06

Supply air nozzles

Supply air nozzles

Supply air nozzles are designed to supply air into rooms in applications requiring large throw distances and low noise levels. They are suitable for supplying either cold or warm air. They are made of anodised sheet aluminium. On request, they can be powder painted in any of the RAL scale colours. Air supply nozzles are supplied either as single components or assembled into blocks, which considerably increase throw distance.

Overview

Supