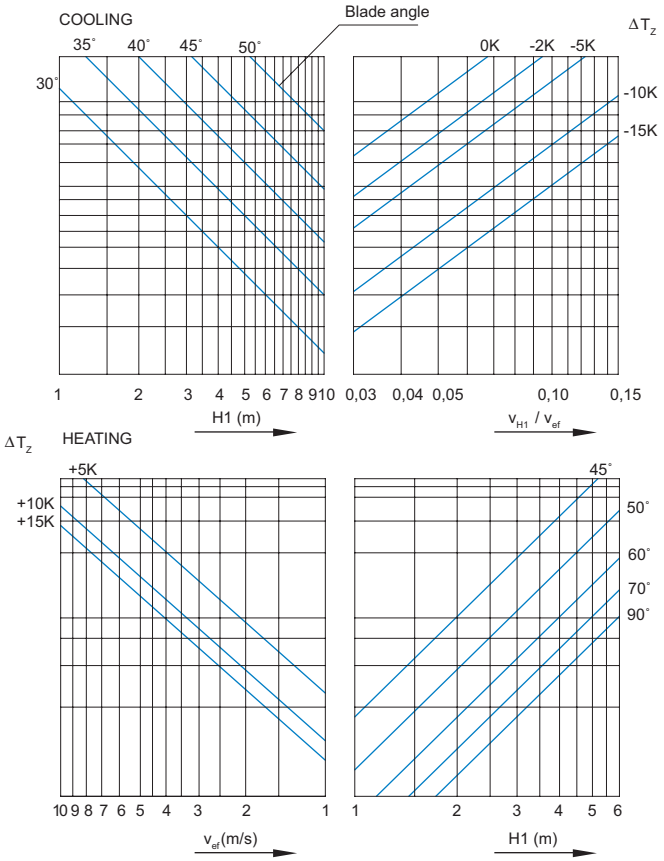
$v_{ef}$ = Q/(Aef×3600) = 2700/(0.32×3600)
$v_{ef}$ = 2.3 m/s
$v_{H1}/v_{ef}$ = 0.2/2.3 = 0,08
Blade angle: 44°

## OD-11V 630



## Blade opening angle during heating and cooling operation

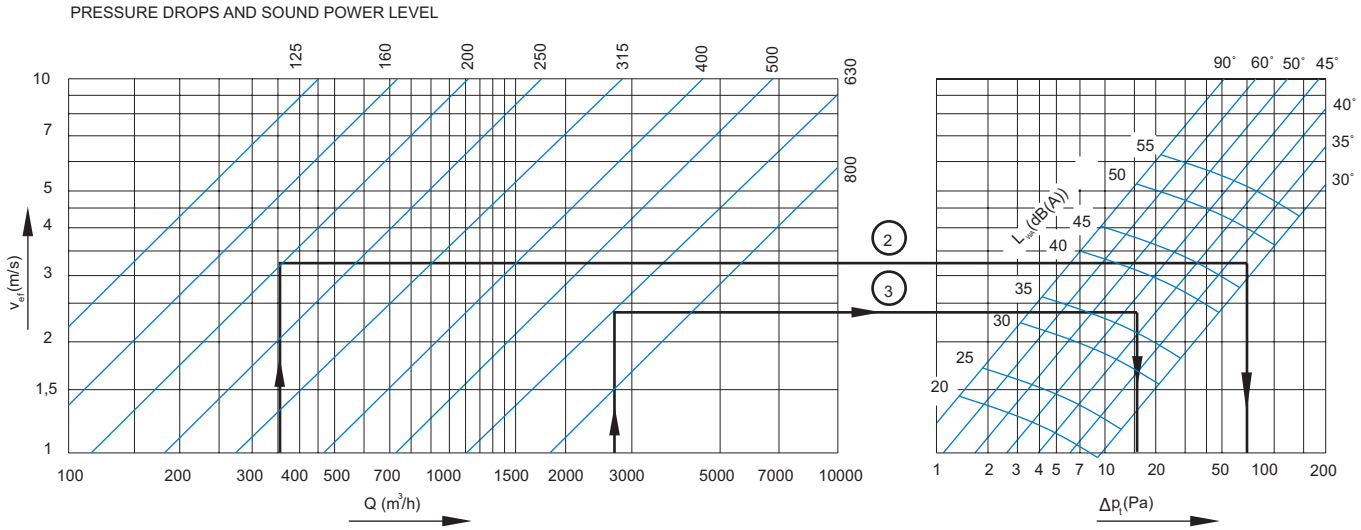
### OD-11V 800




## Pressure drops and sound power level

(for version with dispersing plate)

### D-11V Size 125 - 800




## Calculation

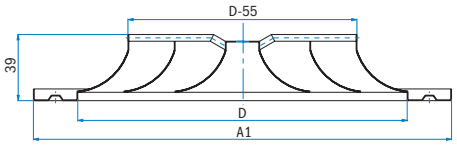
| **Example 2 (cooling)** | **Example 3 (cooling)** |
|---|---|
| Q = 350 m³/h | Q = 2700 m³/h |
| $L_{WA}$ = 47 dB(A) | $L_{WA}$ = 37 dB(A) |
| Δp = 75 Pa | Δp = 16 Pa |
| Blade angle: 32° | Blade angle: 44° |

# Circular diffusers

## Circular diffusers OD-1, OD-2

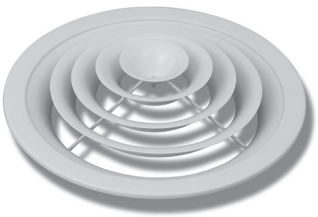
### OD-1

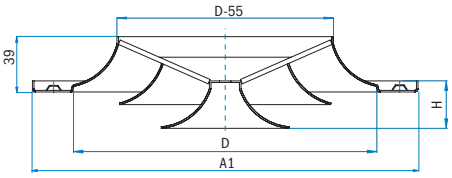
- Fixed diffuser rings
- Central screw installation or fixing with three peripheral screws
- Peripheral foamy sealing strip
- Registers J2




### OD-2

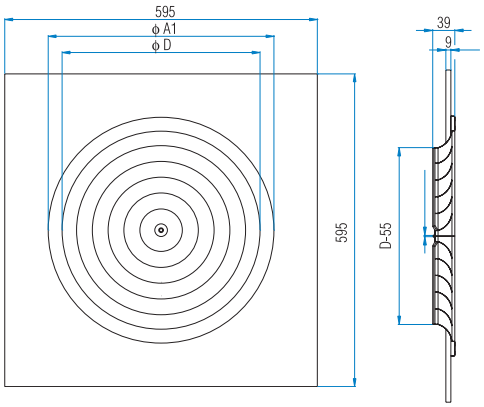
- Fixed diffuser cone-form rings
- Central screw installation or fastening with three peripheral screws
- Peripheral foamy sealing strip
- Registers J2






### OD-1 in the plate

- OD-1 in the plate 595x595
- Sizes from 1 to 5 are available
- Only installation with cross-bar is possible
- Plenum boxes are equal to those for standard OD-1 corresponding nominal sizes




**OD-1 and OD-2 dimensions**

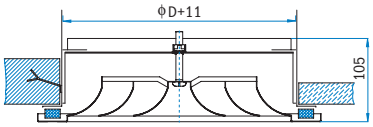
| Size | D (mm) | A1 (mm) | H (mm) | OD-1 $A_{ef}$ ($m^2$) | OD-2 $A_{ef}$ ($m^2$) |
|---|---|---|---|---|---|
| **1** | 192 | 244 | 30 | 0.0085 | 0.0090 |
| **2** | 248 | 300 | 45 | 0.0157 | 0.0167 |
| **3** | 304 | 356 | 60 | 0.0257 | 0.0282 |
| **4** | 360 | 412 | 75 | 0.0381 | 0.0422 |
| **5** | 416 | 468 | 90 | 0.0536 | 0.0618 |
| **6** | 472 | 542 | 98 | 0.0730 | 0.0812 |
| **7** | 528 | 598 | 112 | 0.0955 | 0.1037 |
| **8** | 584 | 654 | 126 | 0.1150 | 0.1235 |

**Dimensions of volume control dampers J2 for OD-1 and OD-2**

| Size | ΦD-52 (mm) | ΦD+11 (mm) |
|---|---|---|
| **1** | 140 | 203 |
| **2** | 196 | 259 |
| **3** | 252 | 315 |
| **4** | 308 | 371 |
| **5** | 364 | 427 |
| **6** | 420 | 483 |
| **7** | 476 | 539 |
| **8** | 532 | 595 |

## Installation of circular diffusers OD-1, OD-2

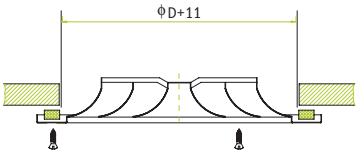
**Installation 7**
- Installation with crossbar.
  Designation: **OD-1/7, OD-2/7**




Built-in duct Duct through the panel ceiling

**Installation 8**
- Installation on register fastened in the duct.
  Register has three girders.
  Designation: **OD-1/8-(J2), OD-2/8-(J2)**

**Installation X** (without opening in the middle)
- Direct installation in the ceiling with three screws
  Designation: **OD-1/X, OD-2/X**



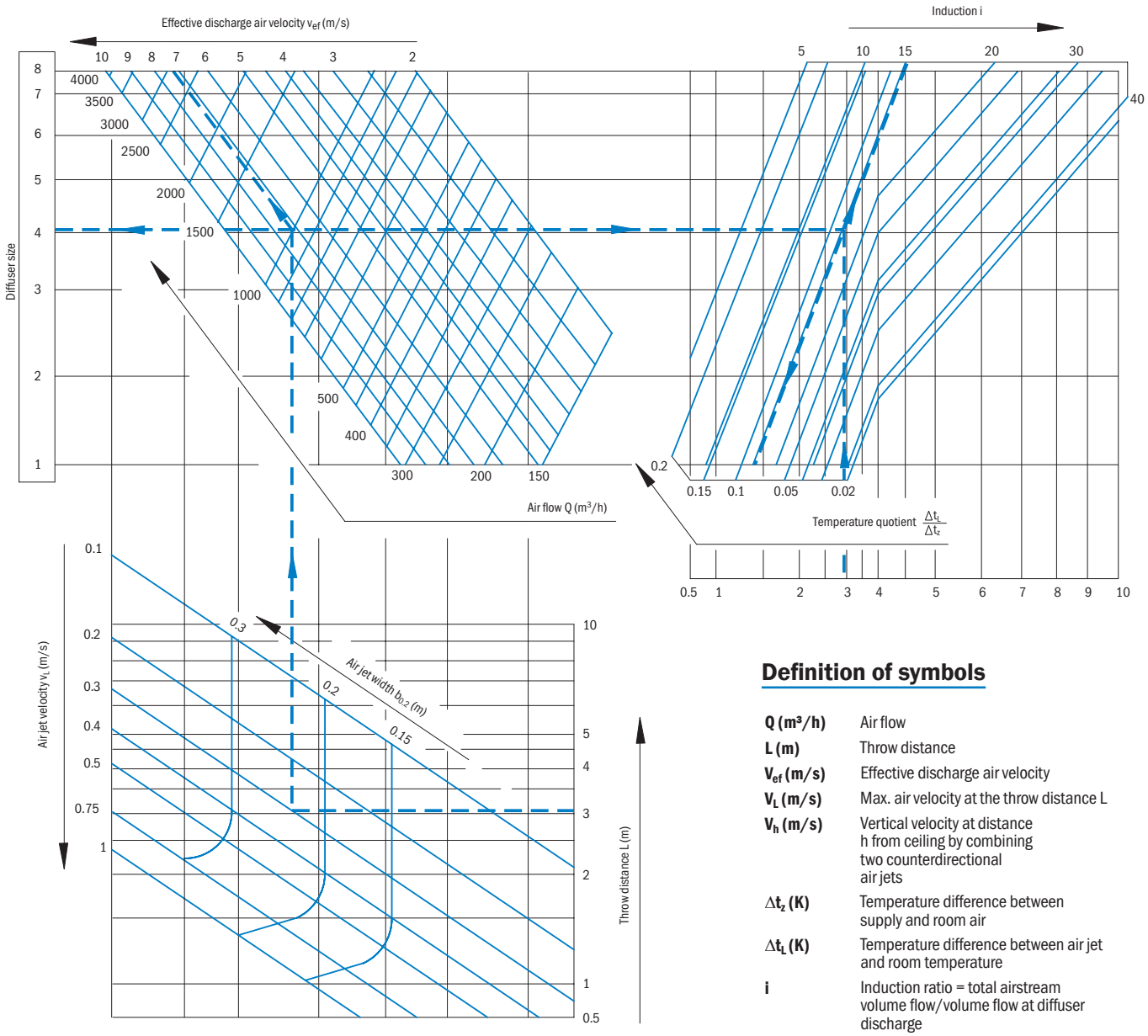

### Ordering key

**OD-1/7-J2 Size 2 / 600**

- Size 2 / 600 — OD-1 in the plate 595x595* (sizes from 1 to 5)
- **J2** Registers
- **7** Installation with the cross-bar
- **8** Installation on volume control damper fastened in the duct
- **X** Three boreholes on the ring without central borehole
- **OD-1** Diffuser type
- **OD-2**

* Only installation number 7 is enabled if OD-1 version is installed into the plate.

**Diagram for determining the size, induction and temperature of the air jet flow of the circular diffusers OD-1**




## Definition of symbols

| | |
|---|---|
| **Q (m³/h)** | Air flow |
| **L (m)** | Throw distance |
| **$V_{ef}$ (m/s)** | Effective discharge air velocity |
| **$V_L$ (m/s)** | Max. air velocity at the throw distance L |
| **$V_h$ (m/s)** | Vertical velocity at distance h from ceiling by combining two counterdirectional air jets |
| **$\Delta t_z$ (K)** | Temperature difference between supply and room air |
| **$\Delta t_L$ (K)** | Temperature difference between air jet and room temperature |
| **i** | Induction ratio = total airstream volume flow/volume flow at diffuser discharge |
| **$b_{0.2}$ (m)** | Width of the air jet is measured at a distance from ceiling where air flow velocity is 0.2 m/s |

## Example

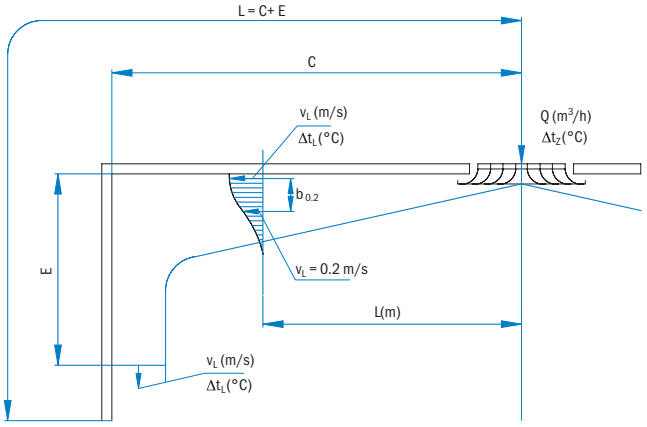
**Given:**

| | |
|---|---|
| Air flow: | Q = 1000 m³/h, L = 3 m |
| Air jet velocity: | $V_L$ = 0.3 m/s |
| Temperature difference: | $\Delta t_z$ = 5 °C |

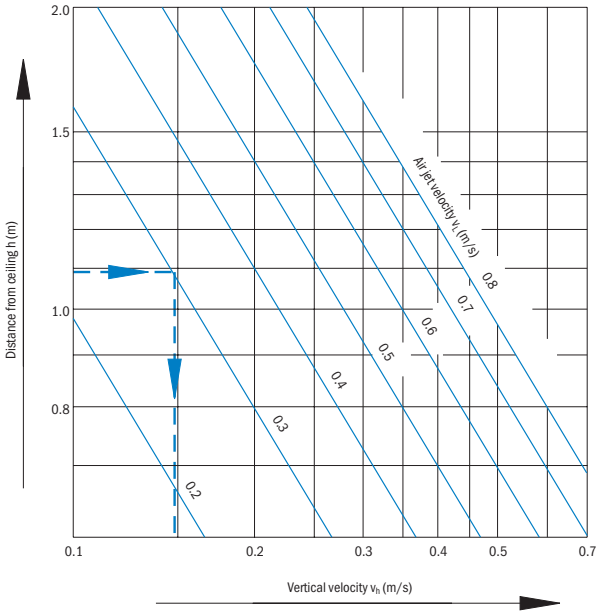
**Solution:**

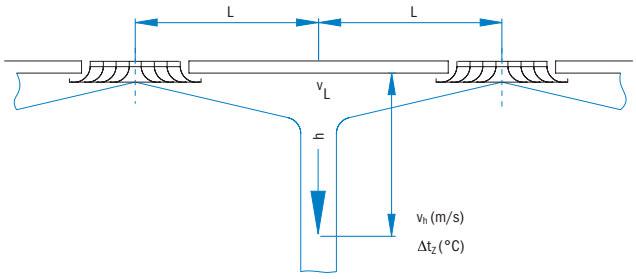
From the diagram select the diffuser OD-1 size 4.

| | |
|---|---|
| effective outlet velocity | $v_{ef}$ = 7.2 m/s |
| temperatue quotient | $\Delta t_L / \Delta t_Z$ = 0.08 |
| temperature difference | $\Delta t_L$ = 0.08 x 5 = 0.4 °C |
| induction | i = 16 |
| width of the air jet | $b_{0.2}$ = 0.22 m |




### Diagram for determination of vertical velocity

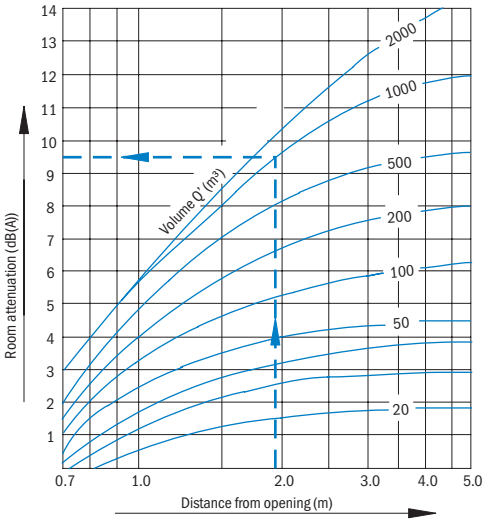



Max temperature quotient $\Delta t_h / \Delta t_z$ determined using the diagram 1 for temperature quotient:

$L_{diagram} = L + h$

### Room attenuation diagram




| | |
|---|---|
| Q' (m³) | calculated volume, depending on room reflectance |
| Q (m³) | actual room volume |

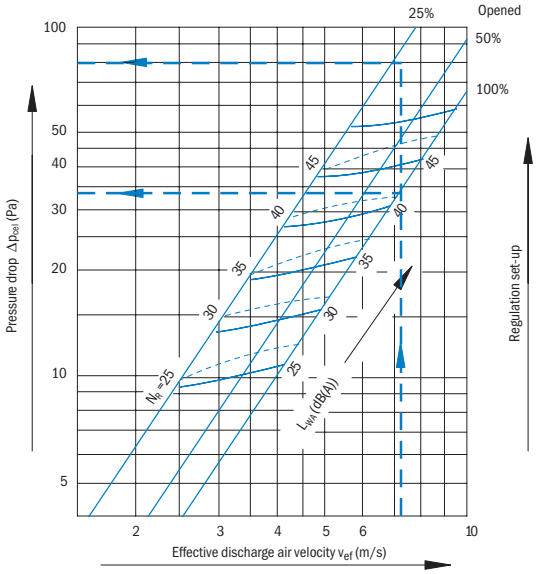
The following data are necessary to calculate the volume Q'.

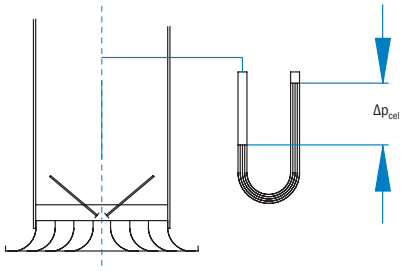
| | |
|---|---|
| 1. Normal rooms | Q' = Q |
| 2. Rooms with highly reflective walls | Q' = 0.5Q |
| 3. Rooms with absorption walls | Q' = 2Q |

## Definition of symbols

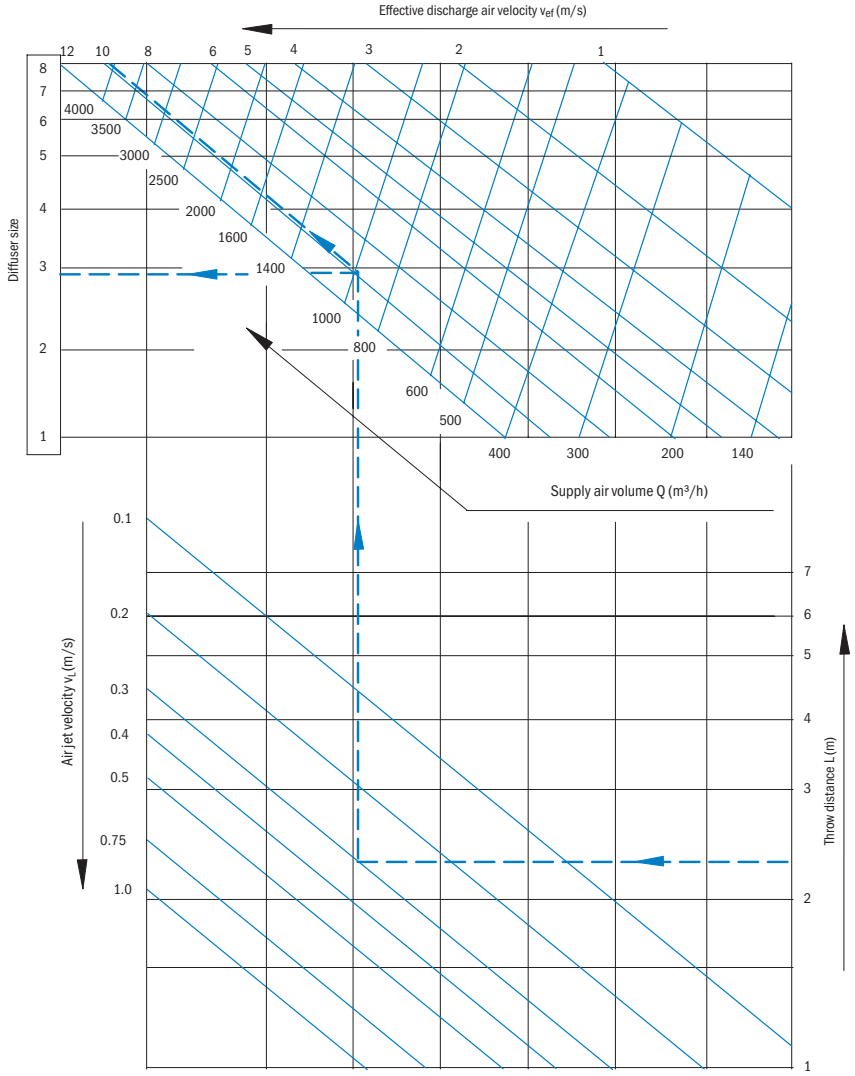
| | |
|---|---|
| **$\Delta p_{cel}$ (Pa)** | Pressure drop |
| **$L_{WA}$ (dB(A))** | Sound power level |
| **$N_R$** | Max. value according to ISO |

**Pressure drop diagram** (Valid for volume control damper J2)




**Sizing diagram for circular diffusers OD-2**




## Definition of symbols

| | |
|---|---|
| **Q (m³/h)** | Air flow |
| **L (m)** | Throw distance |
| **$V_{ef}$ (m/s)** | Effective discharge air velocity |
| **$V_L$ (m/s)** | Max. air velocity at the throw distance L |
| **$V_h$ (m/s)** | Vertical velocity at distance h from ceiling by combining two counterdirectional air jets |
| **$\Delta t_z$ (K)** | Temperature difference between supply and room air |
| **$\Delta t_L$ (K)** | Temperature difference between air jet and room temperature |
| **i** | Induction ratio = total air stream volume flow/volume flow at diffuser discharge |
| **$b_{0.2}$ (m)** | Width of the air jet is measured at a distance from ceiling where air flow velocity is 0.2 m/s |
| **$\Delta p_{cel}$ (Pa)** | Pressure drop |
| **$L_{WA}$ (dB(A))** | Sound power level |
| **$N_R$** | Border value according to ISO |

## Example

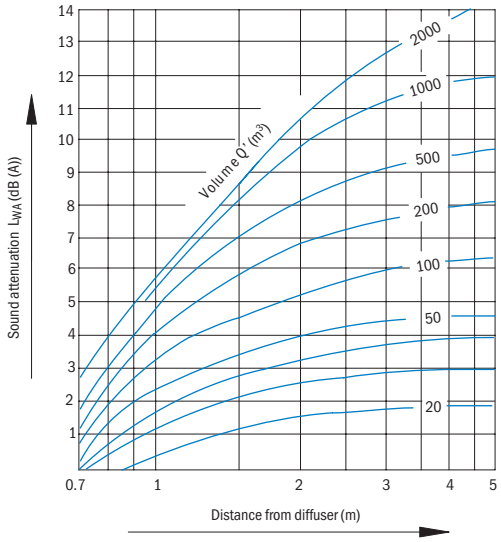
**Given:**

Air flow volume: Q = 1000 m³/h, L = 2.4 m
Air jet velocity: $V_L$ = 0.3 m/s
Temperature difference: $\Delta t_z$ = 5 °C

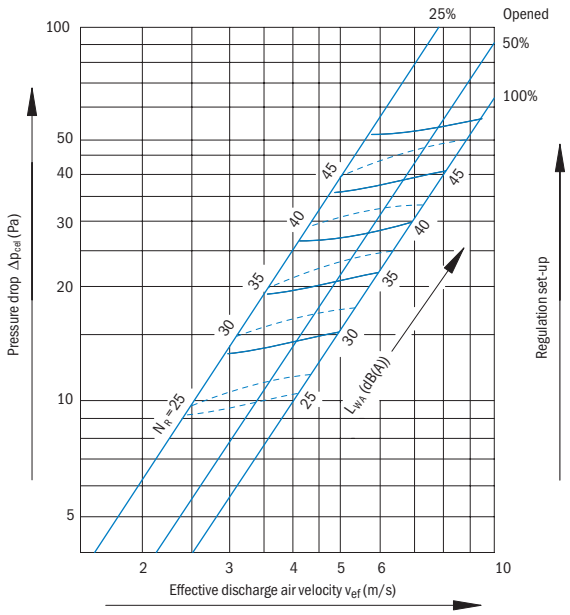
**Solution:**

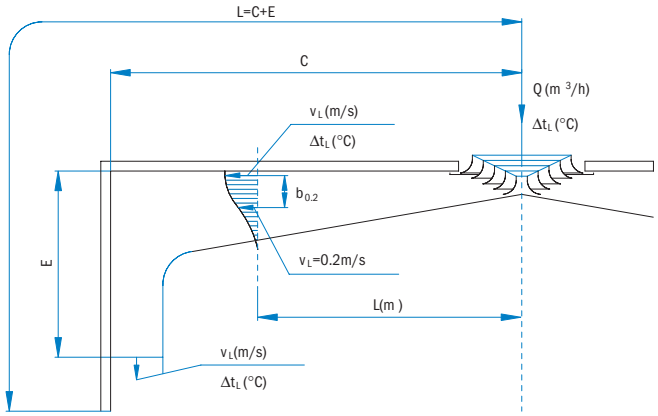
From the diagram select the diffuser OD-2 size 3.

Effective discharge velocity $v_{ef}$ = 9.8 m/s




**Pressure drop diagram** (Valid for register J2)




### Diagram for approximate determination of room attenuation

Q' (m³) Calculated volume, depending on room reflectance
Q (m³) Actual room volume

The following data are necessary to calculate the volume Q'.

1. Normal rooms Q' = Q
2. Rooms with highly reflective walls Q' = 0.5Q
3. Rooms with absorption walls Q' = 2Q

# Swirl diffuser OD-15

## Application

- Suitable for cooling, heating and transition periods,
- Effective operation across the wide range of air flows,
- Installation into suspended ceilings.

## Advantages

- Higher outlet air velocity at the nozzle: achieving a more intensive ceiling effect,
- Achieving of higher throw distance in the heating mode,
- Lower static pressure drop,
- Silent operation,
- High induction.

## Description

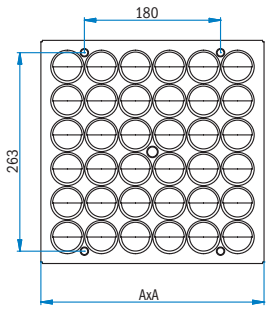
- Large number of rotational nozzles allows for variable and precise discharge direction,
- Metal part of the diffuser plate is powder- coated in RAL 9010 or according to customer specifications,
- Square diffuser plate with the rectangular nozzle layout – KK version,
- Square diffuser plate with the circular nozzle layout – KR version,
- Circular diffuser plate with the circular nozzle layout – RR version.

## Features of a single nozzle

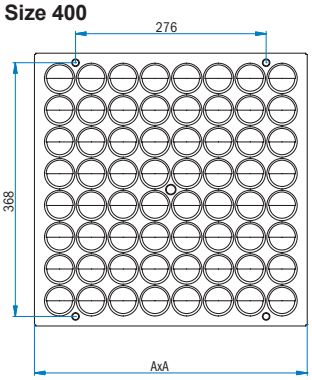
- Aerodynamic shape,
- Distinctive and discrete design.

### OD-15/KK

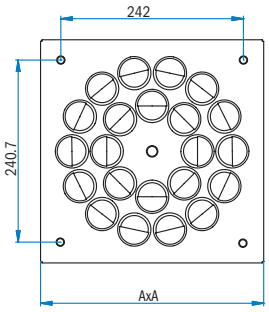
**Size 300**

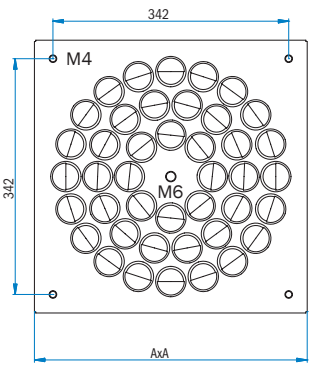



**Size 400**

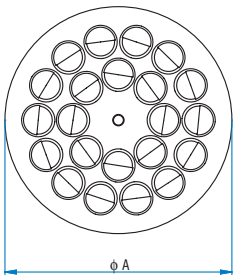


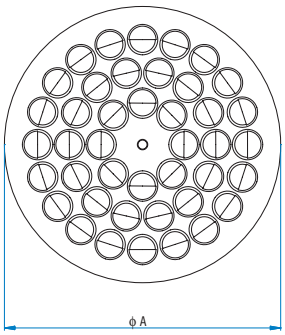

### OD-15/KR




### OD-15/RR

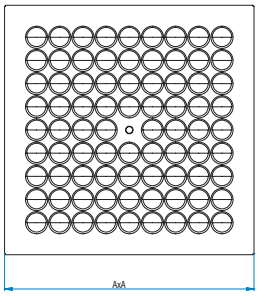


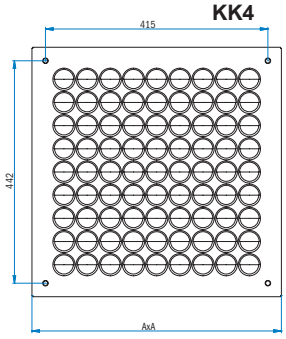
## OD-15/KK

### Size 500

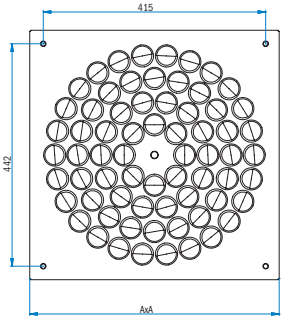
KK1



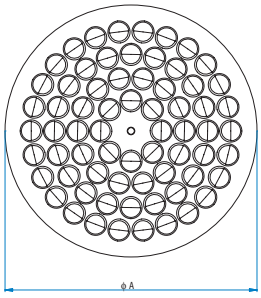

KK4



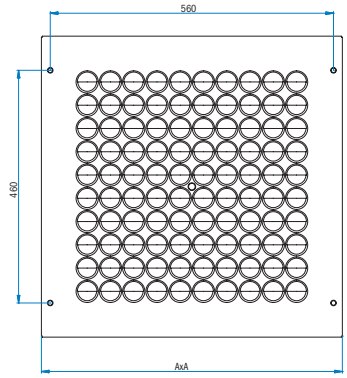

## OD-15/KR

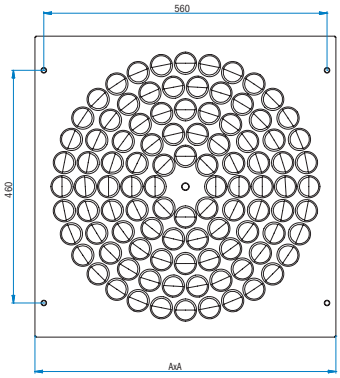


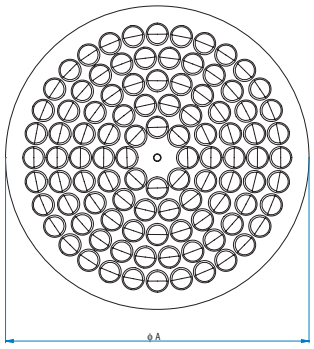

## OD-15/RR




### Size 600, 625



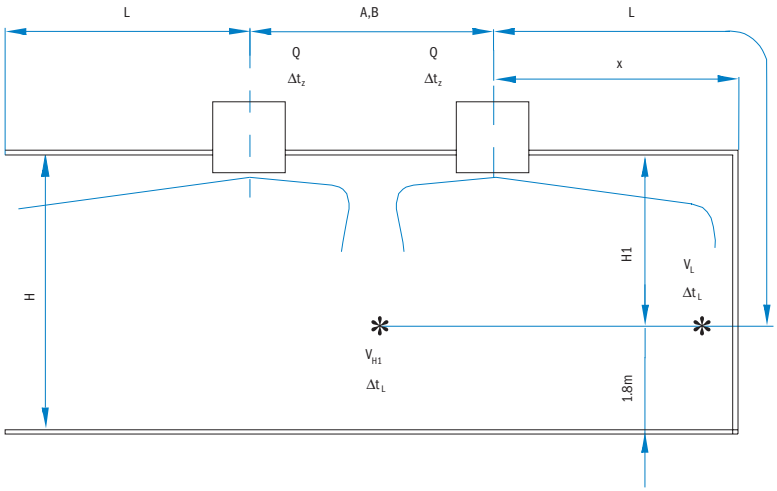




| Dimension | 300KK | 300KR | 300RR | 400KK | 400KR | 400RR | 500KK | 500KR | 500RR | 600KK | 600KR | 600RR | 625KK | 625KR | 625RR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AxA (mm) | 295x295 | 295x295 | Φ300 | 395x395 | 395x395 | Φ400 | 495x495 | 495x495 | Φ500 | 595x595 | 595x595 | Φ600 | 620x320 | 620x620 | Φ625 |
| Number of nozzles | 36 | 22 | 22 | 64 | 42 | 42 | 80 | 68 | 68 | 100 | 100 | 100 | 100 | 100 | 100 |

* tolerances according to standard DIN 7168 T1, middle tolerance class (m) … ±0.8 mm

## Definition of symbols

| | |
|---|---|
| **Q (m³/h)** | Air flow |
| **x (m)** | Horizontal distance to wall |
| **H (m)** | Room height |
| **H1 (m)** | Distance from ceilling to occupied zone |
| **L (m)** | Throw distance (L = H1+ x) |
| **$V_L$ (m/s)** | Air velocity at the throw distance L |
| **$\Delta t_z$ (K)** | Temperate difference between the supply and room air |
| **$\Delta t_L$ (K)** | Temperature difference between air jet and room temperature |
| **$\Delta p_t$ (Pa)** | Pressure drop |
| **$L_{WA}$ (dB(A))** | Sound power level |
| **$V_{H1}$ (m/s)** | Air velocity at the H1distance |
| **A, B (m)** | Distance between diffusers by length and by width |
| **$V_{0.2}$** | Isothermal throw lenght, when velocity of supply air jet 0.2 m/s for 4 way discharge |



## Quick selection tabels

| Type | Q | [l/s] | 34.7 | 41.7 | 48.6 | 55.6 | 62.5 | 69.4 |
|---|---|---|---|---|---|---|---|---|
| | | [m³/h] | 125 | 150 | 175 | 200 | 225 | 250 |
| OD-15/KK/Z/S/M size 300 Φd=125 | $L_{WA}$ | [dB (A)] | 28 | 31 | 36 | 39 | 43 | 45 |
| | $\Delta p_t$ | [Pa] | 18 | 25 | 34 | 45 | 57 | 70 |
| | $L_{0.2}$ | [m] | | 3.8 | 4.6 | 4.8 | 5.0 | 5.2 |
| OD-15/KK/Z/V/M size 300 Φd=125 | $L_{WA}$ | [dB (A)] | 27 | 30 | 34 | 38 | 41 | 44 |
| | $\Delta p_t$ | [Pa] | 17 | 24 | 33 | 43 | 54 | 67 |

| Type | Q | [l/s] | 22.2 | 27.8 | 34.7 | 41.7 | 48.6 | 55.6 |
|---|---|---|---|---|---|---|---|---|
| | | [m³/h] | 80 | 100 | 125 | 150 | 175 | 200 |
| OD-15/KR/ZR/S/M size 300 Φd=160 | $L_{WA}$ | [dB (A)] | 27 | 31 | 37 | 40 | 43 | 49 |
| | $\Delta p_t$ | [Pa] | 11 | 17 | 26 | 37 | 51 | 66 |
| | $L_{0.2}$ | [m] | | 3.9 | 4.7 | 4.9 | 5.1 | 5.3 |
| OD-15/KR/ZR/V/M size 300 Φd=160 | $L_{WA}$ | [dB (A)] | 26 | 29 | 34 | 37 | 40 | 45 |
| | $\Delta p_t$ | [Pa] | 10 | 16 | 25 | 36 | 49 | 64 |

| Type | Q | [l/s] | 55.6 | 69.4 | 83.3 | 97.2 | 111.1 | 125.0 |
|---|---|---|---|---|---|---|---|---|
| | | [m³/h] | 200 | 250 | 300 | 350 | 400 | 450 |
| OD-15/KK/Z/S/M size 400 Φd=200 | $L_{WA}$ | [dB (A)] | 26 | 28 | 34 | 39 | 43 | 45 |
| | $\Delta p_t$ | [Pa] | 9 | 14 | 21 | 28 | 37 | 47 |
| | $L_{0.2}$ | [m] | 2.8 | 3.2 | 3.6 | 4 | 4.2 | 4.6 |
| OD-15/KK/Z/V/M size 400 Φd=200 | $L_{WA}$ | [dB (A)] | 26 | 28 | 33 | 38 | 42 | 45 |
| | $\Delta p_t$ | [Pa] | 10 | 15 | 22 | 29 | 38 | 49 |

| Type | Q | [l/s] | 41.7 | 48.6 | 55.6 | 62.5 | 69.4 | 83.3 |
|---|---|---|---|---|---|---|---|---|
| | | [m³/h] | 150 | 175 | 200 | 225 | 250 | 300 |
| OD-15/KR/ZR/S/M size 400 Φd=200 | $L_{WA}$ | [dB (A)] | 28 | 31 | 35 | 38 | 41 | 43 |
| | $\Delta p_t$ | [Pa] | 11 | 15 | 19 | 24 | 30 | 43 |
| | $L_{0.2}$ | [m] | 2.9 | 3.3 | 3.7 | 4.1 | 4.3 | 4.7 |
| OD-15/KR/ZR/V/M size 400 Φd=200 | $L_{WA}$ | [dB (A)] | 27 | 29 | 32 | 35 | 38 | 41 |
| | $\Delta p_t$ | [Pa] | 10 | 14 | 19 | 23 | 29 | 42 |

| Type | Q | [l/s] | 69.4 | 83.3 | 97.2 | 111.1 | 125.0 | 138.9 |
|---|---|---|---|---|---|---|---|---|
| | | [m³/h] | 250 | 300 | 350 | 400 | 450 | 500 |
| OD-15/KK/Z/S/M size 500 Φd=200 | $L_{WA}$ | [dB (A)] | 26 | 29 | 33 | 37 | 41 | 44 |
| | $\Delta p_t$ | [Pa] | 13 | 18 | 25 | 32 | 41 | 50 |
| | $L_{0.2}$ | [m] | 1.8 | 2.2 | 2.4 | 2.8 | 3.2 | 3.6 |
| OD-15/KK/Z/V/M size 500 Φd=200 | $L_{WA}$ | [dB (A)] | 26 | 28 | 32 | 37 | 41 | 44 |
| | $\Delta p_t$ | [Pa] | 12 | 17 | 24 | 31 | 39 | 48 |

| Type | Q | [l/s] | 55.6 | 69.4 | 83.3 | 97.2 | 111.1 | 125.0 |
|---|---|---|---|---|---|---|---|---|
| | | [m³/h] | 200 | 250 | 300 | 350 | 400 | 450 |
| OD-15/KR/ZR/S/M size 500 Φd=200 | $L_{WA}$ | [dB (A)] | 28 | 32 | 36 | 40 | 44 | 47 |
| | $\Delta p_t$ | [Pa] | 10 | 15 | 22 | 29 | 39 | 49 |
| | $L_{0.2}$ | [m] | 1.9 | 2.3 | 2.5 | 2.9 | 3.3 | 3.7 |

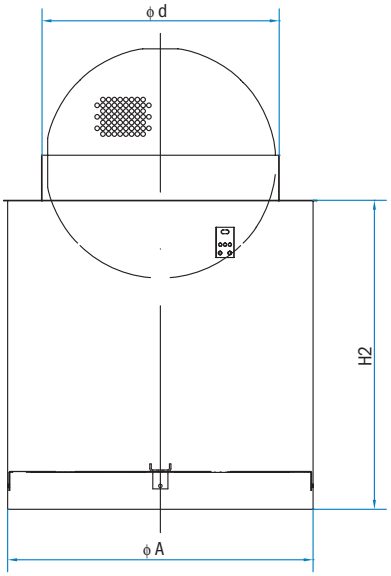
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **OD-15/KR/ZR/V/M size 500** | $L_{WA}$ | [dB (A)] | 29 | 31 | 35 | 40 | 44 | 47 |
| **Φd=200** | $\Delta p_t$ | [Pa] | 9 | 15 | 21 | 29 | 38 | 47 |

| **Type** | **Q** | **[l/s]** | **97.2** | **111.1** | **125.0** | **138.9** | **152.8** | **166.7** |
|---|---|---|---|---|---|---|---|---|
| | | **[m³/h]** | **350** | **400** | **450** | **500** | **550** | **600** |
| **OD-15/KK/Z/S/M size 600,625** | $L_{WA}$ | [dB (A)] | 29 | 32 | 35 | 39 | 41 | 44 |
| **Φd=250** | $\Delta p_t$ | [Pa] | 13 | 16 | 21 | 26 | 31 | 37 |
| | $L_{0.2}$ | [m] | 2.6 | 3 | 3.6 | 4.4 | 5.2 | 5.8 |
| **OD-15/KK/Z/V/M size 600,625** | $L_{WA}$ | [dB (A)] | 29 | 31 | 35 | 38 | 41 | 44 |
| **Φd=250** | $\Delta p_t$ | [Pa] | 13 | 17 | 21 | 27 | 32 | 38 |

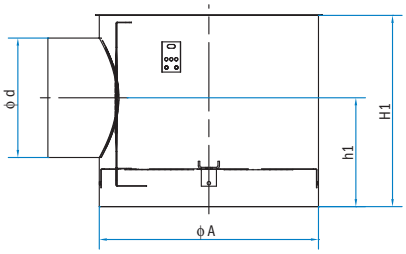
| **Type** | **Q** | **[l/s]** | **97.2** | **111.1** | **125.0** | **138.9** | **152.8** | **166.7** |
|---|---|---|---|---|---|---|---|---|
| | | **[m³/h]** | **350** | **400** | **450** | **500** | **550** | **600** |
| **OD-15/KR/ZR/S/M size 600,625** | $L_{WA}$ | [dB (A)] | 30 | 33 | 37 | 40 | 43 | 45 |
| **Φd=250** | $\Delta p_t$ | [Pa] | 13 | 17 | 21 | 26 | 32 | 38 |
| | $L_{0.2}$ | [m] | 2.8 | 3.2 | 3.8 | 4.7 | 5.4 | 6.2 |
| **OD-15/KR/ZR/V/M size 600,625** | $L_{WA}$ | [dB (A)] | 30 | 33 | 37 | 40 | 43 | 45 |
| **Φd=250** | $\Delta p_t$ | [Pa] | 13 | 17 | 21 | 26 | 32 | 38 |

* $L_{WA}$ and $\Delta p_t$ are given at 100 % open regulation damper

## Round plenum box




**(V)** top entry spigot



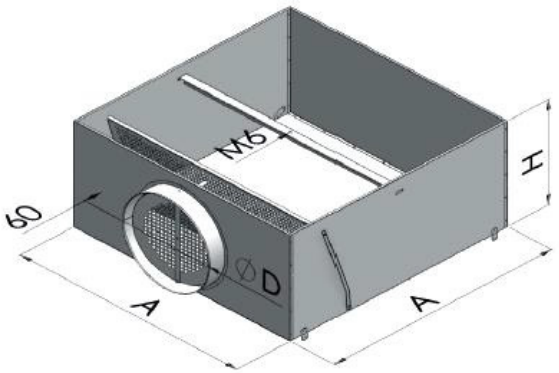

**(S)** side entry spigot

| Size and type | ΦA (mm) | H1 (mm) | Φd (mm) | h1 (mm) | H2 (mm) |
|---|---|---|---|---|---|
| **300KR,RR** | 290 | 245 | 158 | 143 | 245 |
| **400KR,RR** | 390 | 285 | 198 | 163 | 280 |
| **500KR,RR** | 488 | 285 | 198 | 163 | 280 |
| **600KR,RR** | 590 | 335 | 248 | 188 | 330 |
| **625KR,RR** | 590 | 335 | 248 | 188 | 330 |

* tolerances according to standard DIN 7168 T1, middle tolerance class (m) … ±0.8 mm

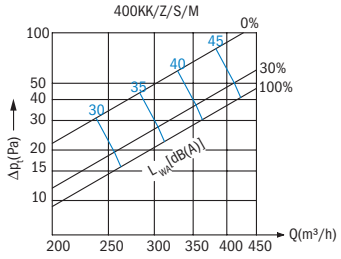
## Square plenum box

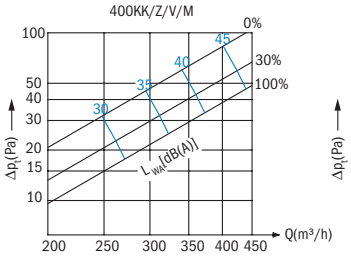
| Designation | Size | A [mm] | ΦD [mm] | H [mm] |
|---|---|---|---|---|
| **K/Z/S/M/** | 300 | 290 | 123 | 175 |
| **K/Z/S/M/** | 400 | 390 | 198 | 250 |
| **K/Z/S/M/** | 500 | 490 | 198 | 250 |
| **K/Z/S/M/** | 600 | 590 | 248 | 300 |
| **K/Z/S/M/** | 625 | 590 | 248 | 300 |

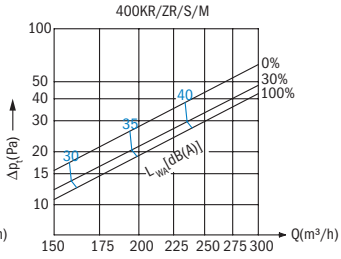


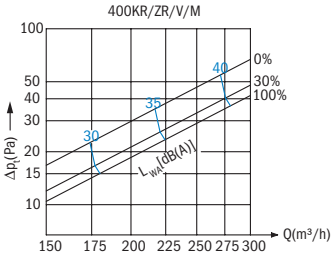

## Pressure drop, sound level

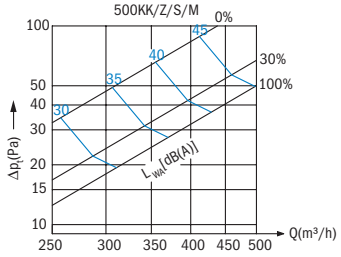
Damper opening: 0 % … closed, 100 % – opened

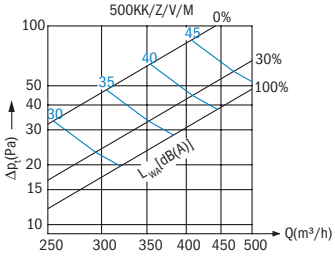


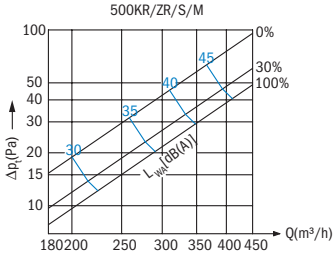



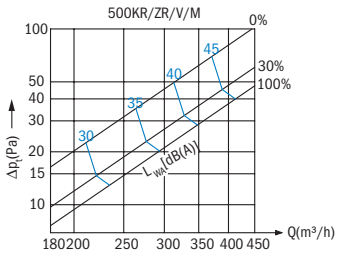



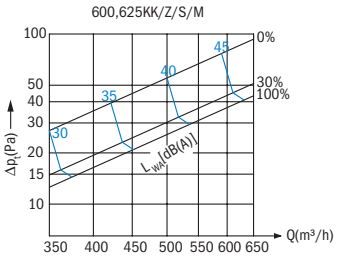



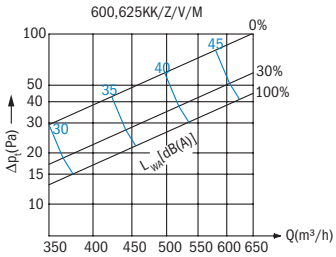



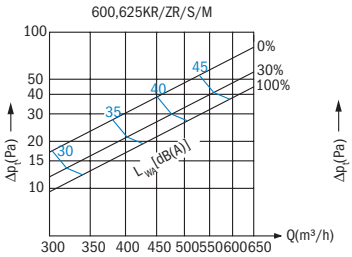



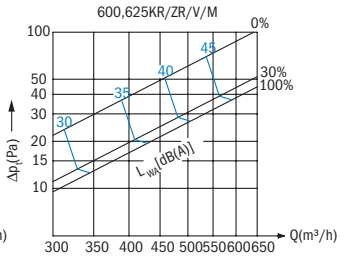



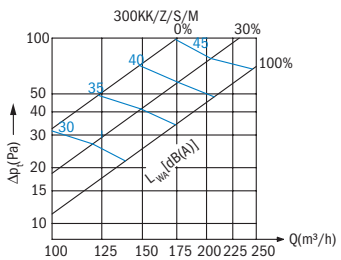



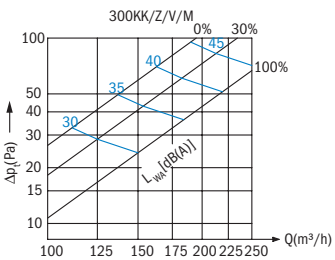



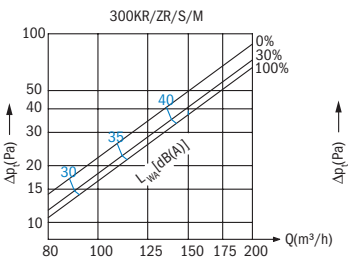



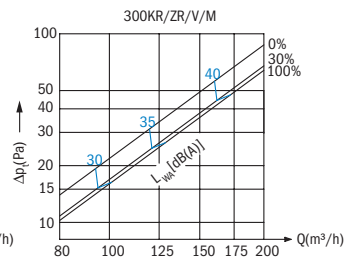



| Type | Sound attenuation* [dB] | | | | | | |
|---|---|---|---|---|---|---|---|
| | octave [Hz] | | | | | | |
| | 125 | 250 | 500 | 1k | 2k | 4k | 8k |
| OD-15/KK/Z/S/M size 300 | 13 | 7 | 10 | 9 | 6 | 5 | 7 |
| OD-15/KK/Z/V/M size 300 | 13 | 8 | 9 | 5 | 4 | 5 | 5 |
| OD-15/KR/ZR/S/M size 300 | 13 | 8 | 13 | 9 | 7 | 7 | 7 |
| OD-15/KR/ZR/V/M size 300 | 12 | 7 | 8 | 5 | 8 | 7 | 7 |
| OD-15/KK/Z/S/M size 400 | 9 | 8 | 8 | 8 | 5 | 5 | 7 |
| OD-15/KK/Z/V/M size 400 | 10 | 7 | 6 | 5 | 4 | 4 | 7 |
| OD-15/KR/ZR/S/M size 400 | 11 | 8 | 12 | 10 | 7 | 6 | 7 |
| OD-15/KR/ZR/V/M size 400 | 12 | 8 | 8 | 8 | 8 | 9 | 9 |
| OD-15/KK/Z/S/M size 500 | 10 | 7 | 7 | 7 | 7 | 5 | 7 |
| OD-15/KK/Z/V/M size 500 | 9 | 7 | 5 | 7 | 4 | 4 | 6 |
| OD-15/KR/ZR/S/M size 500 | 9 | 8 | 9 | 7 | 5 | 5 | 6 |
| OD-15/KR/ZR/V/M size 500 | 10 | 9 | 7 | 5 | 5 | 5 | 5 |
| OD-15/KK/Z/S/M size 600,625 | 6 | 7 | 7 | 6 | 3 | 4 | 6 |
| OD-15/KK/Z/V/M size 600,625 | 9 | 6 | 8 | 2 | 3 | 4 | 5 |
| OD-15/KR/ZR/S/M size 600,625 | 5 | 8 | 7 | 6 | 4 | 4 | 5 |
| OD-15/KR/ZR/V/M size 600,625 | 9 | 8 | 5 | 3 | 4 | 4 | 6 |

* Sound attenuation represents insertion losses; this means reduction in the level of sound power due to the inserted unit (swirl diffuser OD-15).

## Ordering key

**OD-15 KK1 / Z / S / M / I Size**

1 2 3 4 5 6 7

1 Diffuser type

| | |
|---|---|
| **OD-15** | Nozzle diffuser |

2 Diffuser plate type

| | |
|---|---|
| **KK1** | Square diffuser plate, square nozzle arrangement, central fastening |
| **KK4** | Square diffuser plate, square nozzle arrangement, fastening with four screws* |
| **KR1** | Square diffuser plate, radial nozzle arrangement, central fastening |
| **KR4** | Square diffuser plate, radial nozzle arrangement, fastening with four screws* |
| **RR1** | Circular diffuser plate, radial nozzle, central fastening |

3 Plenum box

| | |
|---|---|
| **Z** | Square plenum box for air supply |
| **ZR** | Circular plenum box for air supply (only KR1 and RR1) |

4 Spigot

| | |
|---|---|
| **S** | Side entry spigot |
| **V** | Vertical entry spigot - only on reqest |

5 Air regulation

| | |
|---|---|
| **M** | Volume control damper in entry spigot |

6 Insulation

| | |
|---|---|
| **I5** | 5 mm PE thermal insulation outside of ZR plenum box |
| **I6** | 6 mm PE thermal insulation outside of Z plenum box |
| **I9** | 9 mm synthetic rubber based sound & thermal insulation (-40°C - 105°C) outside of ZR plenum box |
| **I10** | 10 mm synthetic rubber based sound & thermal insulation (-40°C - 105°C) outside of Z plenum box |
| **I19** | 19 mm synthetic rubber based sound & thermal insulation (-40°C - 105°C) outside of ZR plenum box |

7 Dimensions

| | |
|---|---|
| **300** | Size |
| **400** | Size |
| **500** | Size |
| **600** | Size |
| **625** | Size |

* Versions KK4 and KR4 for dimensions 300, 400, 500, 600 are available only when ordering the diffusers without plenum box.

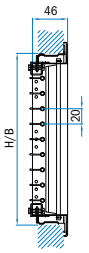
# Stainless steel grilles

## RR-1, RR-3, RR-5, RR-6

- Visible or hidden screw installation
- Flat framer
- **Stainless steel AISI 304 (BA – polished, high gloss)**

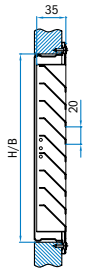
## RR-1

- Individually adjustable vertical and horizontal blades



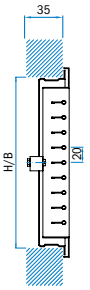

## RR-3

- Fixed horizontal blades



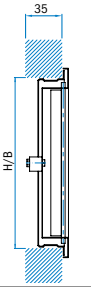

## RR-5

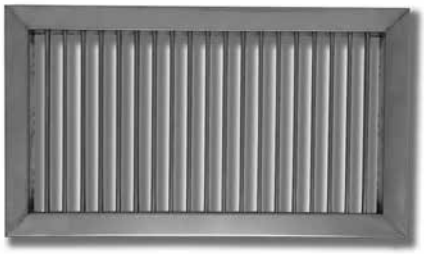
- Individually adjustable horizontal blades




## RR-6

- Individually adjustable vertical blades



## Ordering key

**RR-1/V – F**

- **F** Register – classic
- **FI** Register INOX (frame INOX, aluminium blades)
- **V** Visible screw installation – screw INOX
- **2** Installation frame and locks – galvanised (for RR-1, 5, 6 only)
- **2I** Installation frame INOX and galvanised locks (for RR-1, 5, 6 only)
- **V2** Visible screw installation + installation frame – galvanised
- **V2I** Visible screw installation + installation frame – INOX
- grille type RR-1, RR-3, RR-5, RR-6

**Grille standard dimensions and cross-sections (m²) for RR-5, RR-6:**

| B/H | 75 | 125 | 175 | 225 | 325 | 425 | 525 |
|---|---|---|---|---|---|---|---|
| 225 | 0.007 | 0.015 | 0.021 | 0.029 | | | |
| 325 | 0.011 | 0.023 | 0.033 | 0.044 | 0.066 | | |
| 425 | 0.015 | 0.031 | 0.044 | 0.060 | 0.089 | 0.118 | |
| 525 | 0.019 | 0.038 | 0.055 | 0.075 | 0.112 | 0.148 | 0.185 |
| 625 | 0.022 | 0.046 | 0.067 | 0.090 | 0.134 | 0.179 | 0.223 |
| 725 | 0.026 | 0.054 | 0.078 | 0.106 | 0.157 | 0.209 | 0.261 |
| 825 | 0.030 | 0.062 | 0.089 | 0.121 | 0.180 | 0.239 | 0.298 |
| 925 | 0.034 | 0.070 | 0.101 | 0.136 | 0.203 | 0.270 | 0.336 |
| 1025 | 0.038 | 0.077 | 0.112 | 0.151 | 0.226 | 0.300 | 0.374 |
| 1125 | 0.041 | 0.085 | 0.123 | 0.167 | 0.248 | 0.330 | 0.412 |
| 1225 | 0.045 | 0.093 | 0.134 | 0.182 | 0.271 | 0.360 | 0.450 |

| B/H | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 500 |
|---|---|---|---|---|---|---|---|---|
| 150 | 0.007 | 0.011 | | | | | | |
| 200 | 0.010 | 0.016 | 0.022 | | | | | |
| 250 | 0.013 | 0.021 | 0.029 | 0.037 | | | | |
| 300 | 0.015 | 0.026 | 0.035 | 0.046 | 0.055 | | | |
| 350 | 0.018 | 0.031 | 0.042 | 0.055 | 0.065 | 0.078 | | |
| 400 | 0.021 | 0.036 | 0.049 | 0.063 | 0.076 | 0.090 | 0.103 | |
| 450 | 0.024 | 0.041 | 0.055 | 0.072 | 0.086 | 0.103 | 0.117 | |
| 500 | 0.027 | 0.046 | 0.062 | 0.080 | 0.097 | 0.115 | 0.131 | 0.166 |
| 600 | 0.033 | 0.055 | 0.075 | 0.098 | 0.117 | 0.140 | 0.160 | 0.202 |
| 700 | 0.039 | 0.065 | 0.088 | 0.115 | 0.138 | 0.165 | 0.188 | 0.238 |
| 800 | 0.044 | 0.075 | 0.102 | 0.132 | 0.159 | 0.190 | 0.216 | 0.274 |
| 900 | 0.050 | 0.085 | 0.115 | 0.150 | 0.180 | 0.214 | 0.245 | 0.309 |
| 1000 | 0.056 | 0.095 | 0.128 | 0.167 | 0.201 | 0.239 | 0.273 | 0.345 |
| 1100 | 0.062 | 0.104 | 0.142 | 0.184 | 0.221 | 0.264 | 0.301 | 0.381 |
| 1200 | 0.068 | 0.114 | 0.155 | 0.202 | 0.242 | 0.289 | 0.330 | 0.417 |

**Grille standard dimensions and cross-sections (m²) for RR-1:**

| B/H | 75 | 125 | 175 | 225 | 325 | 425 | 525 |
|---|---|---|---|---|---|---|---|
| 225 | 0.006 | 0.014 | 0.021 | 0.029 | | | |
| 325 | 0.009 | 0.020 | 0.032 | 0.043 | 0.066 | | |
| 425 | 0.012 | 0.027 | 0.042 | 0.057 | 0.088 | 0.118 | |
| 525 | 0.015 | 0.034 | 0.053 | 0.072 | 0.109 | 0.147 | 0.185 |
| 625 | 0.018 | 0.040 | 0.063 | 0.086 | 0.131 | 0.176 | 0.222 |
| 725 | 0.021 | 0.047 | 0.074 | 0.100 | 0.153 | 0.206 | 0.258 |
| 825 | 0.024 | 0.054 | 0.084 | 0.114 | 0.174 | 0.235 | 0.295 |
| 925 | 0.027 | 0.061 | 0.094 | 0.128 | 0.196 | 0.264 | 0.332 |
| 1025 | 0.030 | 0.067 | 0.105 | 0.142 | 0.218 | 0.293 | 0.368 |
| 1125 | 0.032 | 0.074 | 0.115 | 0.157 | 0.239 | 0.322 | 0.405 |
| 1225 | 0.035 | 0.081 | 0.126 | 0.171 | 0.261 | 0.351 | 0.442 |

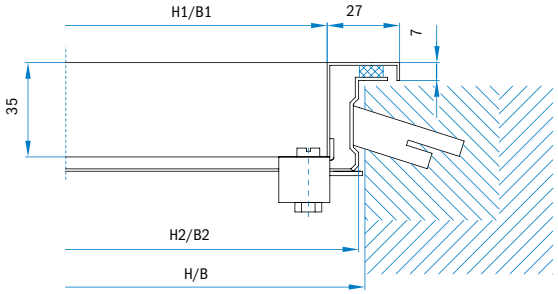
| B/H | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 500 |
|---|---|---|---|---|---|---|---|---|
| 150 | 0.006 | 0.011 | | | | | | |
| 200 | 0.009 | 0.015 | 0.022 | | | | | |
| 250 | 0.011 | 0.020 | 0.029 | 0.037 | | | | |
| 300 | 0.013 | 0.024 | 0.034 | 0.045 | 0.055 | | | |
| 350 | 0.016 | 0.028 | 0.041 | 0.053 | 0.066 | 0.078 | | |
| 400 | 0.018 | 0.032 | 0.047 | 0.061 | 0.075 | 0.089 | 0.103 | |
| 450 | 0.021 | 0.037 | 0.053 | 0.069 | 0.085 | 0.102 | 0.118 | |
| 500 | 0.023 | 0.041 | 0.059 | 0.077 | 0.095 | 0.113 | 0.130 | 0.166 |
| 600 | 0.028 | 0.049 | 0.071 | 0.093 | 0.114 | 0.136 | 0.158 | 0.201 |
| 700 | 0.033 | 0.058 | 0.083 | 0.109 | 0.134 | 0.160 | 0.185 | 0.236 |
| 800 | 0.037 | 0.067 | 0.096 | 0.125 | 0.154 | 0.183 | 0.212 | 0.271 |
| 900 | 0.042 | 0.075 | 0.108 | 0.141 | 0.174 | 0.207 | 0.240 | 0.305 |
| 1000 | 0.047 | 0.084 | 0.120 | 0.157 | 0.194 | 0.230 | 0.267 | 0.340 |
| 1100 | 0.052 | 0.092 | 0.133 | 0.173 | 0.213 | 0.254 | 0.294 | 0.375 |
| 1200 | 0.057 | 0.101 | 0.145 | 0.189 | 0.233 | 0.277 | 0.322 | 0.410 |

**Standard dimensions for RR-3:**

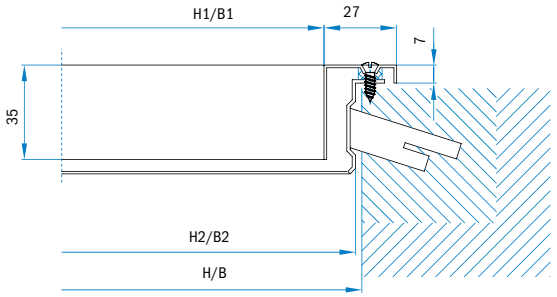
| B/H | 75 | 125 | 225 | 325 | 425 | 525 |
|---|---|---|---|---|---|---|
| 225 | | | | | | |
| 325 | | | | | | |
| 425 | | | | | | |
| 525 | | | | | | |
| 625 | | | | | | |
| 825 | | | | | | |
| 1025 | | | | | | |
| 1225 | | | | | | |

## Ventilating grilles installation

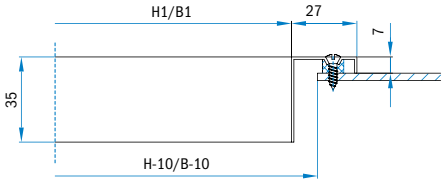
- **Wall installation with built-in frame and hidden fixing (lock) /2**
  B1 = B-27 H1 = H-27
  B2 = B-1 H2 = H-1
  The list of grilles and their designation:
  RR-1/2, RR-3/2, RR-5/2 and RR-6/2




- **Wall installation with built-in frame and visible fixing /V2**
  B1 = B-27 H1 = H-27
  B2 = B-1 H2 = H-1
  The list of grilles and their designation:
  RR-1/V2, RR-3/V2, RR-5/V2, RR-6/V2

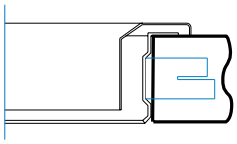


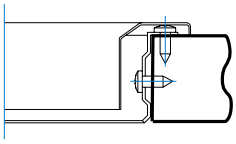

- **Direct installation in wall or duct via the visible fixing**
  B1 = B-27 H1 = H-27
  The list of grilles and their designation:
  RR-1/V, RR-3/V, RR-5/V, RR-6/V

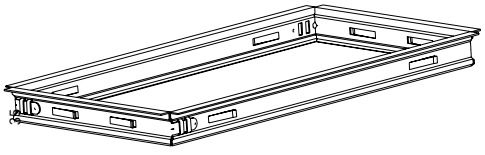



## Mounting of grilles with installation frame

The installation frame may be mortar-mounted (in concrete or brick walls) or fixed with screws (walls, ceilings, ducts, ...).







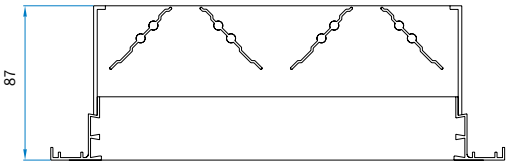
H-10/B-10

## Registers

When adjusting the system, desired operating conditions are obtained by the means of ventilation elements control. Registers are installed for additional air volume control, thus influencing air velocity and throw distance as well. All types of registers, except type of register F, are made of sheet steel and corrosion protected with dipcoat processing in blackwater soluble colour. Upon customer's request registers can be made of galvanised sheet steel and coloured in any colour. Typ of register F is made of plastics.

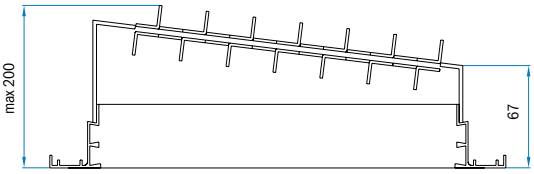
### F

Register has wide counter-directional blades which can be moved with screw-driver via the gear wheel. It is used to control the air flow volume.Blades are made of plastics.



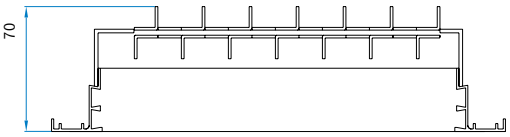

### S

Register has fixed deflector and slider which opens and closes the slots. Due to inclined deflection, air volume damper S is particularly useful for longer grilles, because air flow is evenly distributed throughout the grille.



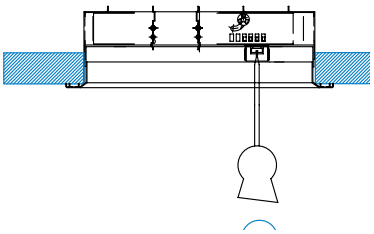

### T

Register has fixed deflector and slider which opens and closes the slots. It isused to control and deflect the air flow from the duct.

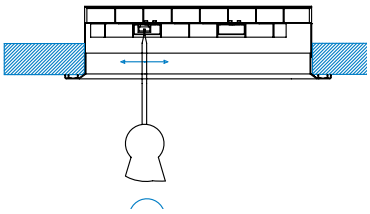



## Set-up of different registers

**Register F**



**Register T**



## Ventilating grilles/registers combinations

| Grille | F | F2 | S | T |
|---|---|---|---|---|
| RR-1 | ■ | | □ | □ |
| RR-3 | □ | | | |
| RR-5 | ■ | | □ | □ |
| RR-6 | ■ | | □ | □ |

■ standard combination
□ possible combination

# Technical data

## Effective discharge area $A_{ef}$ ($m^2$)

| B | H | RR-3 | | RR-5 | RR-1<br>RR-6 |
|---|---|---|---|---|---|
| **225** | 75 | 0.0060 | | 0.0080 | 0.0090 |
| **325** | | 0.0100 | | 0.0110 | 0.0130 |
| **425** | | 0.0130 | | 0.0150 | 0.0170 |
| **525** | | 0.0160 | | 0.0190 | 0.0210 |
| **625** | | 0.0190 | | 0.0230 | 0.0250 |
| **825** | | 0.0260 | | 0.0300 | 0.0340 |
| **1025** | | 0.0320 | | 0.0380 | 0.0420 |
| **1225** | | 0.0380 | | 0.0460 | 0.0510 |
| **225** | 125 | 0.0090 | | 0.0150 | 0.0170 |
| **325** | | 0.0140 | | 0.0230 | 0.0260 |
| **425** | | 0.0190 | | 0.0310 | 0.0350 |
| **525** | | 0.0240 | | 0.0390 | 0.0430 |
| **625** | | 0.0290 | | 0.0470 | 0.0520 |
| **825** | | 0.0380 | | 0.0620 | 0.0690 |
| **1025** | | 0.0480 | | 0.0780 | 0.0860 |
| **1225** | | 0.0570 | | 0.0930 | 0.1040 |
| **325** | 225 | 0.0320 | | 0.0460 | 0.0530 |
| **425** | | 0.0430 | | 0.0610 | 0.0710 |
| **525** | | 0.0530 | | 0.0760 | 0.0870 |
| **625** | | 0.0640 | | 0.0910 | 0.1050 |
| **825** | | 0.0860 | | 0.1220 | 0.1400 |
| **1025** | | 0.1070 | | 0.1530 | 0.1740 |
| **1225** | | 0.1290 | | 0.1830 | 0.2090 |
| **425** | 325 | 0.0660 | | 0.0910 | 0.1070 |
| **525** | | 0.0830 | | 0.1140 | 0.1310 |
| **625** | | 0.1000 | | 0.1360 | 0.1570 |
| **825** | | 0.1340 | | 0.1820 | 0.2110 |
| **1025** | | 0.1670 | | 0.2280 | 0.2620 |
| **1225** | | 0.2010 | | 0.2730 | 0.3150 |
| **625** | 425 | 0.1360 | | 0.1810 | 0.2100 |
| **825** | | 0.1810 | | 0.2420 | 0.2820 |
| **1025** | | 0.2270 | | 0.3020 | 0.3490 |
| **1225** | | 0.2720 | | 0.3630 | 0.4210 |
| **1025** | 525 | 0.2870 | | 0.3770 | 0.4370 |
| **1225** | | 0.3440 | | 0.4530 | 0.5270 |

Discharge or inlet air flow volume is determined via air velocity measuring at the effective area with horizontally positioned blades.

### Use the below formula to calculate air flow volume

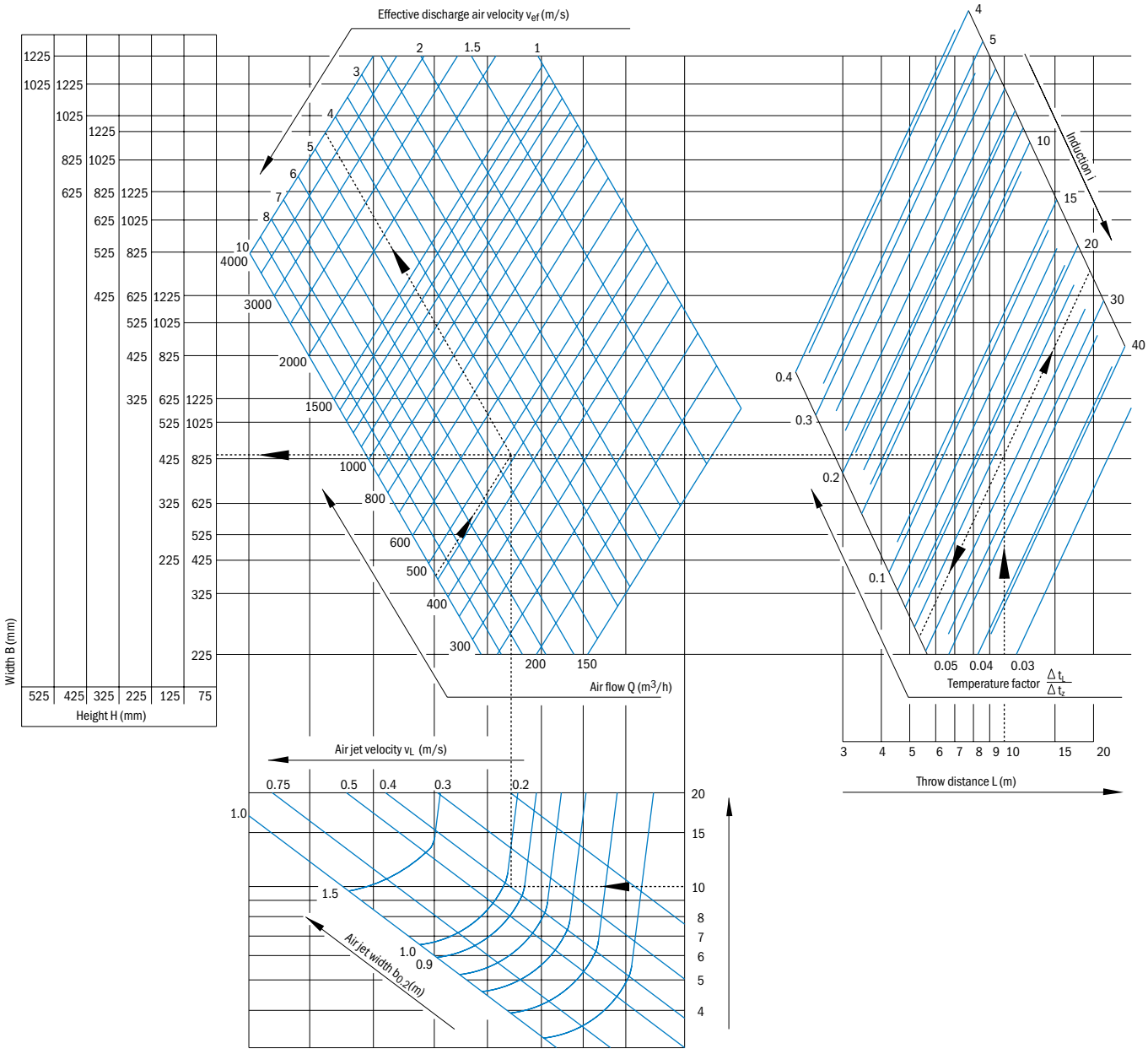
**$Q = V_{ef} \times A_{ef} \times 3600$ ($m^3/h$)**

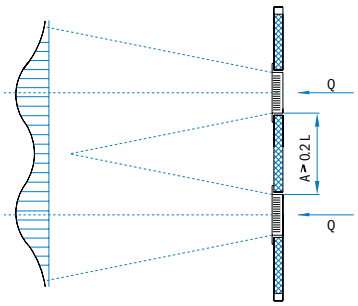
**$V_{ef}$ ($m/s$)** Effective jet velocity

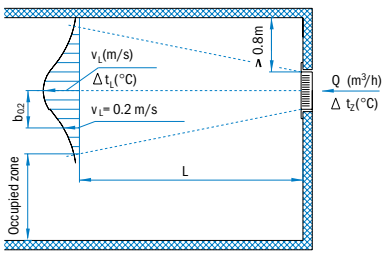
**$A_{ef}$ ($m^2$)** Effective area

# Ventilating grilles RR-1, 3, 5, 6; without ceiling effect (distance from ceiling ≥ 0.8 m)

**Chart for determining the size, induction and temperature of the air flow**
valid for B/H ≤ 12 – fully opened blades



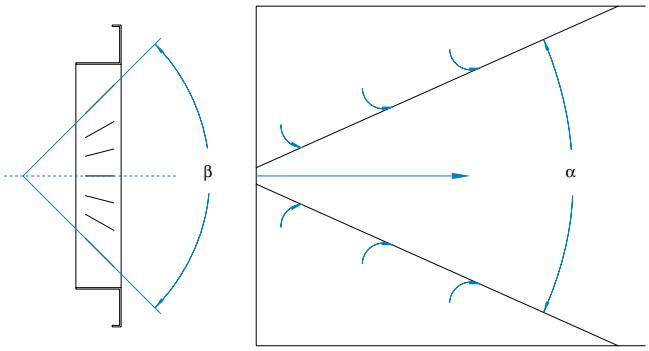




## Definition of Symbols

| | |
|---|---|
| **Q (m³/h)** | Air flow |
| **L (m)** | Throw distance |
| **$V_{ef}$ (m/s)** | Effective discharge air velocity |
| **$V_L$ (m/s)** | Max. air velocity at the throw distance L |
| **$\Delta t_z$ (K)** | Temperature difference between supply and room air |
| **$\Delta t_L$ (K)** | Temperature difference between air jet and room temperature |
| **i** | Induction rate = total airstream volume flow / volume flow at diffuser discharge |
| **$b_{0.2}$ (m)** | Width of air jet is measured at a distance from ceiling where air flow velocity 0.2 m/s |

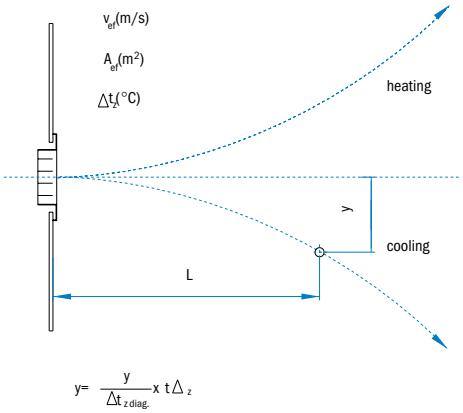
# Ventilating grilles RR-1, 3, 5, 6 without ceiling effect (distance from ceiling ≥ 0.8 m)

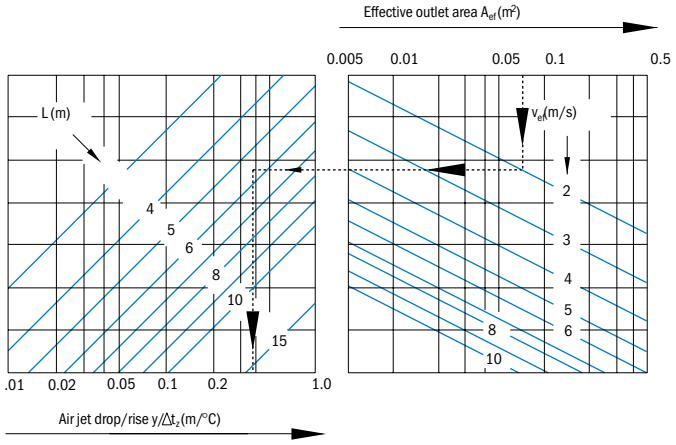
### Table with correcting factors for horizontal air jet deflection:




| | | | |
|---|---|---|---|
| Blade adjusting angle | β | 45° | 90° |
| Air jet spread angle | α | 35° | 60° |
| Air flow velocity | $V_L$ | $V_L$ diag. x 0.7 | x 0.5 |
| Temperature factor $\Delta t_L/\Delta t_Z$ | ($\Delta t_L/\Delta t_Z$ diag.) | x 0.7 | x 0.5 |
| Induction | i | i diag. x 1.4 | x 2.0 |
| Air jet drop | y | y diag. x 1.4 | x 2.0 |
| Distance between grilles | A | 0.25 L | 0.3 L |

### Chart for determining air jet deflection:




## Example

**Given:**

| | |
|---|---|
| Air flow: | **Q = 460 m³/h, L = 10m** |
| Air flow velocity: | **VL = 0.4 m/s** |
| Temperature difference: | **$\Delta t_Z$ = 5 °C** |

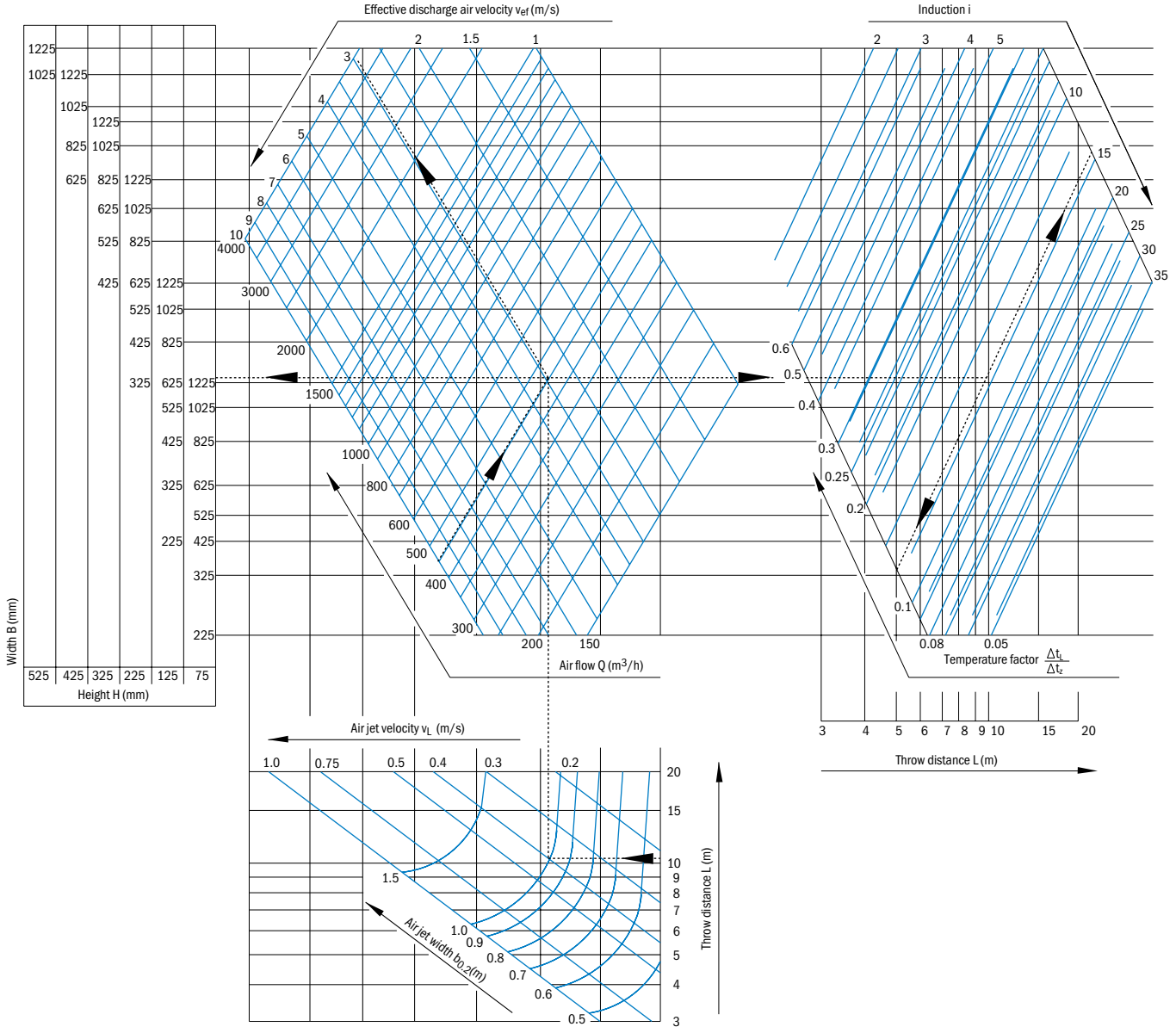
**Solution:**

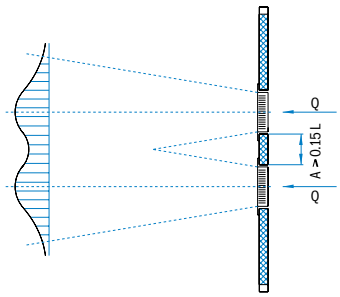
Use the chart, distance from ceiling ≥ 0.8 m
and select the grille type AR-13 size B = 425, H = 125

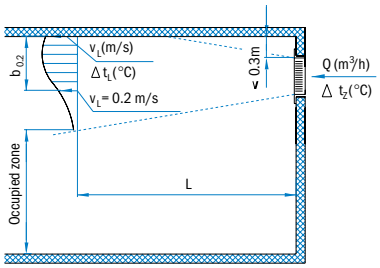
| | |
|---|---|
| Effective outlet air velocity | **$V_{ef}$ = 4.5 m/s** |
| Temperature factor | **$\Delta t_L/\Delta t_Z$ = 0.065** |
| Temperature difference | **$\Delta t_L$ = 0.065 x 5 = 0.32 °C** |
| Induction | **i = 23** |
| Width of the air jet | **$b_{0.2}$ = 1.0 m** |
| Min. distance between grilles | **A = 2 m** |

# Ventilating grilles RR-1, 3, 5, 6 with ceiling effect (distance from ceiling ≤ 0.3 m)

**Chart for determining the size, induction and temperature of the air flow**
valid for B/H ≤ 12 – fully opened blades



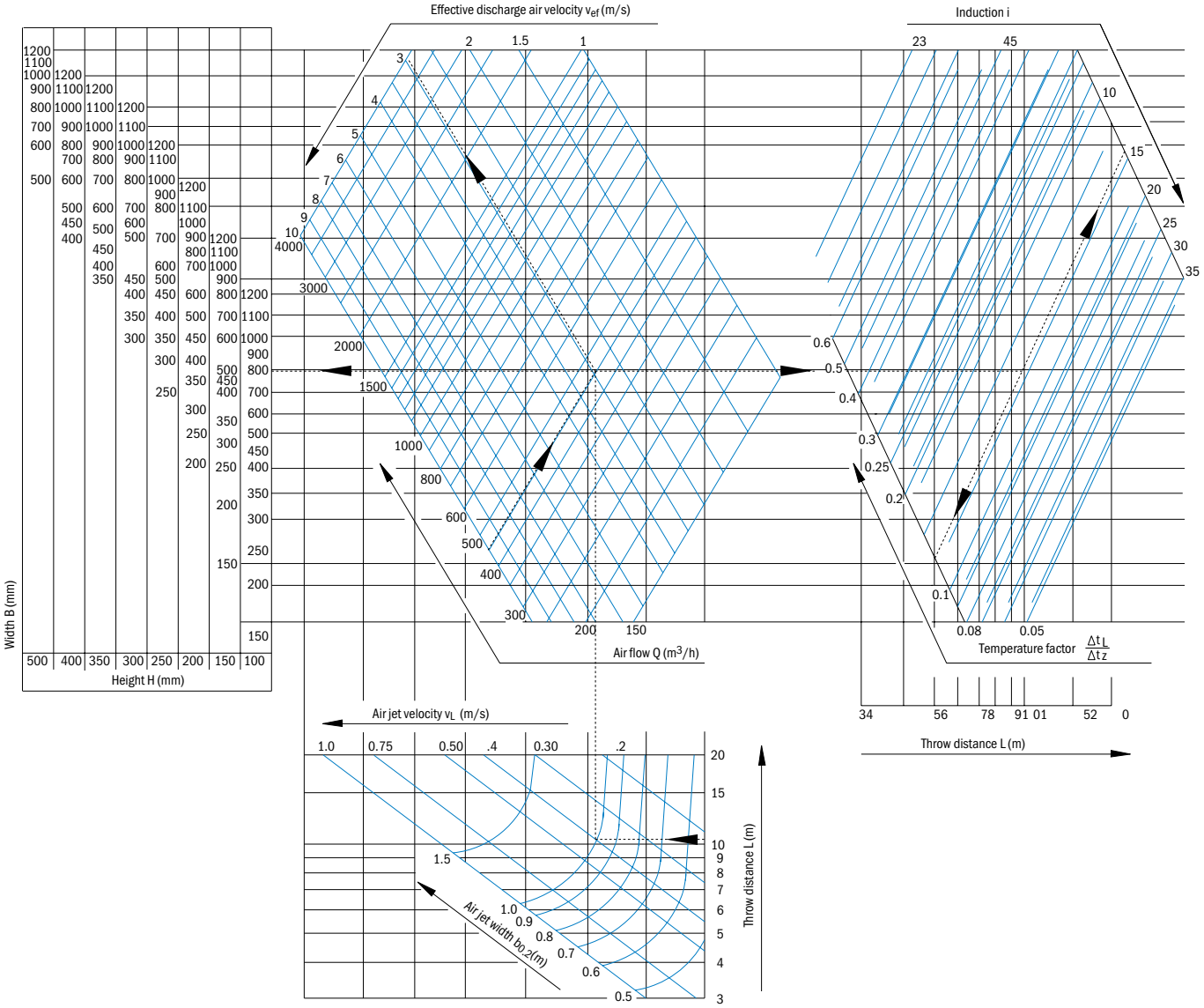




## Definition of symbols

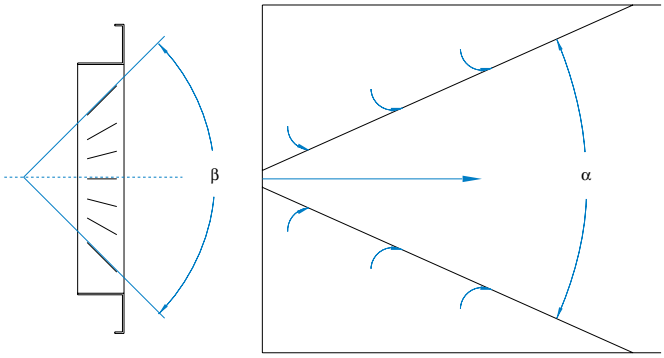
| | |
|---|---|
| **Q (m³/h)** | Air flow |
| **L (m)** | Throw distance |
| **$V_{ef}$ (m/s)** | Effective discharge air velocity |
| **$V_L$ (m/s)** | Max. air velocity at the throw distance L |
| **$\Delta t_z$ (K)** | Temperature difference between supply and room air |
| **$\Delta t_L$ (K)** | Temperature difference between air jet and room temperature |
| **i** | Induction rate = total airstream volume flow / volume flow at diffuser discharge |
| **$b_{0.2}$ (m)** | Width of air jet is measured at a distance from ceiling where air flow velocity 0.2 m/s |

# Ventilating grilles RR-1, 3, 5, 6 with ceiling effect (distance from ceiling ≤ 0.3 m)

**Chart for determining the size, induction and temperature of the air flow**
valid for B/H ≤ 12 – fully opened blades

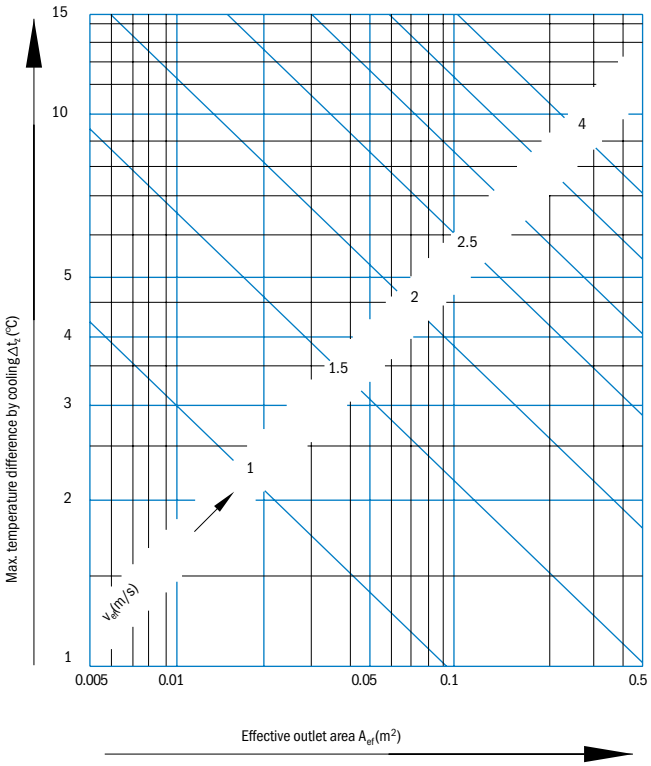


### Table with correcting factors for horizontal air jet deflection




| | | | |
|---|---|---|---|
| Blade adjusting angle | β | 45° | 90° |
| Air jet spread angle | α | 35° | 60° |
| Air flow velocity | $V_L$ | $V_L$ diag. x 0.7 | x 0.5 |
| Temperature factor $\Delta t_L/\Delta t_Z$ | ($\Delta t_L/\Delta t_Z$ diag.) | x 0.7 | x 0.5 |
| Induction | i | i diag. x 1.4 | x 2.0 |
| Air jet drop | y | y diag. x 1.4 | x 2.0 |
| Distance between grilles | A | 0.25 L | 0.3 L |

### Chart for determining air jet deflection




## Example

**Given:**

| | |
|---|---|
| Air flow: | **Q = 460 m³/h, L = 10m** |
| Air flow velocity: | **$V_L$ = 0.4 m/s** |
| Temperature difference: | **$\Delta t_Z$ = 5 °C** |

**Solution:**

Use the chart, distance from ceiling ≤ 0.3 m

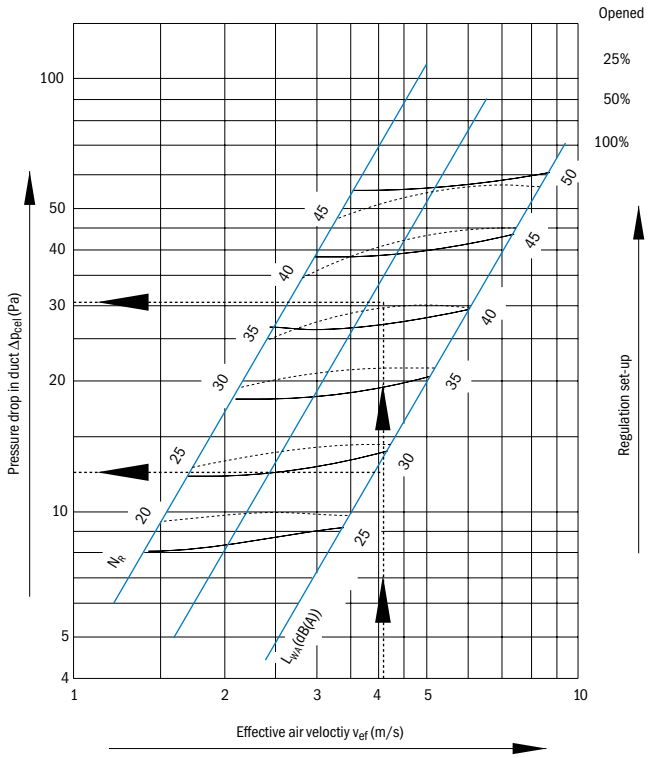
and select the grille type JR-3 size B = 625, H = 125

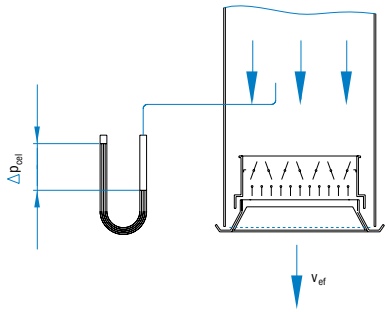
| | |
|---|---|
| Effective outlet air velocity | **$V_{ef}$ = 2.8 m/s** |
| Temperature factor | **$\Delta t_L/\Delta t_Z$ = 0.13** |
| Temperature difference | **$\Delta t_L$ = 0.13 x 5 = 0.65 °C** |
| Induction | **i = 15** |
| Width of the air jet | **$b_{0.2}$ = 1.0 m** |
| Min. distance between grilles | **A = 1.5 m** |

# Technical data for ventilating grilles

### Pressure drop and sound power level diagram for grilles RR-1, 3, 5, 6 with volume control damper F

Fully opened blades



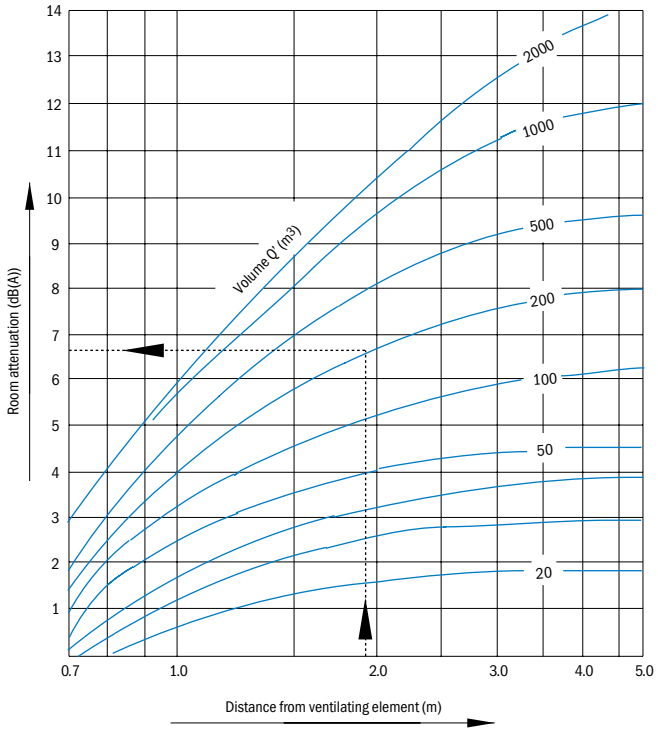

### Table of correction factors for acoustic data

| $A_{ef}$ (m²) | 0.01 | 0.02 | 0.05 | 0.1 | 0.2 | 0.4 |
|---|---|---|---|---|---|---|
| Correction (dB(A)) $N_R$ | -10 | -7 | -3 | 0 | +3 | +6 |

## Definition of symbols

| | |
|---|---|
| **$A_{ef}$** | Effective outlet area |
| **$\Delta p_{cel}$ (Pa)** | Pressure drop |
| **$L_{WA}$ (dB(A))** | Sound power level |
| **$N_R$** | Max. value acc. to ISO |

### Room sound attenuation diagram




**The following data are necessary to calculate the volume Q':**

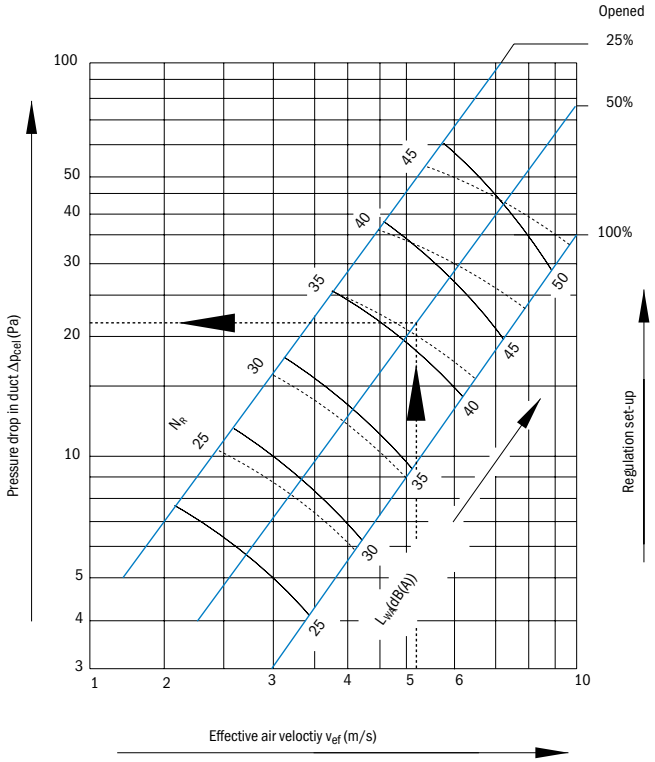
| | |
|---|---|
| 1. Normal rooms | Q' = Q |
| 2. Rooms with highly reflective walls | Q' = 0.5Q |
| 3. Rooms with absorption walls | Q' = 2Q |

## Definition of symbols

| | |
|---|---|
| **Q' (m³)** | Calculated volume, depending on room reflectance |
| **Q (m³)** | Actual room volume |

# Technical data for extracting grilles

**Presure drop and sound power level for grilles RR-1, 3, 5, 6 with volume control damper F**
Fully opened blades



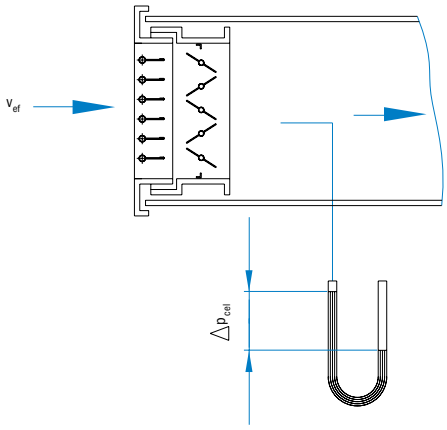



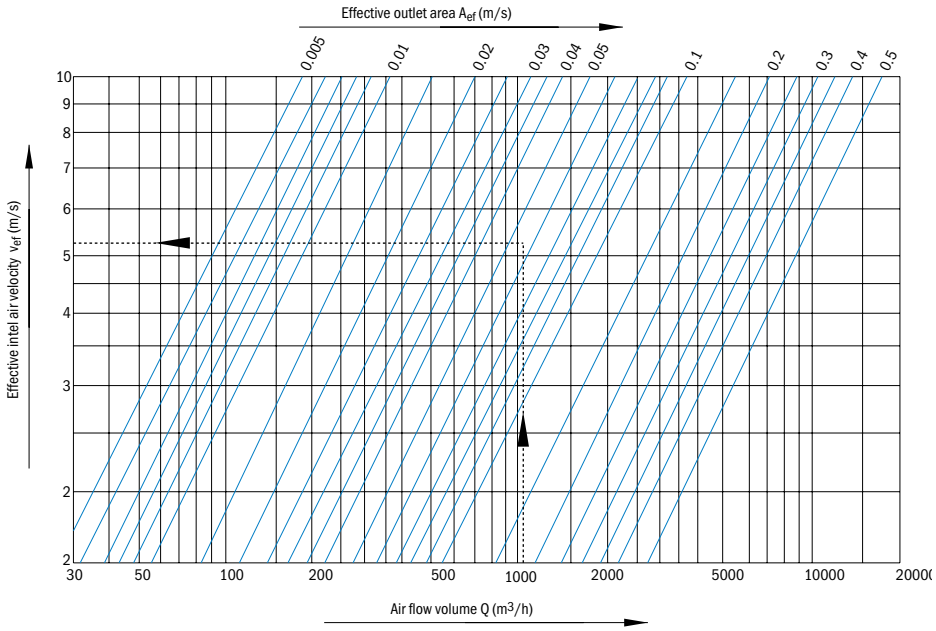

**Table of correction factors for acoustic data**

| $A_{ef}$ (m²) | 0.005 | 0.01 | 0.02 | 0.05 | 0.1 | 0.2 | 0.4 |
|---|---|---|---|---|---|---|---|
| Correction (dB(A)) $N_R$ | -13 | -10 | -7 | -3 | 0 | +3 | +6 |

## Definition of symbols

| | |
|---|---|
| **$\Delta p_{cel}$ (Pa)** | Pressure drop |
| **$L_{WA}$ (dB(A))** | Sound power level |
| **$N_R$** | Max. value acc. to ISO |

### Effective supply air velocity diagram




## Example

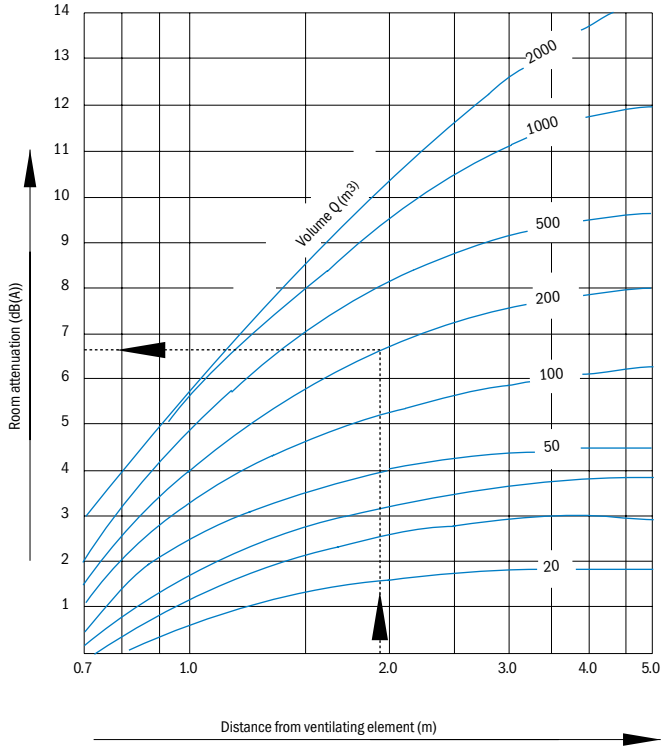
Q = 1000 m³/h

$A_{ef}$ = 0.05 m³ (from the Effective area table)

As follows from the diagram.

$V_{ef}$ = 5.3 m/s

### Room sound attenuation diagram




**The following data are necessary to calculate the volume Q':**

| | |
|---|---|
| 1. Normal rooms | Q' = Q |
| 2. Rooms with highly reflective walls | Q' = 0.5Q |
| 3. Rooms with absorption walls | Q' = 2Q |

## Definition of symbols

| | |
|---|---|
| **Q' (m³)** | Calculated volume, depending on room reflectance |
| **Q (m³)** | Actual room volume |

# Air displacement units

## Air displacement units
## SD-1

**Application**
Air displacement units are suitable for both industrial and comfort air conditioning applications. They are suitable for rooms characterised by high heat loads or heavy air pollution. Air displacement units supply air at large flow rates (up to 10.000 m³/h), at low air velocities (in the range from 0.1 to 0.3 m/s). Supplied air forms a so called »fresh air pool« in the occupied zone. Air is lifted in convection currents from heat sources to the ceiling layer, from which it is extracted from the room. In this way, even temperature field is maintained in the room, free of draught. Diffusers can be installed suspended from the ceiling, standing on the floor or hanging immediately above the occupied zone.

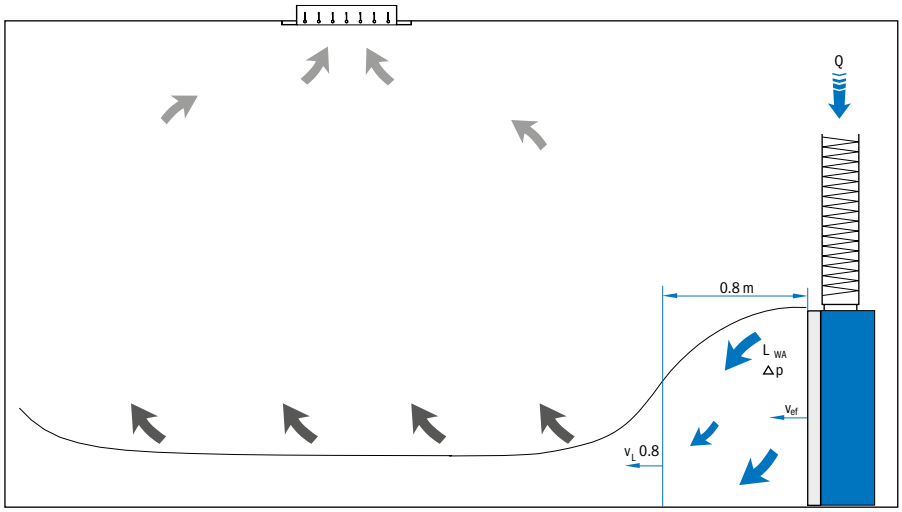
**Description**
Air displacement units are made of sheet steel and painted in RAL 9010. They can be coloured in any other RAL colour at to the customer's request. They consist of a mantle, a bottom plate and a top plate equipped with an inlet spigot. The standard shape of the spigot is round. At the customer's request, it can be rectangular according to the dimension of the unit.

The air displacement unit mantle perforation is designed according to the version. The versions without a filter (F1, F2 and F5) have mantle perforation with round openings (ϕ 5.5 x 8 mm, 37 % free area). The versions with a filter (F3, F4 and F6) have square openings (10 x 10 x 2 mm, 69 % free area).

To achieve a uniform distribution of air across the entire displacement surface, versions F3, F4 and F6 are recommended.

**SD-1**

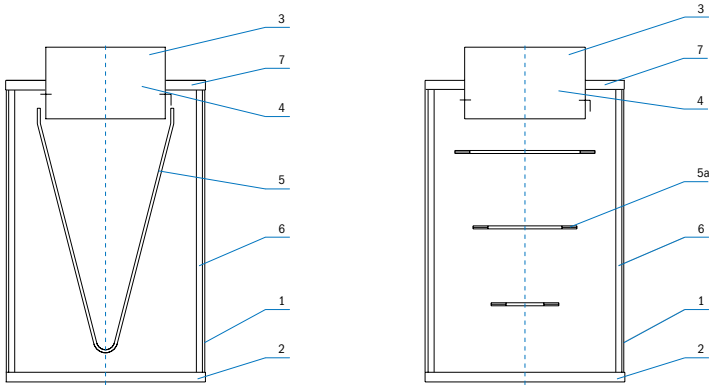
**SD-1:** corner




### Definition of symbols

| | | | |
|---|---|---|---|
| **Q (m³/h)** | Air flow rate | **$\Delta t_L$ (K)** | Temperature difference between air jet and room temperature |
| **$v_L$ (m/s)** | Supplied air velocity at the throw distance L=0.8 m | **$\Delta p_t$ (Pa)** | Pressure drop |
| **$v_{ef}$** | Effective dishcarge air velocity | **$L_{WA}$ (dB(A))** | Sound power level |
| **$\Delta t_z$ (K)** | Temperature difference between supply and room air | | |

**1.** Perforated mantle
**2.** Bottom plate
**3.** Round inlet spigot
**4.** Control flap
**5.** Cone-shaped filter bag
**5a.**Dividing rings
**6.** Filter
**7.** Top plate




## Versions

**F1:** without filters

**F2**: with the filter bag

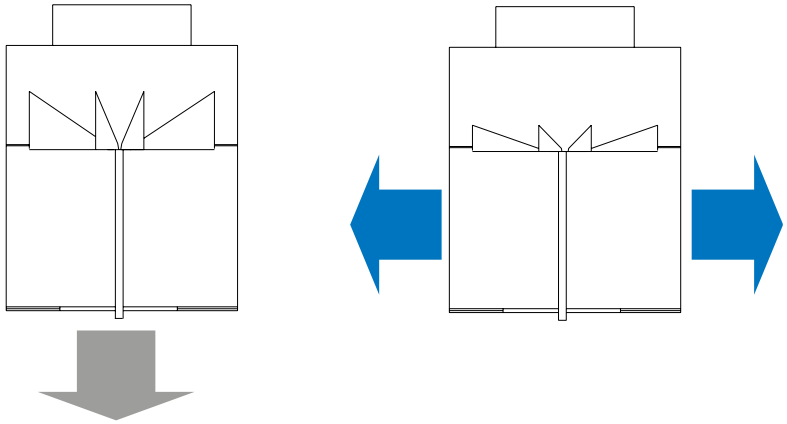
**F3:** with the peripheral filter

**F4:** with the filter bag and the peripheral filter

**F5:** without filters and jet dividing rings

**F6:** with the peripheral filter and dividing rings

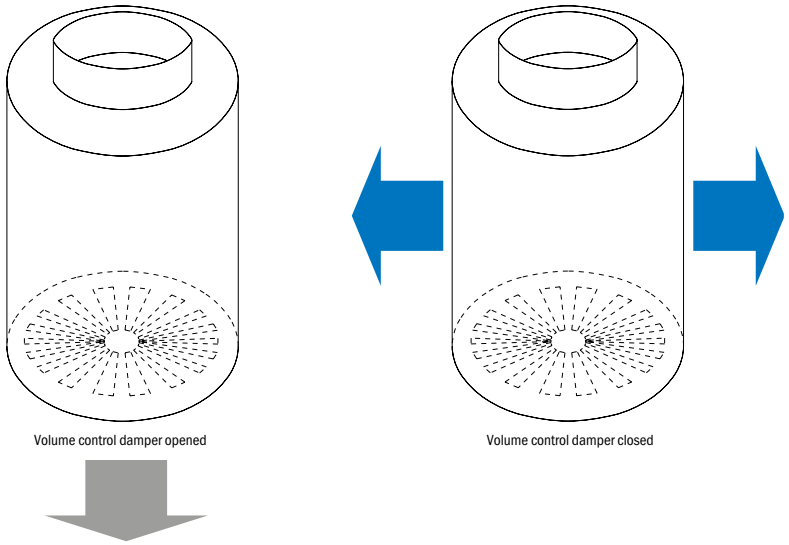
**(R1)** Air jet direction adjustment with blades (available with F1 and F5 version only).



## Special SD-3 version

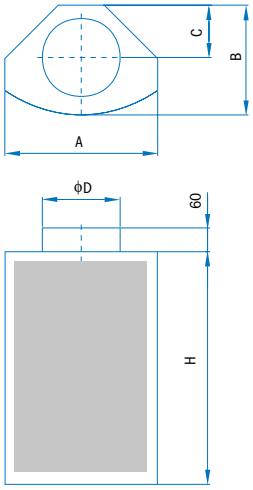
An air displacement unit with regulation R1 and R2 must be mounted under the ceiling for correct operation. On the top plate, there is a special nut for mounting on the ceiling with a threaded rod.

**(R2)** Air jet direction adjustment with a flow control damper (available with F1 and F3 version only).



## Dimensions

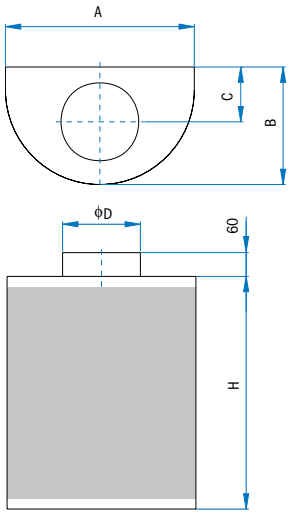
### SD-1




| H |
|---|
| 750 |
| 1000 |
| 1250 |
| 1500 |
| 2000 |
| 2500 |

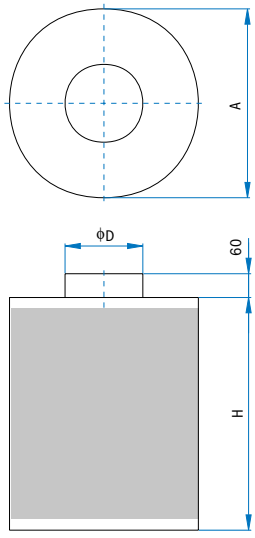
| Size | A | B | C | ϕD |
|---|---|---|---|---|
| **400** | 283 | 180 | 100 | 123 |
| **600** | 424 | 275 | 135 | 148 |
| **800** | 566 | 300 | 150 | 178 |
| **1000** | 707 | 400 | 200 | 198 |
| **1500** | 1061 | 450 | 220 | 248 |
| **2000** | 1414 | 700 | 350 | 298 |

### SD-2



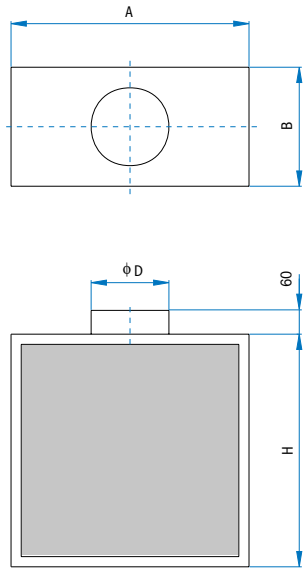

| Size | A | B | C | ϕD |
|---|---|---|---|---|
| **400** | 400 | 320 | 150 | 178 |
| **600** | 600 | 470 | 230 | 198 |
| **800** | 800 | 570 | 250 | 248 |
| **1000** | 1000 | 620 | 280 | 298 |
| **1500** | 1500 | 870 | 350 | 348 |
| **2000** | 2000 | 1120 | 430 | 398 |

### SD-3




| Size | A | ϕD |
|---|---|---|
| **400** | 400 | 248 |
| **600** | 600 | 298 |
| **800** | 800 | 348 |
| **1000** | 1000 | 398 |
| **1500** | 1500 | 498 |
| **2000** | 2000 | 548 |

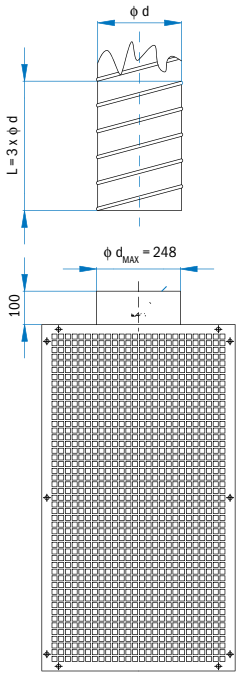
### SD-6




| H |
|---|
| 750 |
| 1000 |
| 1250 |
| 1500 |
| 2000 |
| 2500 |

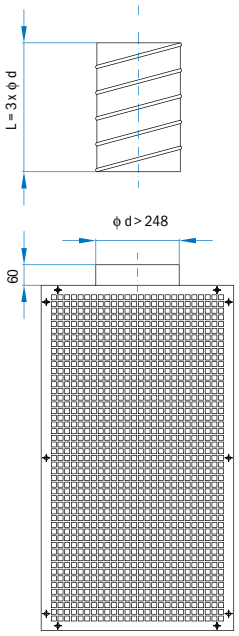
| Size | A | B | ϕD |
|---|---|---|---|
| **400** | 400 | 200 | 148 |
| **600** | 600 | 250 | 178 |
| **800** | 800 | 300 | 198 |
| **1000** | 1000 | 350 | 248 |
| **1500** | 1500 | 400 | 298 |
| **2000** | 2000 | 450 | 313 |

**Inlet spigot ϕd$_{max}$ = 248 mm**
The minimum straight duct length L = 3 x ϕd before the diffuser is sufficient to stabilise the airflow at the diffuser inlet.




| ϕd (mm) | Q$_{max}$ (m³/h) |
|---|---|
| **78** | 80 |
| **98** | 130 |
| **123** | 200 |
| **138** | 260 |
| **148** | 300 |
| **158** | 340 |
| **178** | 440 |
| **198** | 540 |
| **223** | 690 |
| **248** | 850 |

**Example of correct assembly of airflow regulation SD-1, 2, 3, 6**
Maximum airflow Q$_{max}$ for the chosen inlet spigot with a size of ϕd has been calculated for the maximum recommended air velocity in the spigot of V = 5 m/s. Optimum air velocity in the spigot is 2 – 3 m/s.




| ϕd (mm) | Q$_{max}$ (m³/h) |
|---|---|
| **278** | 1080 |
| **298** | 1240 |
| **313** | 1370 |
| **353** | 1740 |
| **398** | 2220 |
| **448** | 2810 |
| **498** | 3480 |
| **558** | 4370 |
| **628** | 5540 |

## Ordering key:

**SD-3/F1/R1/ Size 400 H=750**

**H 750, 1000, 1250, 1500, 2000, 2500** standard heights

**Size 400, 600, 800, 1000, 1500, 2000** standard sizes

**Regulation:**

**R1** Regulation with blades (available with types SD-3, version F1 and F5 only)

**R2** Regulation with a flow control damper (available with types SD-3, version F1 and F3 only)

**Versions:**

**F1** Without filters (perforation with round openings (ø5.5 x 8 mm 37 % free area))

**F2** With the filter bag (perforation with round openings (ø5.5 x 8 mm 37 % free area))

**F3** With the peripheral filter (perforation with square opening (10 x 10 x 2 mm, 69 % free area))

**F4** With the filter bag and the peripheral filter (perforation with square opening (10 x 10 x 2 mm, 69 % free area))

**F5** With dividing rings without filters (perforation with round openings (ø5.5 x 8 mm 37 % free area))

**F6** With dividing rings and the peripheral filter (perforation with square opening (10 x 10 x 2 mm, 69 % free area))

**Types:**

**SD-1** Corner

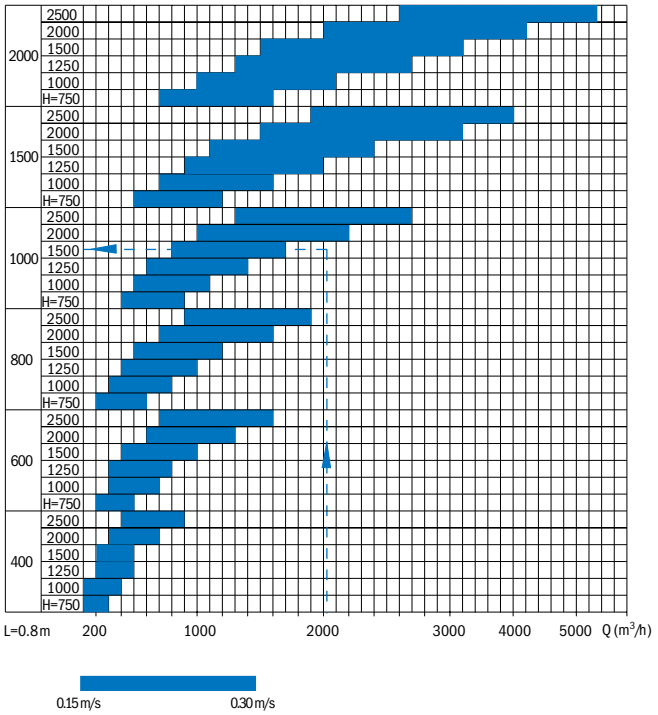
**SD-2** Semi-cylindrical

**SD-3** Cylindrical

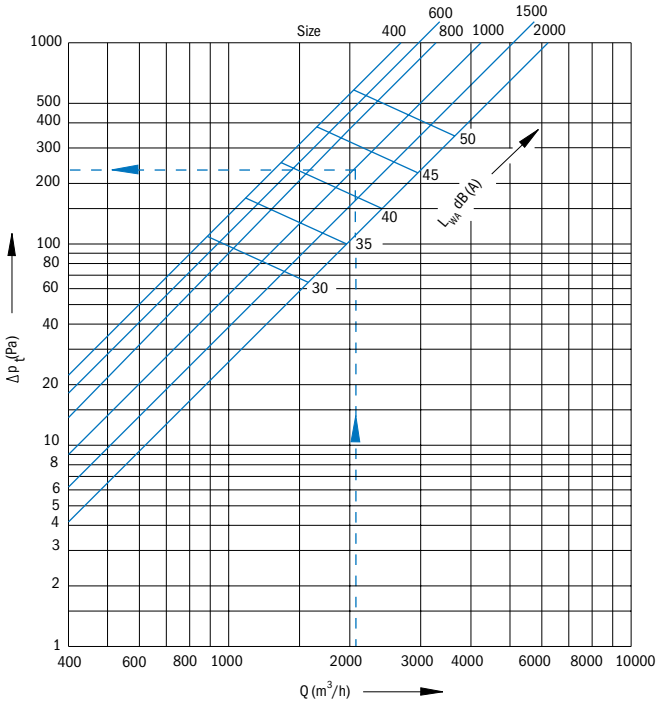
**SD-6** Rectangular

## Technical data for SD-1

### Diagrams to determine the supplied air velocity at the throw distance L=0.8 m:




### Pressure drop and noise level diagram:




### KF correction factor table

| Correction | Size | 750 | 1000 | 1250 | 1500 | 2000 | 2500 |
|---|---|---|---|---|---|---|---|
| $\Delta p_t$ for the type F3 | **400** | 1.44 | 1.00 | 0.80 | 0.26 | 0.16 | 0.11 |
| | **600** | 1.10 | 1.00 | 0.96 | 0.28 | 0.26 | 0.25 |
| | **800** | 1.06 | 1.00 | 0.97 | 0.29 | 0.27 | 0.27 |
| | **1000** | 1.10 | 1.00 | 0.96 | **0.33** | 0.31 | 0.30 |
| | **1500** | 1.04 | 1.00 | 0.98 | 0.34 | 0.33 | 0.33 |
| | **2000** | 1.02 | 1.00 | 0.99 | 0.38 | 0.38 | 0.37 |
| $\Delta p_t$ for the type F1 | **400** | 0.55 | 0.51 | 0.50 | 0.05 | 0.04 | 0.04 |
| | **600** | 0.56 | 0.51 | 0.49 | 0.14 | 0.13 | 0.13 |
| | **800** | 0.93 | 0.93 | 0.93 | 0.26 | 0.26 | 0.26 |
| | **1000** | 0.90 | 0.89 | 0.89 | **0.28** | 0.28 | 0.28 |
| | **1500** | 0.96 | 0.95 | 0.95 | 0.32 | 0.32 | 0.32 |
| | **2000** | 0.98 | 0.98 | 0.98 | 0.37 | 0.37 | 0.37 |
| $\Delta p_t$ for the type F4 | **400** | 2.33 | 1.42 | 1.11 | 0.47 | 0.28 | 0.19 |
| | **600** | 1.30 | 1.11 | 1.03 | 0.33 | 0.28 | 0.26 |
| | **800** | 1.19 | 1.07 | 1.02 | 0.32 | 0.29 | 0.28 |
| | **1000** | 1.29 | 1.11 | 1.02 | **0.38** | 0.33 | 0.31 |
| | **1500** | 1.13 | 1.05 | 1.01 | 0.36 | 0.34 | 0.34 |
| | **2000** | 1.06 | 1.02 | 1.01 | 0.39 | 0.38 | 0.38 |

| Size | 400 | 600 | 800 | 1000 | 1500 | 2000 |
|---|---|---|---|---|---|---|
| L (m) | 0.214 | 0.406 | 0.502 | **0.718** | 1.066 | 1.400 |

## Definition of symbols

| | |
|---|---|
| **Q (m³/h)** | Air flow rate |
| **$v_L$ (m/s)** | Supplied air velocity at the throw distance L=0.8 m |
| **$\Delta p_t$ (Pa)** | Pressure drop |
| **$L_{WA}$ (dB(A))** | Sound power level |

## Example calculation

Q = 2000 m³/h
We select size 1000; H = 1500
$A_{ef}$ = 0.718 x 1.5 x 0.6944 = 0.748 (m²)
$v_{ef}$ = Q / ($A_{ef}$ x 3600) = 2000 / (0.748 x 3600) = 0.74 m/s
$L_{WA}$ = 42 dB(A)

Pressure drop:

**Tip F3**

$\Delta p_t$ = from the diagram x KF (za H = 1500) = 230 x 0.33 = 75.9 Pa

**Tip F1**

$\Delta p_t$ = from the diagram x KF (za H = 1500) = 230 x 0.28 = 64.4 Pa

**Tip F4**

$\Delta p_t$ = from the diagram x KF (za H = 1500) = 230 x 0.38 = 87.4 Pa

Free area $A_{ef}$:

$A_{ef}$ = L x H x 0.6944 (m²) L-from the table

$A_{ef}$ = L x H x 0.37 (m²) for the versions F1, F2 and F5 (without filter) and mantle perforation with round openings

# Air displacement units

## Air displacement units
## SD-2

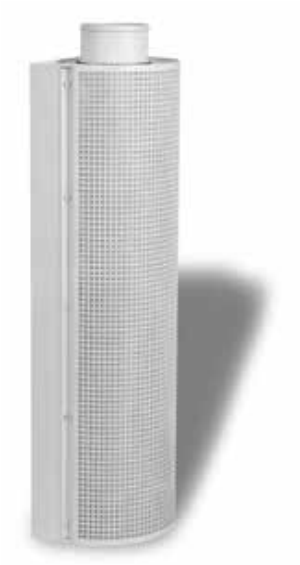
**Application**
Air displacement units are suitable for both industrial and comfort air conditioning applications. They are suitable for rooms characterised by high heat loads or heavy air pollution. Air displacement units supply air at large flow rates (up to 10.000 m³/h), at low air velocities (in the range from 0.1 to 0.3 m/s). Supplied air forms a so called »fresh air pool« in the occupied zone. Air is lifted in convection currents from heat sources to the ceiling layer, from which it is extracted from the room. In this way, even temperature field is maintained in the room, free of draught. Diffusers can be installed suspended from the ceiling, standing on the floor or hanging immediately above the occupied zone.

**Description**
Air displacement units are made of sheet steel and painted in RAL 9010. They can be coloured in any other RAL colour at to the customer's request. They consist of a mantle, a bottom plate and a top plate equipped with an inlet spigot. The standard shape of the spigot is round. At the customer's request, it can be rectangular according to the dimension of the unit.

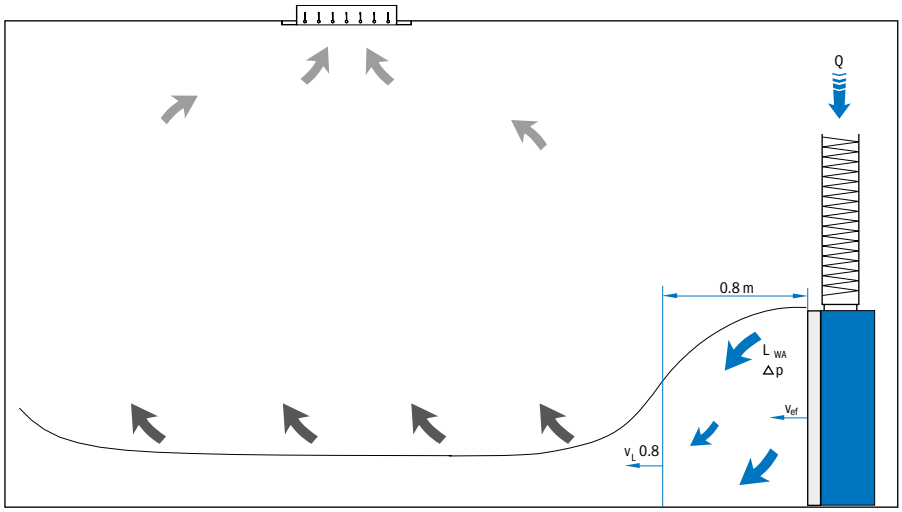
The air displacement unit mantle perforation is designed according to the version. The versions without a filter (F1, F2 and F5) have mantle perforation with round openings (ϕ 5.5 x 8 mm, 37 % free area). The versions with a filter (F3, F4 and F6) have square openings (10 x 10 x 2 mm, 69 % free area).

To achieve a uniform distribution of air across the entire displacement surface, versions F3, F4 and F6 are recommended.

**SD-2**



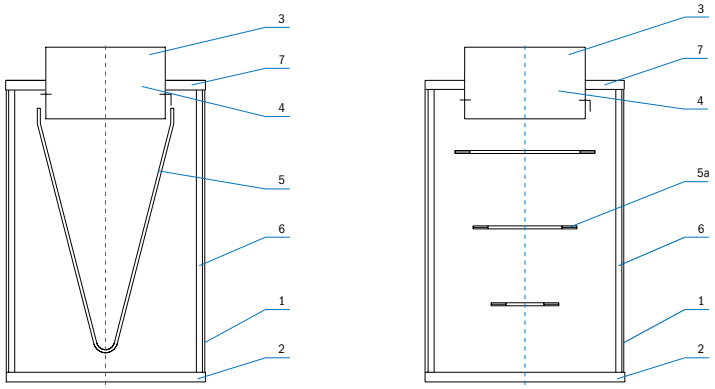
**SD-2:** semi-cylindrical




### Definition of symbols

| | | | |
|---|---|---|---|
| **Q (m³/h)** | Air flow rate | **$\Delta t_L$ (K)** | Temperature difference between air jet and room temperature |
| **$v_L$ (m/s)** | Supplied air velocity at the throw distance L=0.8 m | **$\Delta p_t$ (Pa)** | Pressure drop |
| **$v_{ef}$** | Effective dishcarge air velocity | **$L_{WA}$ (dB(A))** | Sound power level |
| **$\Delta t_z$ (K)** | Temperature difference between supply and room air | | |

**1.** Perforated mantle
**2.** Bottom plate
**3.** Round inlet spigot
**4.** Control flap
**5.** Cone-shaped filter bag
**5a.**Dividing rings
**6.** Filter
**7.** Top plate




## Versions

**F1:** without filters

**F2**: with the filter bag

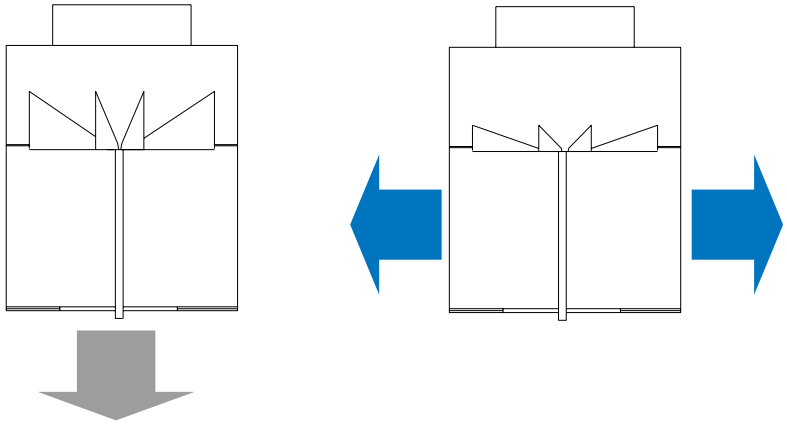
**F3:** with the peripheral filter

**F4:** with the filter bag and the peripheral filter

**F5:** without filters and jet dividing rings

**F6:** with the peripheral filter and dividing rings

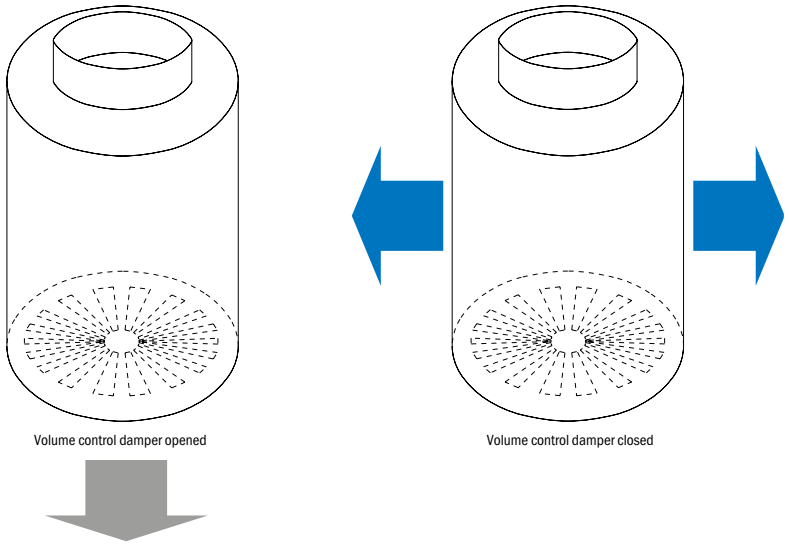
**(R1)** Air jet direction adjustment with blades (available with F1 and F5 version only).



## Special SD-3 version

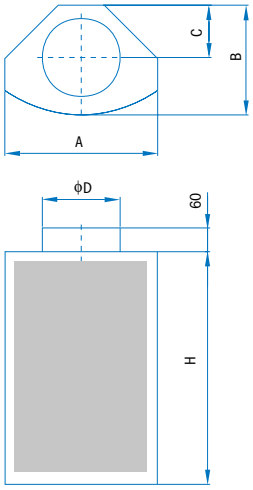
An air displacement unit with regulation R1 and R2 must be mounted under the ceiling for correct operation. On the top plate, there is a special nut for mounting on the ceiling with a threaded rod.

**(R2)** Air jet direction adjustment with a flow control damper (available with F1 and F3 version only).



## Dimensions

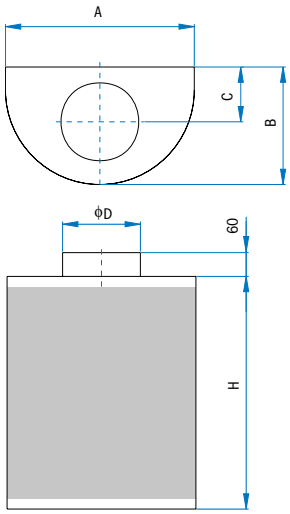
### SD-1




| H |
|---|
| 750 |
| 1000 |
| 1250 |
| 1500 |
| 2000 |
| 2500 |

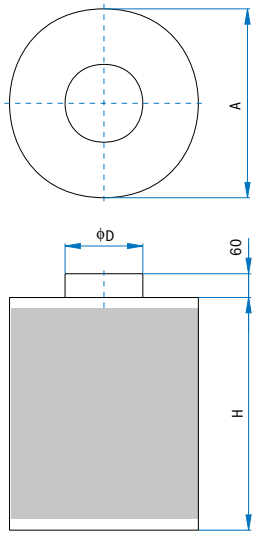
| Size | A | B | C | ϕD |
|---|---|---|---|---|
| **400** | 283 | 180 | 100 | 123 |
| **600** | 424 | 275 | 135 | 148 |
| **800** | 566 | 300 | 150 | 178 |
| **1000** | 707 | 400 | 200 | 198 |
| **1500** | 1061 | 450 | 220 | 248 |
| **2000** | 1414 | 700 | 350 | 298 |

### SD-2



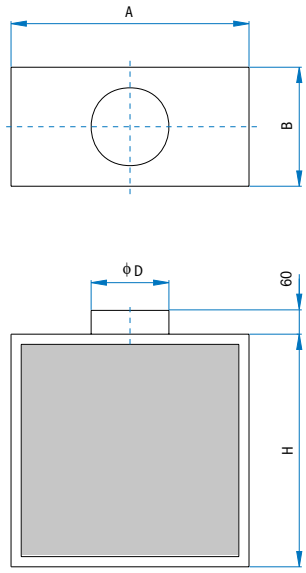

| Size | A | B | C | ϕD |
|---|---|---|---|---|
| **400** | 400 | 320 | 150 | 178 |
| **600** | 600 | 470 | 230 | 198 |
| **800** | 800 | 570 | 250 | 248 |
| **1000** | 1000 | 620 | 280 | 298 |
| **1500** | 1500 | 870 | 350 | 348 |
| **2000** | 2000 | 1120 | 430 | 398 |

### SD-3




| Size | A | ϕD |
|---|---|---|
| **400** | 400 | 248 |
| **600** | 600 | 298 |
| **800** | 800 | 348 |
| **1000** | 1000 | 398 |
| **1500** | 1500 | 498 |
| **2000** | 2000 | 548 |

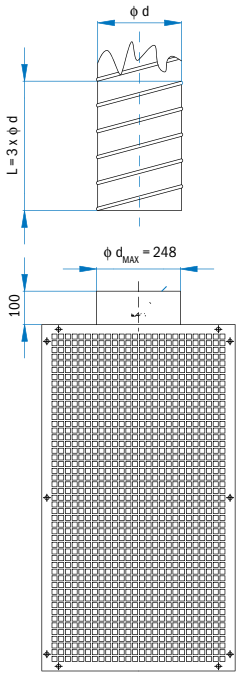
### SD-6




| H |
|---|
| 750 |
| 1000 |
| 1250 |
| 1500 |
| 2000 |
| 2500 |

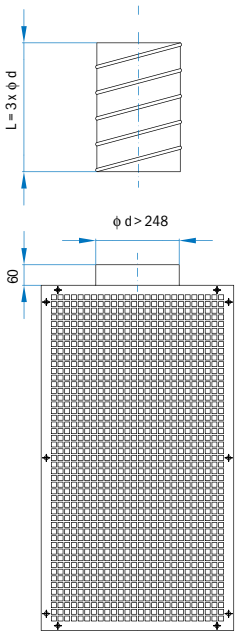
| Size | A | B | ϕD |
|---|---|---|---|
| **400** | 400 | 200 | 148 |
| **600** | 600 | 250 | 178 |
| **800** | 800 | 300 | 198 |
| **1000** | 1000 | 350 | 248 |
| **1500** | 1500 | 400 | 298 |
| **2000** | 2000 | 450 | 313 |

**Inlet spigot ϕd$_{max}$ = 248 mm**
The minimum straight duct length L = 3 x ϕd before the diffuser is sufficient to stabilise the airflow at the diffuser inlet.




| ϕd (mm) | Q$_{max}$ (m³/h) |
|---|---|
| **78** | 80 |
| **98** | 130 |
| **123** | 200 |
| **138** | 260 |
| **148** | 300 |
| **158** | 340 |
| **178** | 440 |
| **198** | 540 |
| **223** | 690 |
| **248** | 850 |

**Example of correct assembly of airflow regulation SD-1, 2, 3, 6**
Maximum airflow Q$_{max}$ for the chosen inlet spigot with a size of ϕd has been calculated for the maximum recommended air velocity in the spigot of V = 5 m/s. Optimum air velocity in the spigot is 2 – 3 m/s.




| ϕd (mm) | Q$_{max}$ (m³/h) |
|---|---|
| **278** | 1080 |
| **298** | 1240 |
| **313** | 1370 |
| **353** | 1740 |
| **398** | 2220 |
| **448** | 2810 |
| **498** | 3480 |
| **558** | 4370 |
| **628** | 5540 |

## Ordering key:

**SD-3/F1/R1/ Size 400 H=750**

**H 750, 1000, 1250, 1500, 2000, 2500** standard heights

**Size 400, 600, 800, 1000, 1500, 2000** standard sizes

**Regulation:**

**R1** Regulation with blades (available with types SD-3, version F1 and F5 only)

**R2** Regulation with a flow control damper (available with types SD-3, version F1 and F3 only)

**Versions:**

**F1** Without filters (perforation with round openings (ø5.5 x 8 mm 37 % free area))

**F2** With the filter bag (perforation with round openings (ø5.5 x 8 mm 37 % free area))

**F3** With the peripheral filter (perforation with square opening (10 x 10 x 2 mm, 69 % free area))

**F4** With the filter bag and the peripheral filter (perforation with square opening (10 x 10 x 2 mm, 69 % free area))

**F5** With dividing rings without filters (perforation with round openings (ø5.5 x 8 mm 37 % free area))

**F6** With dividing rings and the peripheral filter (perforation with square opening (10 x 10 x 2 mm, 69 % free area))

**Types:**

**SD-1** Corner

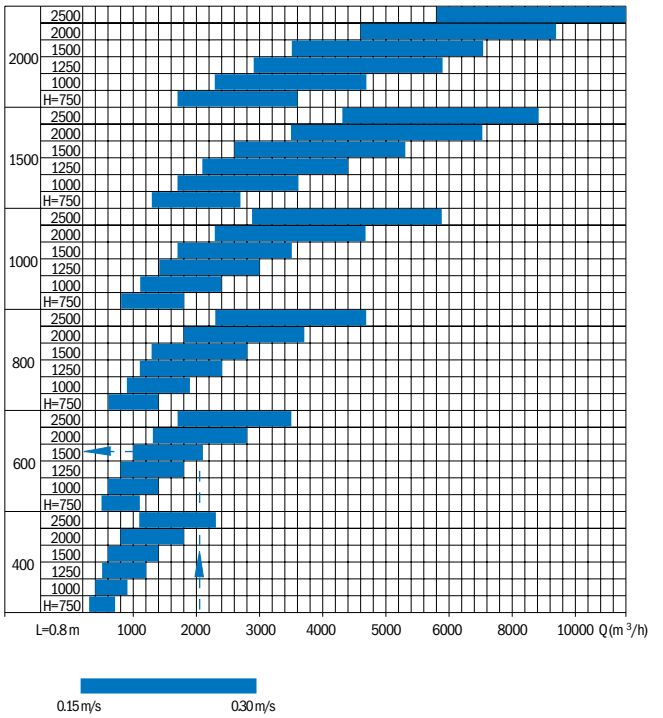
**SD-2** Semi-cylindrical

**SD-3** Cylindrical

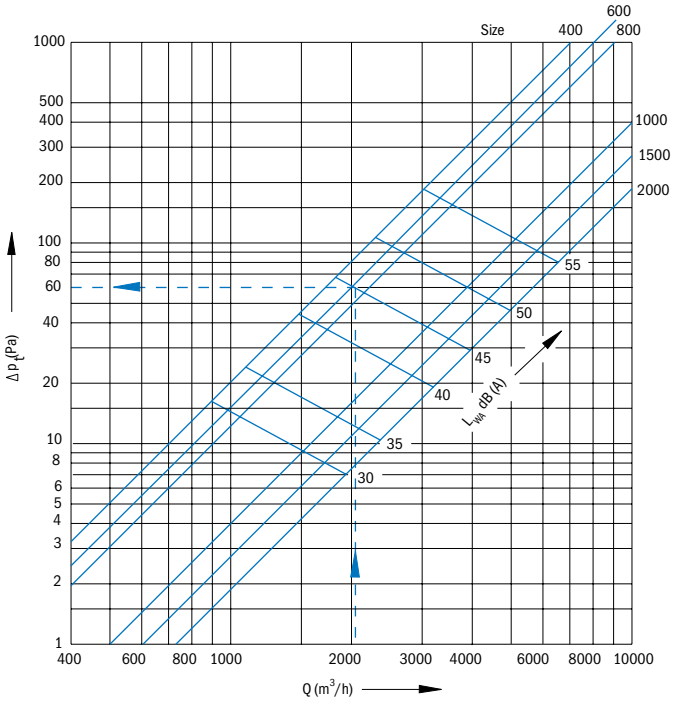
**SD-6** Rectangular

## Technical data for SD-2

### Diagrams to determine the supplied air velocity at the throw distance L=0.8 m:




### Pressure drop and noise level diagram:




### KF correction factor table

| Correction | Size | 750 | 1000 | 1250 | 1500 | 2000 | 2500 |
|---|---|---|---|---|---|---|---|
| $\Delta p_t$ for the type F3 | **400** | 1.43 | 1.00 | 0.81 | 0.28 | 0.18 | 0.13 |
| | **600** | 1.15 | 1.00 | 0.93 | **0.32** | 0.29 | 0.27 |
| | **800** | 1.08 | 1.00 | 0.97 | 0.35 | 0.33 | 0.33 |
| | **1000** | 1.30 | 1.00 | 0.87 | **0.33** | 0.26 | 0.23 |
| | **1500** | 1.13 | 1.00 | 0.94 | 0.36 | 0.33 | 0.32 |
| | **2000** | 1.07 | 1.00 | 0.97 | 0.38 | 0.36 | 0.36 |
| $\Delta p_t$ for the type F1 | **400** | 0.56 | 0.52 | 0.51 | 0.07 | 0.07 | 0.06 |
| | **600** | 0.58 | 0.84 | 0.83 | **0.25** | 0.25 | 0.25 |
| | **800** | 0.92 | 0.92 | 0.91 | 0.32 | 0.31 | 0.31 |
| | **1000** | 0.69 | 0.67 | 0.66 | **0.18** | 0.18 | 0.18 |
| | **1500** | 0.87 | 0.86 | 0.86 | 0.30 | 0.30 | 0.30 |
| | **2000** | 0.93 | 0.92 | 0.92 | 0.35 | 0.34 | 0.34 |
| $\Delta p_t$ for the type F4 | **400** | 2.30 | 1.48 | 1.11 | 0.19 | 0.29 | 0.21 |
| | **600** | 1.44 | 1.16 | 1.04 | **0.39** | 0.33 | 0.30 |
| | **800** | 1.23 | 1.08 | 1.02 | 0.39 | 0.35 | 0.34 |
| | **1000** | 1.91 | 1.33 | 1.08 | **0.47** | 0.34 | 0.28 |
| | **1500** | 1.38 | 1.14 | 1.03 | 0.42 | 0.36 | 0.34 |
| | **2000** | 1.21 | 1.08 | 1.02 | 0.41 | 0.36 | 0.37 |

| Size | 400 | 600 | 800 | 1000 | 1500 | 2000 |
|---|---|---|---|---|---|---|
| **L (m)** | 0.598 | 0.920 | 1.228 | 1.550 | 2.334 | 3.120 |

## Definition of symbols

| | |
|---|---|
| **Q (m³/h)** | Air flow rate |
| **$v_L$ (m/s)** | Supplied air velocity at the throw distance L=0.8 m |
| **$\Delta p_t$ (Pa)** | Pressure drop |
| **$L_{WA}$ (dB(A))** | Sound power level |

## Example calculation

Q = 2000 m³/h
We select size 600; H = 1500
$A_{ef}$ = 0.92 x 1.5 x 0.6944 = 0.958 (m²)
$v_{ef}$ = Q / ($A_{ef}$ x 3600) = 2000 / (0.958 x 3600) = 0.58 m/s
$L_{WA}$ = 45 dB(A)

Pressure drop:

**Tip F3**

$\Delta p_t$ = from the diagram x KF (za H = 1500) = 60 x 0.32 = 19.2 Pa

**Tip F1**

$\Delta p_t$ = from the diagram x KF (za H = 1500) = 60 x 0.25 = 15 Pa

**Tip F4**

$\Delta p_t$ = from the diagram x KF (za H = 1500) = 60 x 0.39 = 19.5 Pa

Free area $A_{ef}$:

$A_{ef}$= L x H x 0.6944 (m²) L-from the table

$A_{ef}$= L x H x 0.37 (m²) for the versions F1, F2 and F5 (without filter) and mantle perforation with round openings

# Air displacement units

## Air displacement units
## SD-3

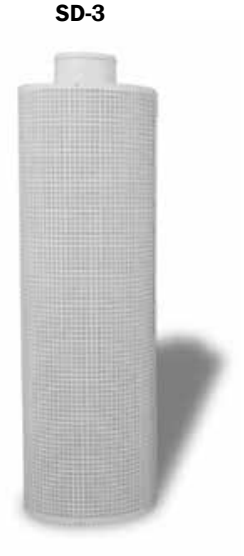
**Application**
Air displacement units are suitable for both industrial and comfort air conditioning applications. They are suitable for rooms characterised by high heat loads or heavy air pollution. Air displacement units supply air at large flow rates (up to 10.000 m³/h), at low air velocities (in the range from 0.1 to 0.3 m/s). Supplied air forms a so called »fresh air pool« in the occupied zone. Air is lifted in convection currents from heat sources to the ceiling layer, from which it is extracted from the room. In this way, even temperature field is maintained in the room, free of draught. Diffusers can be installed suspended from the ceiling, standing on the floor or hanging immediately above the occupied zone.

**Description**
Air displacement units are made of sheet steel and painted in RAL 9010. They can be coloured in any other RAL colour at to the customer's request. They consist of a mantle, a bottom plate and a top plate equipped with an inlet spigot. The standard shape of the spigot is round. At the customer's request, it can be rectangular according to the dimension of the unit.

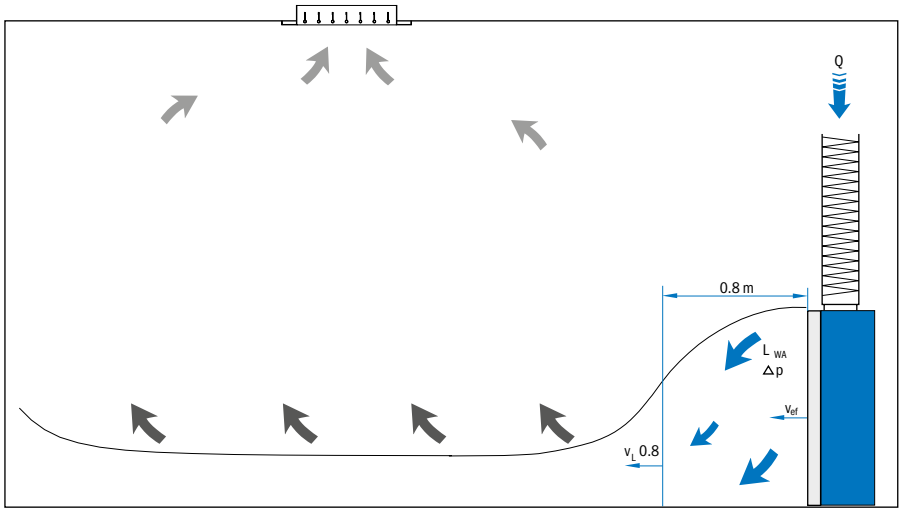
The air displacement unit mantle perforation is designed according to the version. The versions without a filter (F1, F2 and F5) have mantle perforation with round openings (ϕ 5.5 x 8 mm, 37 % free area). The versions with a filter (F3, F4 and F6) have square openings (10 x 10 x 2 mm, 69 % free area).

To achieve a uniform distribution of air across the entire displacement surface, versions F3, F4 and F6 are recommended.

**SD-3**



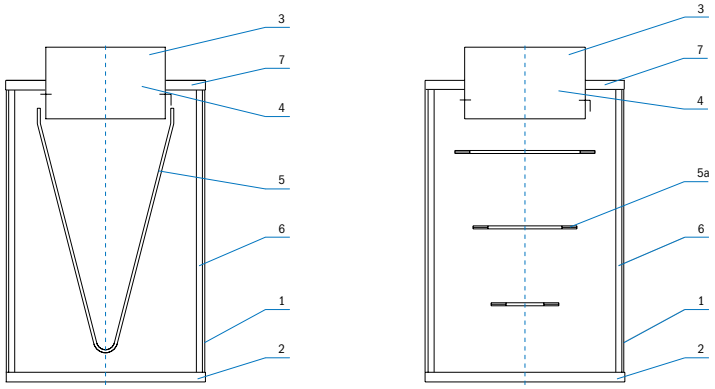
**SD-3:** cylindrical




## Definition of symbols

| | |
|---|---|
| **Q (m³/h)** | Air flow rate |
| **$v_L$ (m/s)** | Supplied air velocity at the throw distance L=0.8 m |
| **$v_{ef}$** | Effective dishcarge air velocity |
| **$\Delta t_z$ (K)** | Temperature difference between supply and room air |
| **$\Delta t_L$ (K)** | Temperature difference between air jet and room temperature |
| **$\Delta p_t$ (Pa)** | Pressure drop |
| **$L_{WA}$ (dB(A))** | Sound power level |

**1.** Perforated mantle
**2.** Bottom plate
**3.** Round inlet spigot
**4.** Control flap
**5.** Cone-shaped filter bag
**5a.**Dividing rings
**6.** Filter
**7.** Top plate




## Versions

**F1:** without filters

**F2**: with the filter bag

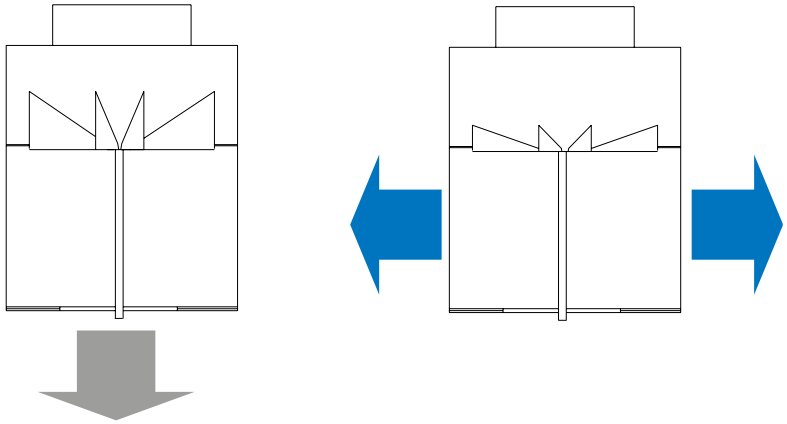
**F3:** with the peripheral filter

**F4:** with the filter bag and the peripheral filter

**F5:** without filters and jet dividing rings

**F6:** with the peripheral filter and dividing rings

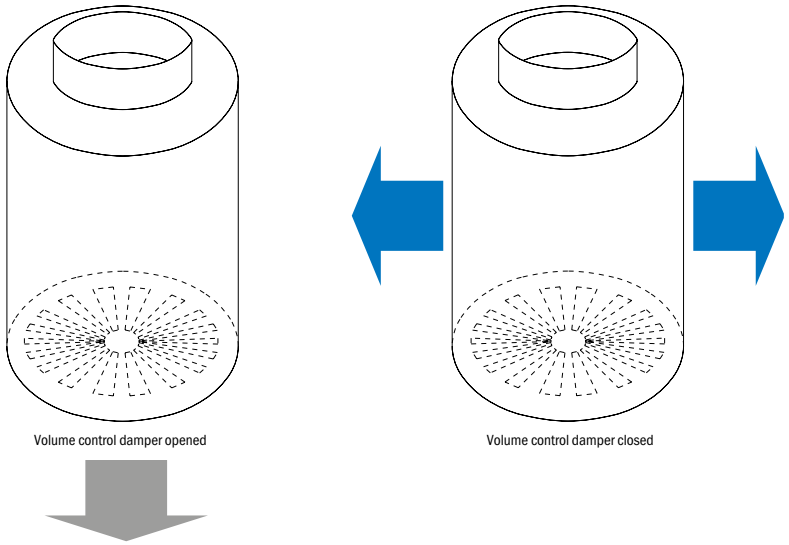
**(R1)** Air jet direction adjustment with blades (available with F1 and F5 version only).



## Special SD-3 version

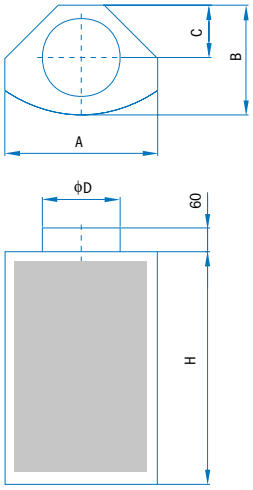
An air displacement unit with regulation R1 and R2 must be mounted under the ceiling for correct operation. On the top plate, there is a special nut for mounting on the ceiling with a threaded rod.

**(R2)** Air jet direction adjustment with a flow control damper (available with F1 and F3 version only).



## Dimensions

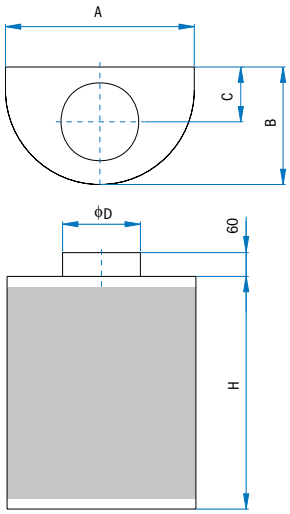
### SD-1




| H |
|---|
| 750 |
| 1000 |
| 1250 |
| 1500 |
| 2000 |
| 2500 |

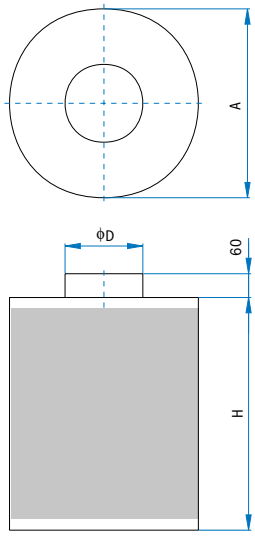
| Size | A | B | C | ϕD |
|---|---|---|---|---|
| **400** | 283 | 180 | 100 | 123 |
| **600** | 424 | 275 | 135 | 148 |
| **800** | 566 | 300 | 150 | 178 |
| **1000** | 707 | 400 | 200 | 198 |
| **1500** | 1061 | 450 | 220 | 248 |
| **2000** | 1414 | 700 | 350 | 298 |

### SD-2



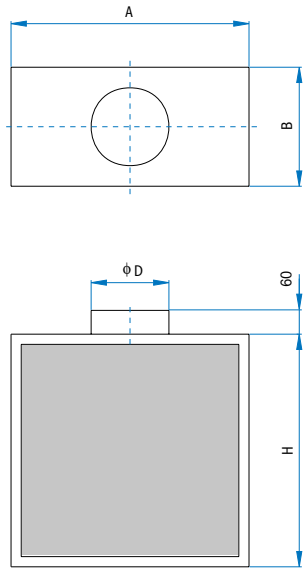

| Size | A | B | C | ϕD |
|---|---|---|---|---|
| **400** | 400 | 320 | 150 | 178 |
| **600** | 600 | 470 | 230 | 198 |
| **800** | 800 | 570 | 250 | 248 |
| **1000** | 1000 | 620 | 280 | 298 |
| **1500** | 1500 | 870 | 350 | 348 |
| **2000** | 2000 | 1120 | 430 | 398 |

### SD-3




| Size | A | ϕD |
|---|---|---|
| **400** | 400 | 248 |
| **600** | 600 | 298 |
| **800** | 800 | 348 |
| **1000** | 1000 | 398 |
| **1500** | 1500 | 498 |
| **2000** | 2000 | 548 |

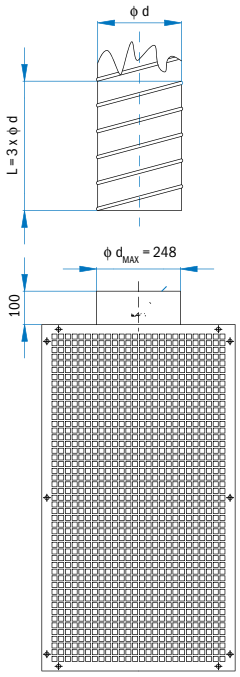
### SD-6




| H |
|---|
| 750 |
| 1000 |
| 1250 |
| 1500 |
| 2000 |
| 2500 |

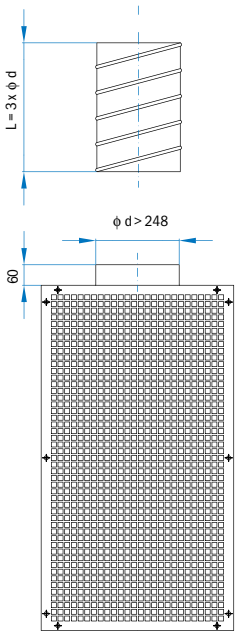
| Size | A | B | ϕD |
|---|---|---|---|
| **400** | 400 | 200 | 148 |
| **600** | 600 | 250 | 178 |
| **800** | 800 | 300 | 198 |
| **1000** | 1000 | 350 | 248 |
| **1500** | 1500 | 400 | 298 |
| **2000** | 2000 | 450 | 313 |

**Inlet spigot ϕd$_{max}$ = 248 mm**
The minimum straight duct length L = 3 x ϕd before the diffuser is sufficient to stabilise the airflow at the diffuser inlet.




| ϕd (mm) | Q$_{max}$ (m³/h) |
|---|---|
| **78** | 80 |
| **98** | 130 |
| **123** | 200 |
| **138** | 260 |
| **148** | 300 |
| **158** | 340 |
| **178** | 440 |
| **198** | 540 |
| **223** | 690 |
| **248** | 850 |

**Example of correct assembly of airflow regulation SD-1, 2, 3, 6**
Maximum airflow Q$_{max}$ for the chosen inlet spigot with a size of ϕd has been calculated for the maximum recommended air velocity in the spigot of V = 5 m/s. Optimum air velocity in the spigot is 2 – 3 m/s.




| ϕd (mm) | Q$_{max}$ (m³/h) |
|---|---|
| **278** | 1080 |
| **298** | 1240 |
| **313** | 1370 |
| **353** | 1740 |
| **398** | 2220 |
| **448** | 2810 |
| **498** | 3480 |
| **558** | 4370 |
| **628** | 5540 |

## Ordering key:

**SD-3/F1/R1/ Size 400 H=750**

**H 750, 1000, 1250, 1500, 2000, 2500** standard heights

**Size 400, 600, 800, 1000, 1500, 2000** standard sizes

**Regulation:**

**R1** Regulation with blades (available with types SD-3, version F1 and F5 only)

**R2** Regulation with a flow control damper (available with types SD-3, version F1 and F3 only)

**Versions:**

**F1** Without filters (perforation with round openings (ø5.5 x 8 mm 37 % free area))

**F2** With the filter bag (perforation with round openings (ø5.5 x 8 mm 37 % free area))

**F3** With the peripheral filter (perforation with square opening (10 x 10 x 2 mm, 69 % free area))

**F4** With the filter bag and the peripheral filter (perforation with square opening (10 x 10 x 2 mm, 69 % free area))

**F5** With dividing rings without filters (perforation with round openings (ø5.5 x 8 mm 37 % free area))

**F6** With dividing rings and the peripheral filter (perforation with square opening (10 x 10 x 2 mm, 69 % free area))

**Types:**

**SD-1** Corner

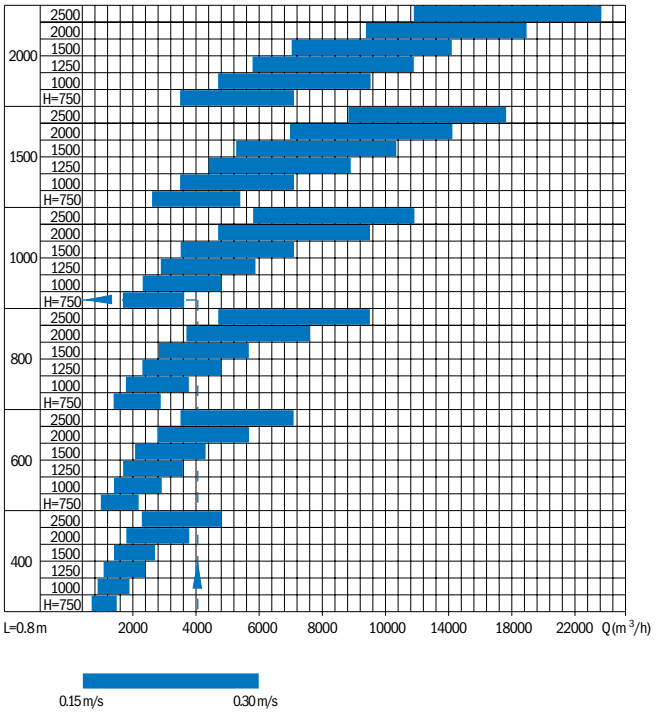
**SD-2** Semi-cylindrical

**SD-3** Cylindrical

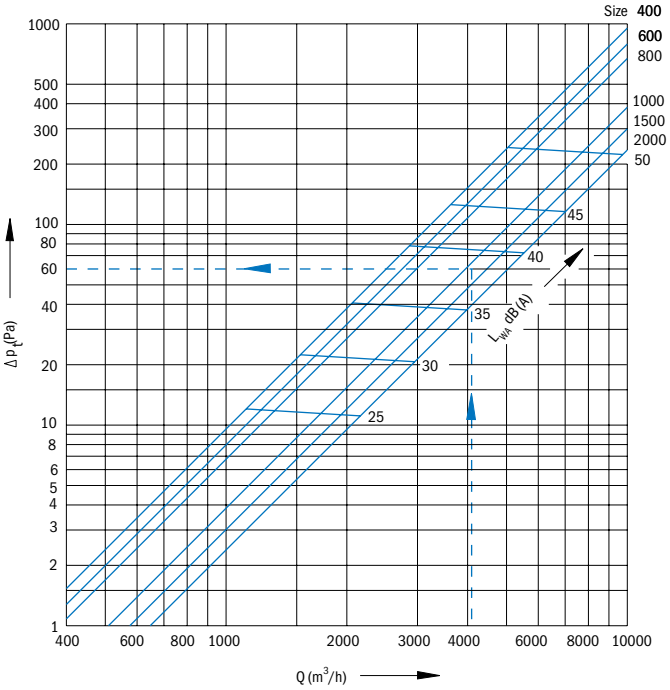
**SD-6** Rectangular

## Technical data for SD-3

### Diagrams to determine the supplied air velocity at the throw distance L=0.8 m:




### Pressure drop and noise level diagram:




### KF correction factor table

| Correction | Size | 750 | 1000 | 1250 | 1500 | 2000 | 2500 |
|---|---|---|---|---|---|---|---|
| $\Delta p_t$ for the type F3 | **400** | 1.47 | 1.00 | 0.79 | 0.36 | 0.26 | 0.21 |
| | **600** | 1.11 | 1.00 | 0.95 | 0.55 | 0.52 | 0.51 |
| | **800** | 1.05 | 1.00 | 0.98 | 0.61 | 0.59 | 0.59 |
| | **1000** | **1.05** | 1.00 | 0.98 | 0.19 | 0.18 | 0.17 |
| | **1500** | 1.02 | 1.00 | 0.99 | 0.22 | 0.21 | 0.21 |
| | **2000** | 1.01 | 1.00 | 1.00 | 0.23 | 0.22 | 0.22 |
| $\Delta p_t$ for the type F1 | **400** | 0.51 | 0.48 | 0.46 | 0.14 | 0.13 | 0.13 |
| | **600** | 0.88 | 0.87 | 0.87 | 0.49 | 0.49 | 0.49 |
| | **800** | 0.95 | 0.94 | 0.94 | 0.58 | 0.58 | 0.58 |
| | **1000** | **0.95** | 0.95 | 0.95 | 0.17 | 0.17 | 0.17 |
| | **1500** | 0.98 | 0.98 | 0.98 | 0.21 | 0.21 | 0.21 |
| | **2000** | 0.99 | 0.99 | 0.99 | 0.22 | 0.22 | 0.22 |
| $\Delta p_t$ for the type F4 | **400** | 2.42 | 1.52 | 1.12 | 0.59 | 0.38 | 0.29 |
| | **600** | 1.34 | 1.13 | 1.03 | 0.60 | 0.55 | 0.53 |
| | **800** | 1.15 | 1.06 | 1.01 | 0.63 | 0.61 | 0.60 |
| | **1000** | **1.14** | 1.05 | 1.01 | 0.21 | 0.19 | 0.18 |
| | **1500** | 1.05 | 1.02 | 1.00 | 0.22 | 0.22 | 0.21 |
| | **2000** | 1.03 | 1.01 | 1.00 | 0.23 | 0.23 | 0.22 |

## Definition of symbols

| | |
|---|---|
| **Q (m³/h)** | Air flow rate |
| **$v_L$ (m/s)** | Supplied air velocity at the throw distance L=0.8 m |
| **$\Delta p_t$ (Pa)** | Pressure drop |
| **$L_{WA}$ (dB(A))** | Sound power level |

## Example calculation:

Q = 4000 m³/h
We select size 1000; H = 750
$A_{ef}$ = 1 x π x 0.75 x 0.6944 = 1.64 (m²)
$v_{ef}$ = Q / ($A_{ef}$ x 3600) = 4000 / (1.64 x 3600) = 0.68 m/s
$L_{WA}$ = 37 dB(A)

Pressure drop:

**Tip F3**

$\Delta p_t$ = from the diagram x KF (za H = 750) = 60 x 1.05 = 63.0 Pa

**Tip F1**

$\Delta p_t$ = from the diagram x KF (za H = 750) = 60 x 0.95 = 57.0 Pa

**Tip F4**

$\Delta p_t$ = from the diagram x KF (za H = 750) = 60 x 1.14 = 68.4 Pa

Free area $A_{ef}$:

$A_{ef}$ = A x π x H x 0.6944 (m²) A- Size (m)

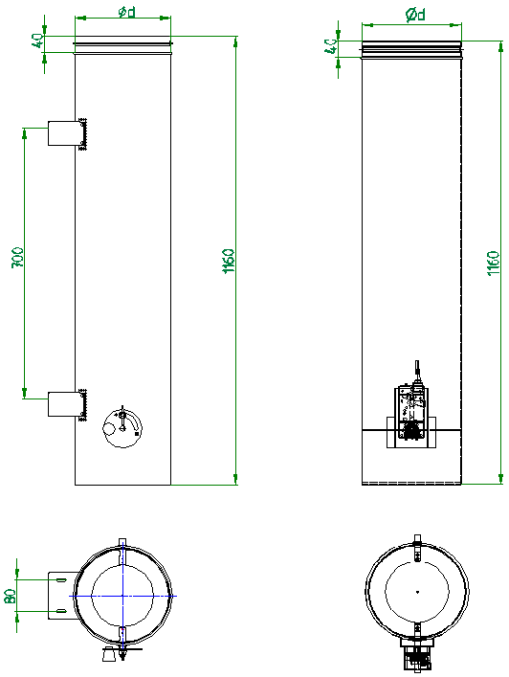
$A_{ef}$= A x π x H x 0.37 (m²) for the versions F1, F2 and F5 (without filter) and mantle perforation with round openings

# Air displacement units SD-3N

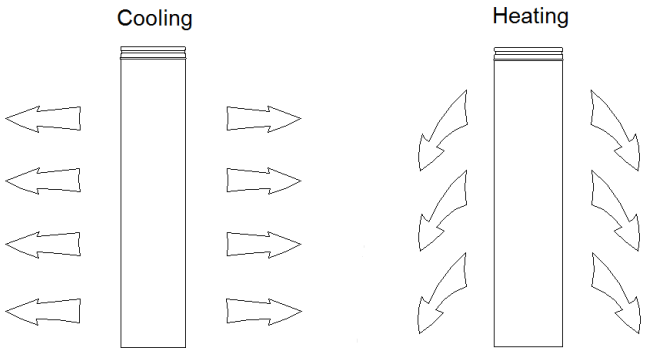
Air displacement units SD-3N are used for air conditioning for industry, sports and other major facilities. They are suitable for areas in which we are faced with higher heat loads or a significant pollution. SD-3N can be set to the regime for heating or cooling, either manually or with actuator. This is intended to change the direction of air supply, between horizontal and vertical.

## Description

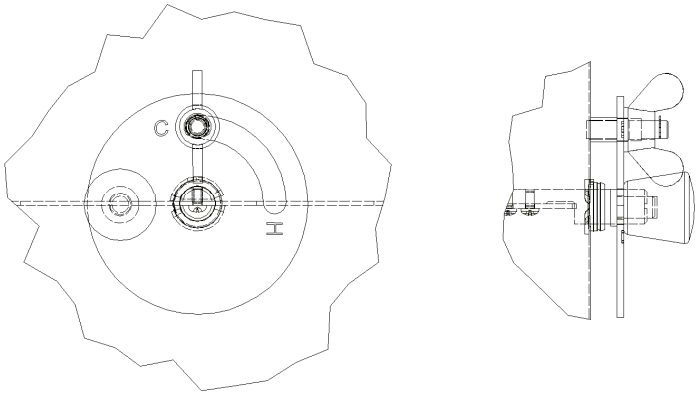
Air displacement units SD-3N are made of steel and powder coated normally in RAL 9010 at the request of the buyer as well as any other color in the RAL color chart. They consist of a perforated housing, bottom plate and the damper for the selection of heating-cooling regime. Diffusers SD-3N have to be placed upright and they can be individually fitted or attached to the wall. They are provided for the supply of large quantities of fresh air (to 10000m$^3$/h), at low air speeds (from 0.1 to 0.3 m/s).



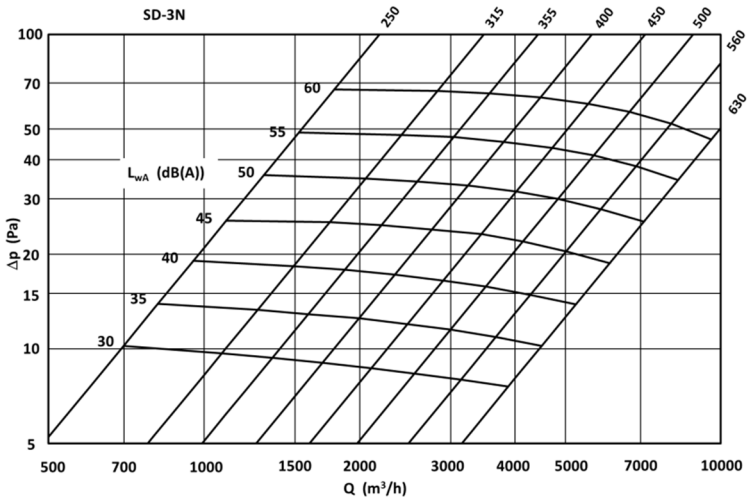

| Size | Ød (mm) | H (mm) |
|---|---|---|
| 250 | 248 | 1160 |
| 315 | 313 | 1160 |
| 355 | 353 | 1160 |
| 400 | 398 | 1160 |
| 450 | 448 | 1160 |
| 500 | 498 | 1160 |
| 560 | 558 | 1160 |
| 630 | 628 | 1160 |




Showing the proper placement of dampers for cooling mode (C). In the case of heating turn the damper into position H (heating).




## Pressure drop and noise level diagram:



## Symbols:

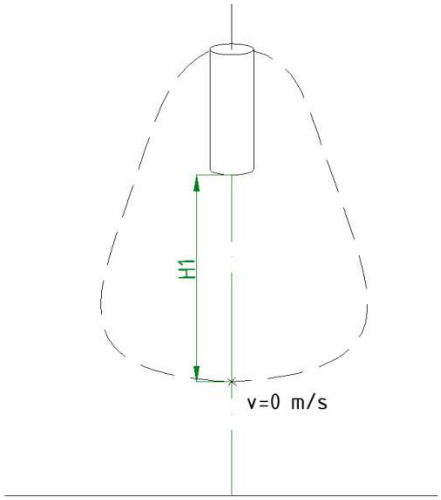
**$L_{WA}$ (dB(A))** sound power level

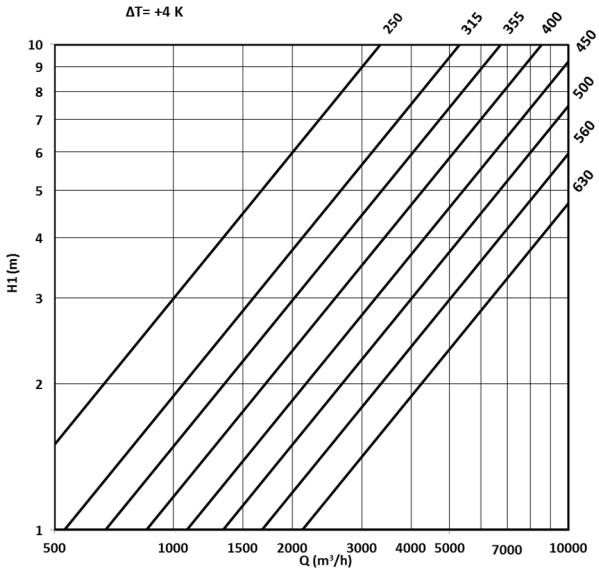
**Δp (Pa)** pressure drop

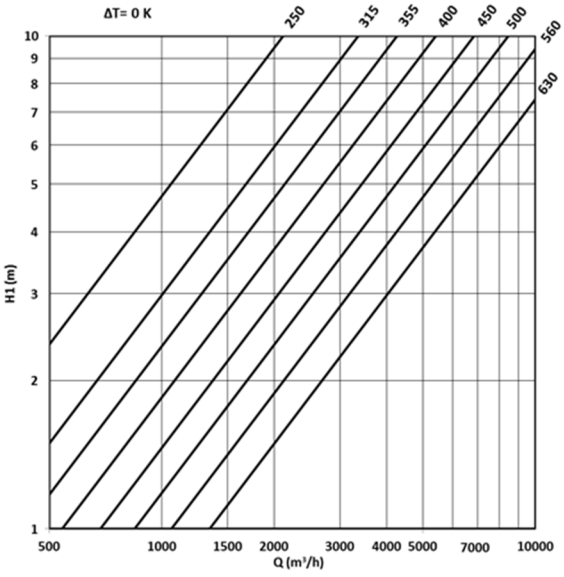
**$L_{0,2}$ (m)** throw distance horizontally when the air speed is still 0,2 m/s

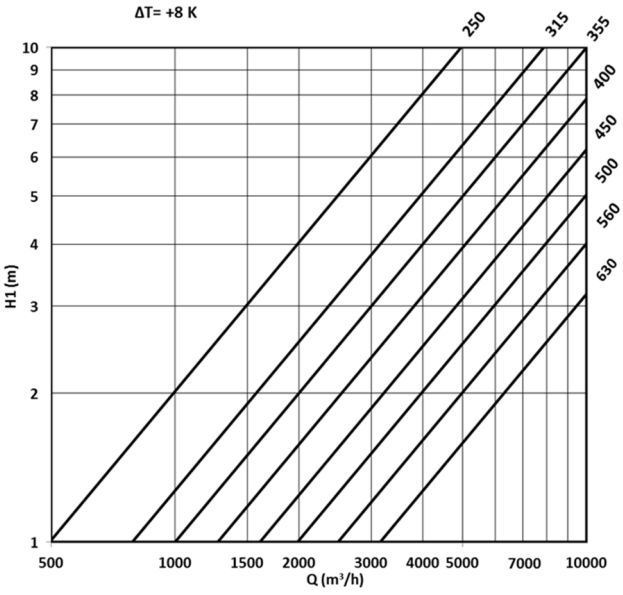
**H1 (m)** throw distance vertically when the air speed reach speed 0,0 m/s (turning point)

## Throw distances vertically – heating mode

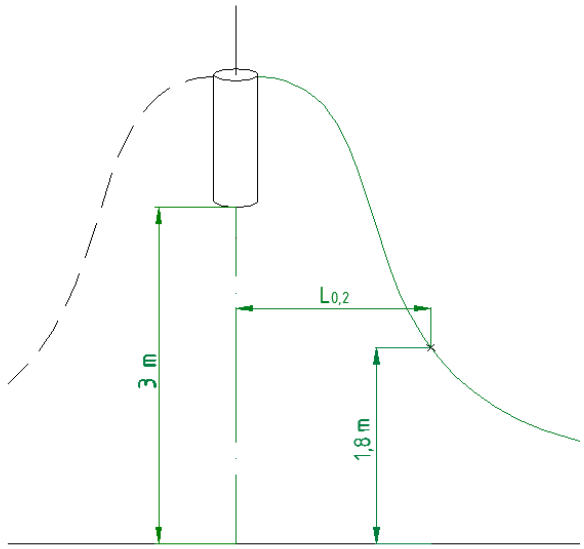


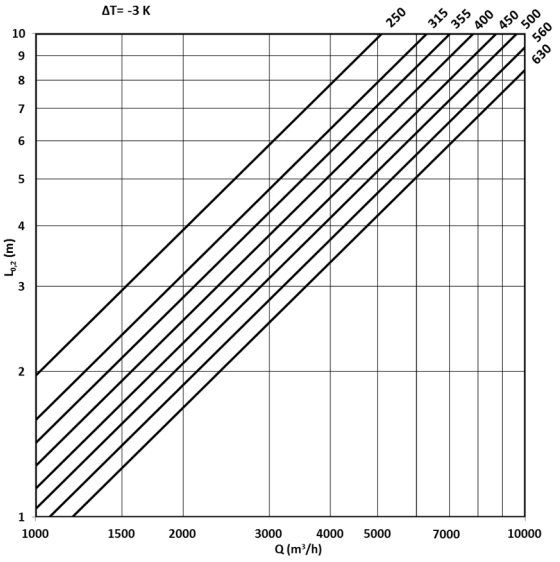



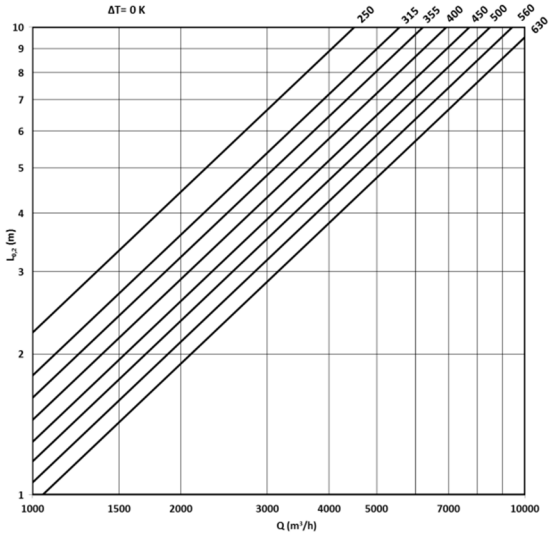



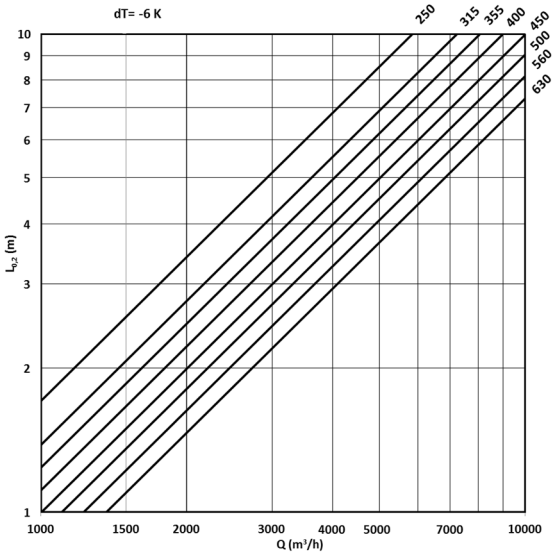



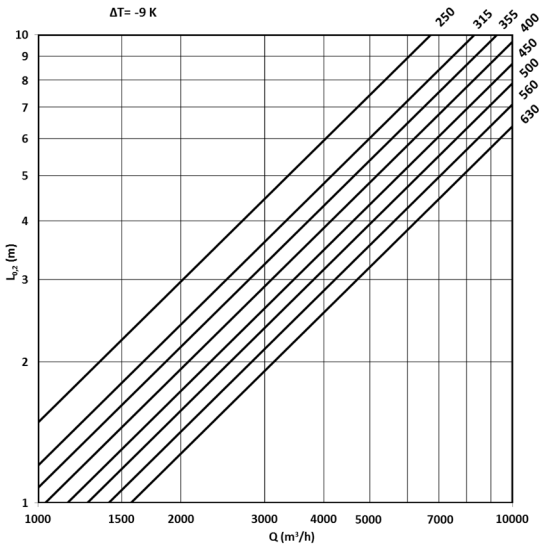
# Throw distances horizontally – cooling mode



# Fast selection diagram:

| Size | 250 | | | | 315 | | | | 355 | | | | 400 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Q ($m^3$/h) | Δp (Pa) | $L_{WA}$ (dB) | $L_{0,2}$ (m) | H1 (m) | Δp (Pa) | $L_{WA}$ (dB) | $L_{0,2}$ (m) | H1 (m) | Δp (Pa) | $L_{WA}$ (dB) | $L_{0,2}$ (m) | H1 (m) | Δp (Pa) | $L_{WA}$ (dB) | $L_{0,2}$ (m) | H1 (m) |
| 700 | 10 | 30 | 1,6 | 2,3 | 4 | >25 | 1,2 | 1,5 | | | | | | | | |
| 800 | 13 | 34 | 1,8 | 2,6 | 5 | >25 | 1,5 | 1,7 | | | | | | | | |
| 900 | 17 | 38 | 1,9 | 2,8 | 7 | >25 | 1,6 | 1,8 | 4 | >25 | 1,4 | 1,4 | | | | |
| 1000 | 21 | 42 | 2,0 | 3,0 | 8 | 28 | 1,7 | 1,9 | 5 | >25 | 1,5 | 1,6 | | | | |
| 1500 | 47 | 54 | 2,9 | 4,5 | 19 | 40 | 2,5 | 2,8 | 11 | 33 | 2,2 | 2,2 | 7 | 26 | 1,9 | 1,8 |
| 2000 | | | | | 33 | 49 | 3,2 | 3,8 | 20 | 42 | 2,8 | 3,0 | 13 | 35 | 2,6 | 2,4 |
| 2500 | | | | | 52 | 56 | 3,9 | 4,3 | 32 | 49 | 3,5 | 4,3 | 20 | 42 | 3,2 | 2,9 |
| 3000 | | | | | 74 | 62 | 4,8 | 5,6 | 46 | 55 | 4,3 | 4,5 | 28 | 48 | 3,8 | 3,5 |
| 3500 | | | | | | | | | 62 | 59 | 5,0 | 4,8 | 39 | 52 | 4,5 | 4,1 |
| 4000 | | | | | | | | | 82 | 64 | 5,7 | 5,9 | 50 | 57 | 5,0 | 4,7 |
| 4500 | | | | | | | | | | | | | 64 | 60 | 5,6 | 5,3 |
| 5000 | | | | | | | | | | | | | 79 | 63 | 6,3 | 5,9 |

| Size | 450 | | | | 500 | | | | 560 | | | | 630 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Q ($m^3$/h) | Δp (Pa) | $L_{WA}$ (dB) | $L_{0,2}$ (m) | H1 (m) | Δp (Pa) | $L_{WA}$ (dB) | $L_{0,2}$ (m) | H1 (m) | Δp (Pa) | $L_{WA}$ (dB) | $L_{0,2}$ (m) | H1 (m) | Δp (Pa) | $L_{WA}$ (dB) | $L_{0,2}$ (m) | H1 (m) |
| 2000 | 8 | 28 | 2,3 | 1,9 | | | | | | | | | | | | |
| 2500 | 12 | 35 | 2,8 | 2,3 | 8 | 29 | 2,5 | 1,8 | | | | | | | | |
| 3000 | 18 | 41 | 3,4 | 2,8 | 12 | 35 | 3,2 | 1,9 | | | | | | | | |
| 3500 | 24 | 46 | 4,0 | 3,3 | 16 | 40 | 3,7 | 3,3 | 10 | 34 | 3,3 | 2,1 | | | | |
| 4000 | 31 | 50 | 4,5 | 3,7 | 20 | 44 | 4,1 | 3,0 | 13 | 38 | 3,7 | 2,4 | | | | |
| 4500 | 40 | 54 | 5,0 | 4,2 | 26 | 48 | 4,7 | 3,4 | 16 | 42 | 4,3 | 2,7 | 10 | 35 | 3,8 | 2,2 |
| 5000 | 49 | 57 | 5,7 | 4,7 | 32 | 51 | 5,2 | 3,7 | 20 | 45 | 4,7 | 3,0 | 13 | 38 | 4,2 | 2,4 |
| 6000 | 71 | 62 | 6,3 | 5,1 | 46 | 57 | 6,2 | 4,1 | 29 | 51 | 5,6 | 3,3 | 18 | 45 | 5,0 | 2,6 |
| 7000 | | | | | 63 | 62 | 7,2 | 4,5 | 40 | 56 | 6,5 | 3,7 | 25 | 50 | 5,8 | 2,8 |
| 8000 | | | | | | | | | 52 | 60 | 7,5 | 4,7 | 32 | 54 | 6,7 | 3,8 |
| 9000 | | | | | | | | | 66 | 64 | 8,4 | 5,4 | 41 | 58 | 7,5 | 4,3 |
| 10000 | | | | | | | | | | | | | 50 | 61 | 8,3 | 4,7 |

**$L_{0,2}$** - horizontal throw at ΔT=-3 K
**H1** - vertical throw at ΔT=+4 K

# Order key:

**SD-3N/B1/K**

**K** – individually mounting

**S** – wall mounting

**R** – manual regulation

**B1** - actuator Belimo LM 24A

**B2** – actuator Belimo LM 230A

# Air displacement units

## Air displacement units
## SD-6

**Application**
Air displacement units are suitable for both industrial and comfort air conditioning applications. They are suitable for rooms characterised by high heat loads or heavy air pollution. Air displacement units supply air at large flow rates (up to 10.000 m³/h), at low air velocities (in the range from 0.1 to 0.3 m/s). Supplied air forms a so called »fresh air pool« in the occupied zone. Air is lifted in convection currents from heat sources to the ceiling layer, from which it is extracted from the room. In this way, even temperature field is maintained in the room, free of draught. Diffusers can be installed suspended from the ceiling, standing on the floor or hanging immediately above the occupied zone.

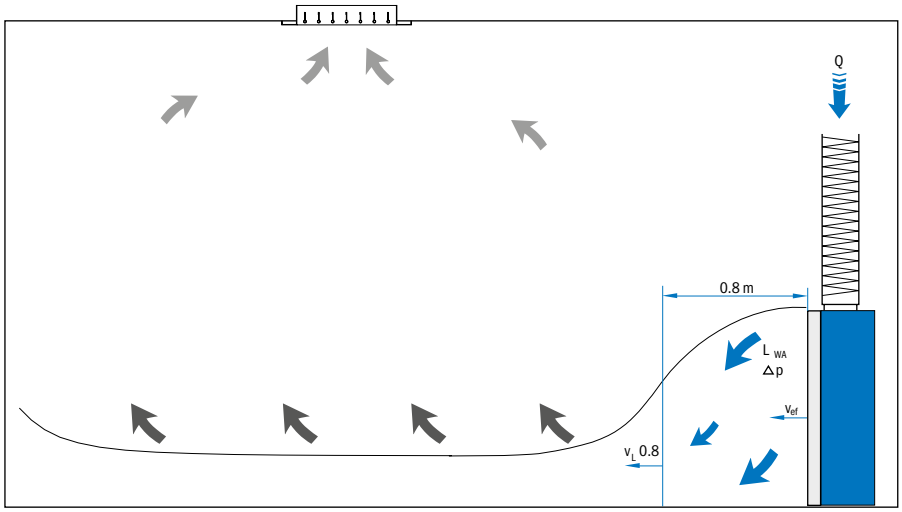
**Description**
Air displacement units are made of sheet steel and painted in RAL 9010. They can be coloured in any other RAL colour at to the customer's request. They consist of a mantle, a bottom plate and a top plate equipped with an inlet spigot. The standard shape of the spigot is round. At the customer's request, it can be rectangular according to the dimension of the unit.

The air displacement unit mantle perforation is designed according to the version. The versions without a filter (F1, F2 and F5) have mantle perforation with round openings (ϕ 5.5 x 8 mm, 37 % free area). The versions with a filter (F3, F4 and F6) have square openings (10 x 10 x 2 mm, 69 % free area).

To achieve a uniform distribution of air across the entire displacement surface, versions F3, F4 and F6 are recommended.

**SD-6**

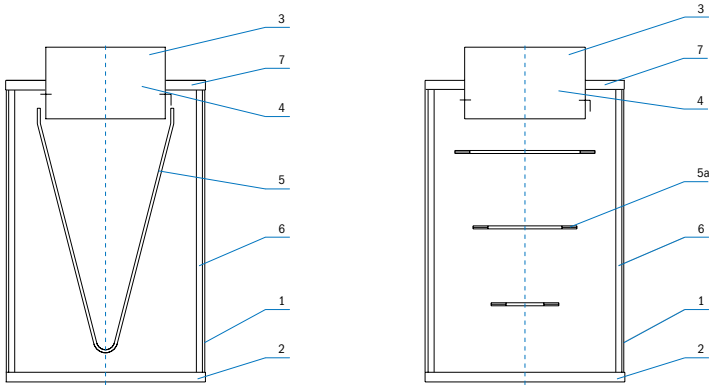
**SD-6:** rectangular




## Definition of symbols

| | |
|---|---|
| **Q (m³/h)** | Air flow rate |
| **$v_L$ (m/s)** | Supplied air velocity at the throw distance L=0.8 m |
| **$v_{ef}$** | Effective dishcarge air velocity |
| **$\Delta t_z$ (K)** | Temperature difference between supply and room air |
| **$\Delta t_L$ (K)** | Temperature difference between air jet and room temperature |
| **$\Delta p_t$ (Pa)** | Pressure drop |
| **$L_{WA}$ (dB(A))** | Sound power level |

**1.** Perforated mantle
**2.** Bottom plate
**3.** Round inlet spigot
**4.** Control flap
**5.** Cone-shaped filter bag
**5a.**Dividing rings
**6.** Filter
**7.** Top plate




## Versions

**F1:** without filters

**F2**: with the filter bag

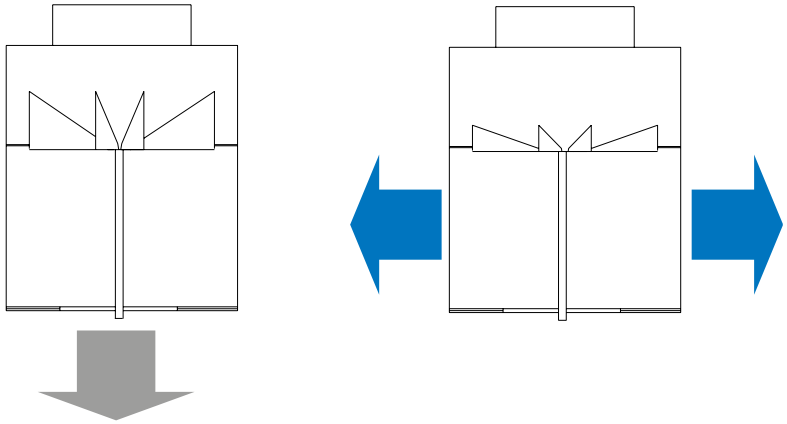
**F3:** with the peripheral filter

**F4:** with the filter bag and the peripheral filter

**F5:** without filters and jet dividing rings

**F6:** with the peripheral filter and dividing rings

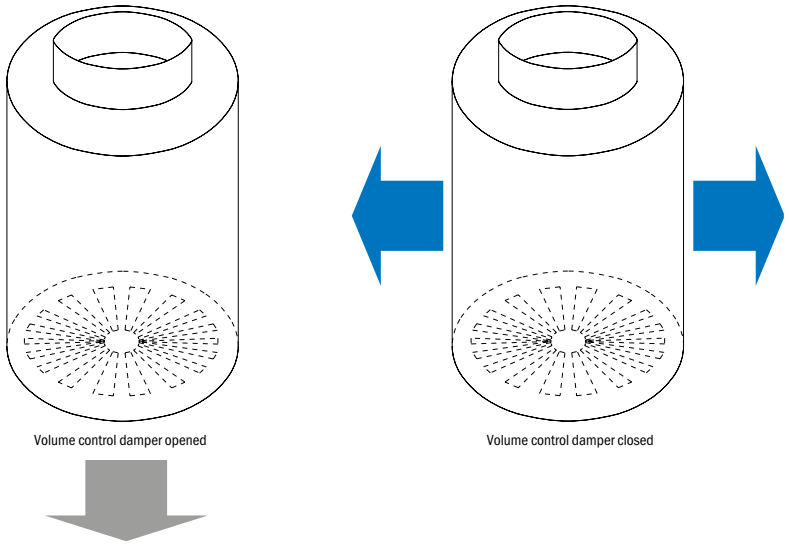
**(R1)** Air jet direction adjustment with blades (available with F1 and F5 version only).



## Special SD-3 version

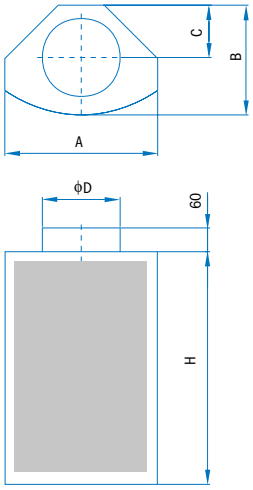
An air displacement unit with regulation R1 and R2 must be mounted under the ceiling for correct operation. On the top plate, there is a special nut for mounting on the ceiling with a threaded rod.

**(R2)** Air jet direction adjustment with a flow control damper (available with F1 and F3 version only).



## Dimensions

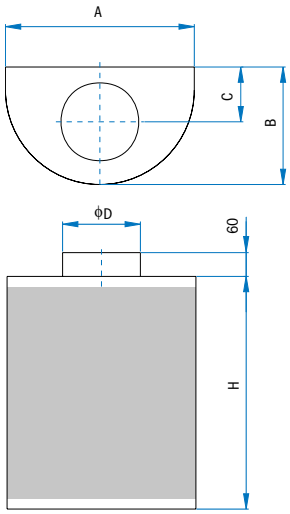
### SD-1




| H |
|---|
| 750 |
| 1000 |
| 1250 |
| 1500 |
| 2000 |
| 2500 |

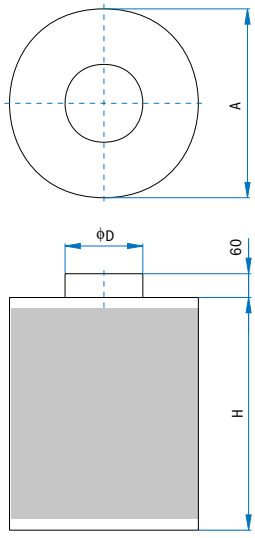
| Size | A | B | C | ϕD |
|---|---|---|---|---|
| **400** | 283 | 180 | 100 | 123 |
| **600** | 424 | 275 | 135 | 148 |
| **800** | 566 | 300 | 150 | 178 |
| **1000** | 707 | 400 | 200 | 198 |
| **1500** | 1061 | 450 | 220 | 248 |
| **2000** | 1414 | 700 | 350 | 298 |

### SD-2



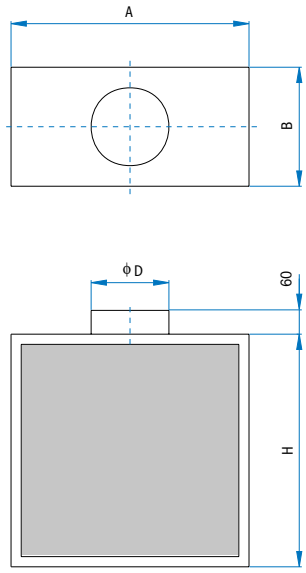

| Size | A | B | C | ϕD |
|---|---|---|---|---|
| **400** | 400 | 320 | 150 | 178 |
| **600** | 600 | 470 | 230 | 198 |
| **800** | 800 | 570 | 250 | 248 |
| **1000** | 1000 | 620 | 280 | 298 |
| **1500** | 1500 | 870 | 350 | 348 |
| **2000** | 2000 | 1120 | 430 | 398 |

### SD-3




| Size | A | ϕD |
|---|---|---|
| **400** | 400 | 248 |
| **600** | 600 | 298 |
| **800** | 800 | 348 |
| **1000** | 1000 | 398 |
| **1500** | 1500 | 498 |
| **2000** | 2000 | 548 |

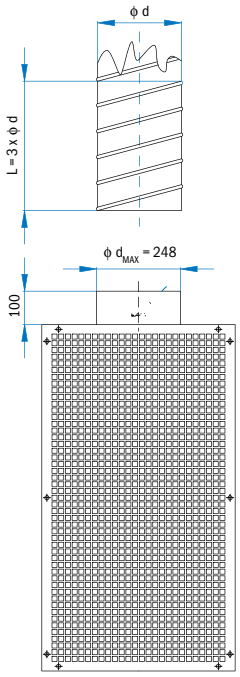
### SD-6




| H |
|---|
| 750 |
| 1000 |
| 1250 |
| 1500 |
| 2000 |
| 2500 |

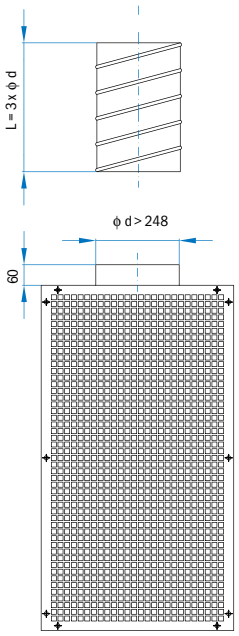
| Size | A | B | ϕD |
|---|---|---|---|
| **400** | 400 | 200 | 148 |
| **600** | 600 | 250 | 178 |
| **800** | 800 | 300 | 198 |
| **1000** | 1000 | 350 | 248 |
| **1500** | 1500 | 400 | 298 |
| **2000** | 2000 | 450 | 313 |

**Inlet spigot ϕd$_{max}$ = 248 mm**
The minimum straight duct length L = 3 x ϕd before the diffuser is sufficient to stabilise the airflow at the diffuser inlet.




| ϕd (mm) | Q$_{max}$ (m³/h) |
|---|---|
| **78** | 80 |
| **98** | 130 |
| **123** | 200 |
| **138** | 260 |
| **148** | 300 |
| **158** | 340 |
| **178** | 440 |
| **198** | 540 |
| **223** | 690 |
| **248** | 850 |

**Example of correct assembly of airflow regulation SD-1, 2, 3, 6**
Maximum airflow Q$_{max}$ for the chosen inlet spigot with a size of ϕd has been calculated for the maximum recommended air velocity in the spigot of V = 5 m/s. Optimum air velocity in the spigot is 2 – 3 m/s.




| ϕd (mm) | Q$_{max}$ (m³/h) |
|---|---|
| **278** | 1080 |
| **298** | 1240 |
| **313** | 1370 |
| **353** | 1740 |
| **398** | 2220 |
| **448** | 2810 |
| **498** | 3480 |
| **558** | 4370 |
| **628** | 5540 |

## Ordering key:

**SD-3/F1/R1/ Size 400 H=750**

**H 750, 1000, 1250, 1500, 2000, 2500** standard heights

**Size 400, 600, 800, 1000, 1500, 2000** standard sizes

**Regulation:**

**R1** Regulation with blades (available with types SD-3, version F1 and F5 only)

**R2** Regulation with a flow control damper (available with types SD-3, version F1 and F3 only)

**Versions:**

**F1** Without filters (perforation with round openings (ø5.5 x 8 mm 37 % free area))

**F2** With the filter bag (perforation with round openings (ø5.5 x 8 mm 37 % free area))

**F3** With the peripheral filter (perforation with square opening (10 x 10 x 2 mm, 69 % free area))

**F4** With the filter bag and the peripheral filter (perforation with square opening (10 x 10 x 2 mm, 69 % free area))

**F5** With dividing rings without filters (perforation with round openings (ø5.5 x 8 mm 37 % free area))

**F6** With dividing rings and the peripheral filter (perforation with square opening (10 x 10 x 2 mm, 69 % free area))

**Types:**

**SD-1** Corner

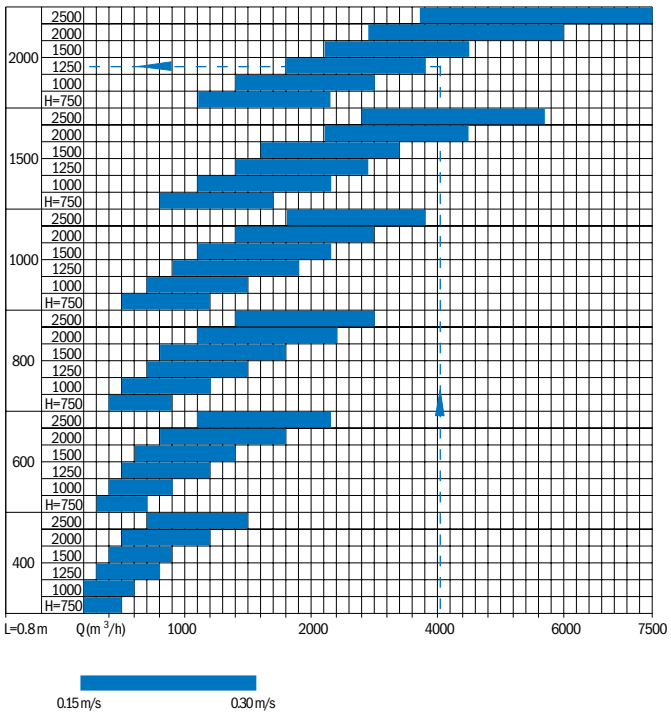
**SD-2** Semi-cylindrical

**SD-3** Cylindrical

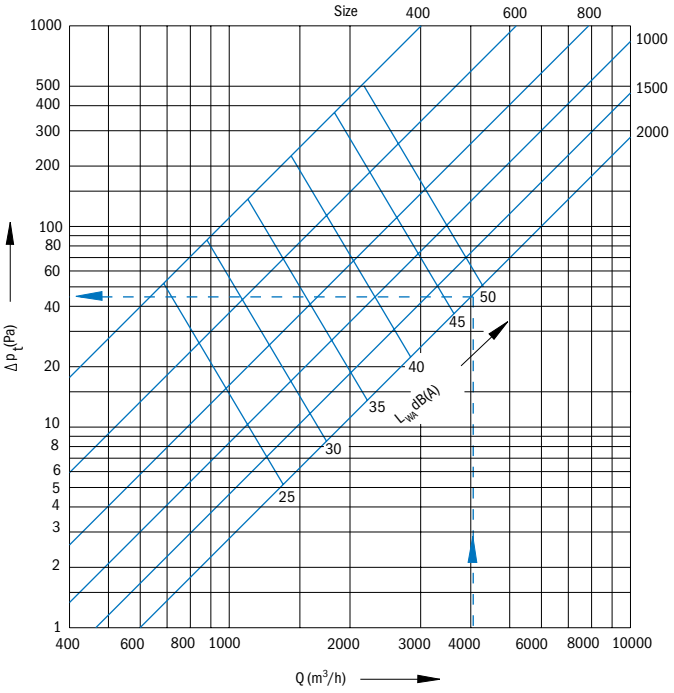
**SD-6** Rectangular

## Technical data for SD-6

### Diagrams to determine the supplied air velocity at the throw distance L=0.8 m:




### Pressure drop and noise level diagram:




### KF correction factor table

| Correction | Size | 750 | 1000 | 1250 | 1500 | 2000 | 2500 |
|---|---|---|---|---|---|---|---|
| $\Delta p_t$ for the type F3 | **400** | 1.11 | 1.00 | 0.95 | 0.93 | 0.90 | 0.89 |
| | **600** | 1.14 | 1.00 | 0.94 | 0.90 | 0.87 | 0.86 |
| | **800** | 1.18 | 1.00 | 0.92 | 0.88 | 0.83 | 0.82 |
| | **1000** | 1.22 | 1.00 | 0.90 | 0.85 | 0.79 | 0.77 |
| | **1500** | 1.18 | 1.00 | 0.92 | 0.88 | 0.84 | 0.82 |
| | **2000** | 1.17 | 1.00 | **0.92** | 0.89 | 0.85 | 0.83 |
| $\Delta p_t$ for the type F1 | **400** | 0.89 | 0.88 | 0.88 | 0.88 | 0.87 | 0.87 |
| | **600** | 0.85 | 0.84 | 0.84 | 0.84 | 0.83 | 0.83 |
| | **800** | 0.81 | 0.80 | 0.79 | 0.79 | 0.79 | 0.78 |
| | **1000** | 0.77 | 0.75 | 0.74 | 0.74 | 0.74 | 0.83 |
| | **1500** | 0.81 | 0.80 | 0.79 | 0.79 | 0.79 | 0.78 |
| | **2000** | 0.83 | 0.81 | **0.81** | 0.80 | 0.80 | 0.73 |
| $\Delta p_t$ for the type F4 | **400** | 1.32 | 1.12 | 1.03 | 0.98 | 0.93 | 0.79 |
| | **600** | 1.42 | 1.16 | 1.04 | 0.97 | 0.91 | 0.80 |
| | **800** | 1.55 | 1.20 | 1.05 | 0.96 | 0.88 | 0.91 |
| | **1000** | 1.68 | 1.25 | 1.06 | 0.95 | 0.85 | 0.88 |
| | **1500** | 1.55 | 1.20 | 1.05 | 0.96 | 0.88 | 0.85 |
| | **2000** | 1.51 | 1.19 | **1.04** | 0.97 | 0.89 | 0.86 |

## Definition of symbols

| | |
|---|---|
| **Q (m³/h)** | Air flow rate |
| **$v_L$ (m/s)** | Supplied air velocity at the throw distance L=0.8 m |
| **$\Delta p_t$ (Pa)** | Pressure drop |
| **$L_{WA}$ (dB(A))** | Sound power level |

## Example calculation:

Q = 4000 m³/h
We select size 2000; H = 1250
$A_{ef}$ = 2 x 1.25 x 0.6944 = 1.74 (m²)
$v_{ef}$ = Q / ($A_{ef}$ x 3600) = 4000 / (1.74 x 3600) = 0.64 m/s
$L_{WA}$ = 48 dB(A)

Pressure drop:

**Tip F3**

$\Delta p_t$ = from the diagram x KF (za H = 1250) = 45 x 0.92 = 41.4 Pa

**Tip F1**

$\Delta p_t$ = from the diagram x KF (za H = 1250) = 45 x 0.81 = 36.4 Pa

**Tip F4**

$\Delta p_t$ = from the diagram x KF (za H = 1250) = 45 x 1.04 = 46.8 Pa

Free area $A_{ef}$:

$A_{ef}$ = A x H x 0.6944 (m²) A- Size (m)

$A_{ef}$= A x H x 0.37 (m²) for the versions F1, F2 and F5 (without filter) and mantle perforation with round openings

# Supply air nozzle VŠ-5

**Application**
Air supply nozzles VŠ-5 are applied in the supply of cold or warm air in rooms where long throw distances and low noise operation are required. By combining individual nozzles into a block, the throw distance is increased proportionally. There is a choice of several mounting methods.

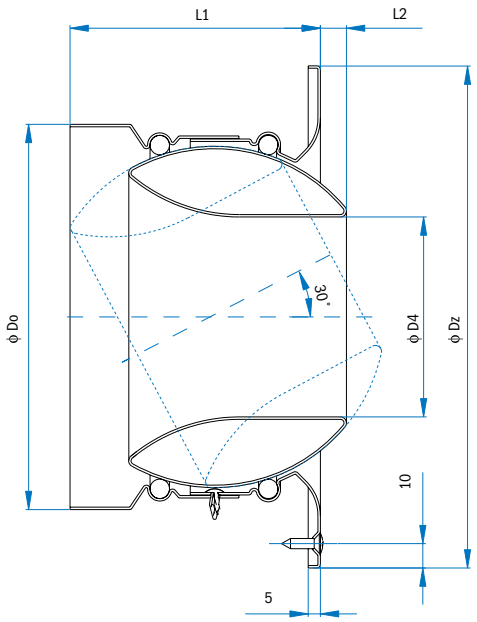
**Description**
Supply nozzles VŠ-5 are adjustable. The air jet can be adjusted:

- manually, in all directions, within a ±30° range
- by means of an electric motor or thermostat element, in horizontal and vertical direction, within a ±30° range.

The nozzle setting depends on the supplied air temperature.

The supply nozzle is integrated in a housing, thus even with the largest size, 400, it does not project into the room by more than 45 mm (see dimension L2 as a function of the setting angle 0°).

Supply nozzles VŠ-5 are made of galvanised eloxal treated aluminium sheet. On customer's request, nozzles can be powder painted in any of the RAL scale colours.

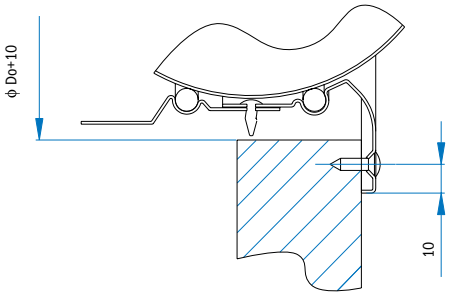



**Sizes and dimensions**
L2* ... corresponds to the setting angle 0°

| Size | ΦDo | ΦDz | ΦD4 | L1 | L2* | $A_{ef}$ (m²) | Weight (kg) |
|---|---|---|---|---|---|---|---|
| **100** | 98 | 146 | 40 | 87 | -5 | 0.0013 | 0.20 |
| **125** | 123 | 171 | 64 | 91 | -1 | 0.0032 | 0.27 |
| **160** | 158 | 206 | 82 | 98 | 11 | 0.0053 | 0.3 |
| **200** | 198 | 252 | 108 | 108 | 19 | 0.0092 | 0.55 |
| **250** | 248 | 312 | 136 | 121 | 29 | 0.0145 | 0.77 |
| **315** | 313 | 377 | 174 | 145 | 35 | 0.0238 | 1.12 |
| **400** | 398 | 472 | 230 | 171 | 45 | 0.0415 | 1.64 |

**Mounting methods:**

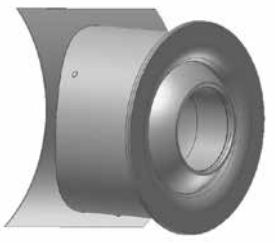
- **Standalone nozzle (V)**
  A nozzle without extensions is mounted by means of three bolts from its face. The mounting opening dimension is ΦDo+10mm.

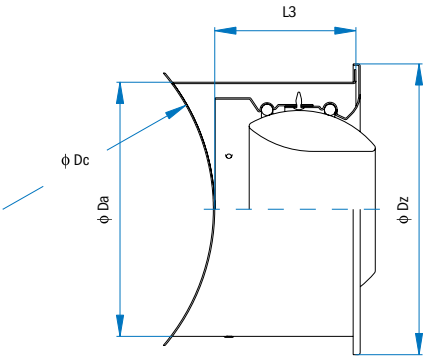



- **Mounting with extensions (designations D,K,E)**
  Visible nozzle mounting by means of an extension. The nozzle is supplied with the extension already installed. The installation technician mounts the extension to a round or rectangular duct by means of rivets or self-tapping screws. On customer's request, the extension can be powder painted in any of the RAL scale colours. The duct diameter ΦDc shall be specified in the order.

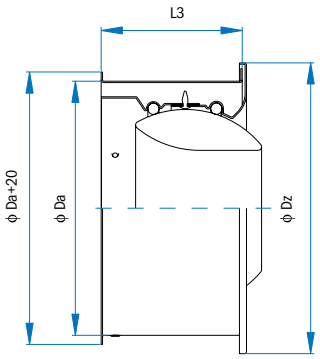
  The extension is mounted separately. A standard dimension duct is attached to the extension connector.

Mounting to a round duct (D)

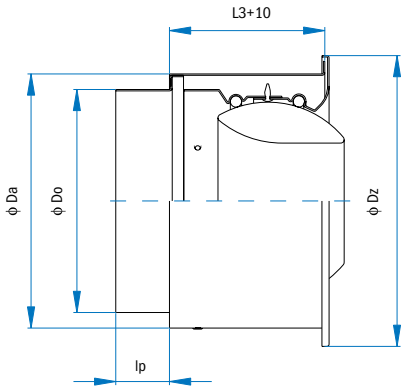




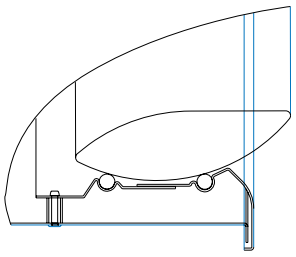

Mounting to a rectangular duct (K)




Mounting with a connector to a duct (E)



- **Mounting of a nozzle on the extension**
  The nozzle is fixed into the extension on the side face, thus there are no bolts on its face side.



| Size | ΦDo | ΦDz | ΦDa | ΦDa+20 | L3 | ΦDc min | lp |
|---|---|---|---|---|---|---|---|
| **100** | 98 | 146 | 118 | 138 | 90 | 160 | 63 |
| **125** | 123 | 171 | 143 | 163 | 95 | 200 | 63 |
| **160** | 158 | 206 | 178 | 198 | 100 | 225 | 63 |
| **200** | 198 | 252 | 224 | 244 | 110 | 280 | 83 |
| **250** | 248 | 312 | 284 | 304 | 120 | 355 | 78 |
| **315** | 313 | 377 | 349 | 369 | 150 | 400 | 78 |
| **400** | 398 | 472 | 444 | 464 | 170 | 560 | 73 |

**Adjustment methods:**

- **Manual adjustment in all directions, within a ±30° (R)**

- **Electric motor adjustment, for standalone mounting**

  **B4** motor Belimo NM 24A

  **B5** motor Belimo NM 230A

  **B6** motor Belimo NM 24A SR

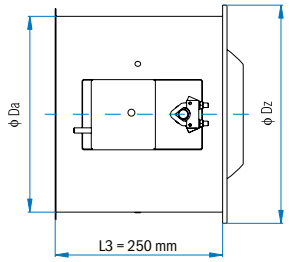
  **J4** motor Joventa DAS 1

  **J5** motor Joventa DAS 2

  **J6** motor Joventa DMS 1.1

  Variants D, K and E available.

  With all the variants, the L3 dimension equals 250 mm.



**Adjustment methods:**

- **Electric motor adjustment, internal drive**

  **B1 LH** motor Belimo LH 24A 100

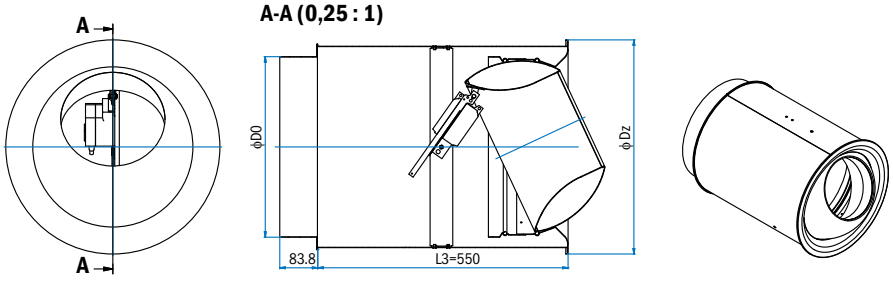
  **B2 LH** motor Belimo LH 230A 100

  **B3 LH** motor Belimo LH 24A SR

  **B4 LH** motor Belimo LH 24A MP100

  Variants D, K and E available.

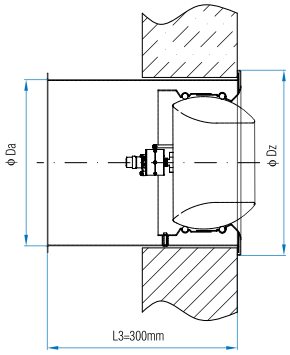
  With all the variants, the L3 dimension equals 550 mm. Variant is available in following sizes: 160, 200, 250, 315 and 400.




- **Termostatic regulation**
  Available designs: D, K or E.

  The dimension L3 is 300 mm and is the same for all sizes. The designs are compatible with the sizes 200, 250, 315 and 400.

  **Advantages**
  - Automatic regulation using a thermostatic head
  - Requires no motor or installation required for motor power supply and control




## Ordering key

**VŠ-5/D/R/C0 Size 160**

**Standard sizes** 100, 125, 160, 200, 250, 315, 400

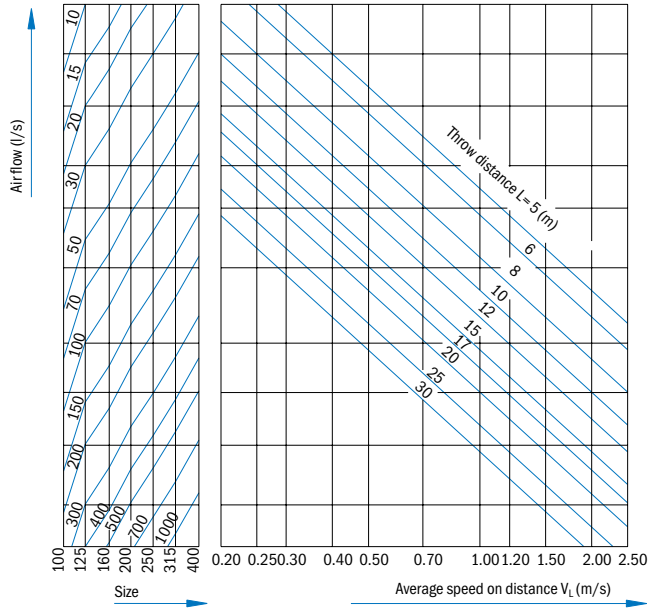
**C0** Eloxal treated, in the original Al colour (C0)
**RAL** Standard RAL 9010 (30 % gloss) (on customer's request, any RAL scale colour)

**R** Manual adjustment
**B4** Motor Belimo NM 24A standalone mounting
**B5** Motor Belimo NM 230A standalone mounting
**B6** Motor Belimo NM 24A SR standalone mounting
**J4** Motor Joventa DAS 1 standalone mounting
**J5** Motor Joventa DAS 2 standalone mounting
**J6** Motor Joventa DMS 1.1 standalone mounting
**B1 LH** Motor Belimo LH 24A 100
**B2 LH** Motor Belimo LH 230A 100
**B3 LH** Motor Belimo LH 24A SR
**B4 LH** Motor Belimo LH 24A MP100
**TR** Termostatic regulation*

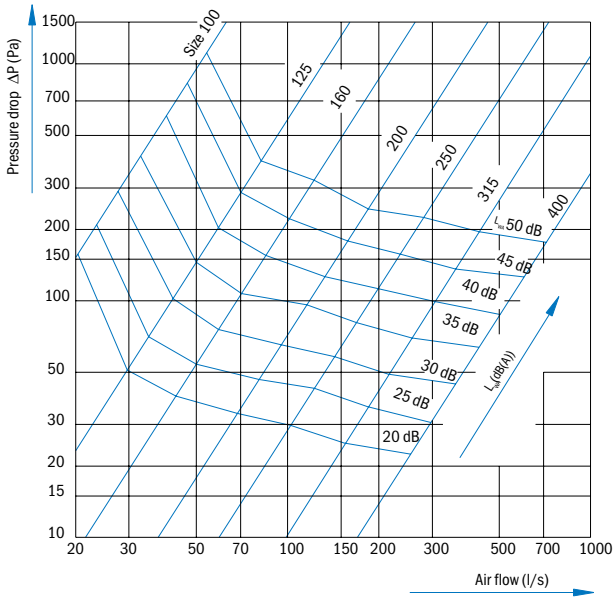
**V** Nozzle without extension – mounting with three bolts
**D** mounting to a round duct (specify ΦDc in the order)
**K** mounting to a rectangular duct
**E** mounting with a connector to a duct

* Variant is available in following sizes: 200, 250, 315 and 400.

## Air velocity in the air jet centre and throw distance




## Pressure drops and noise levels




## Air jet discharge angle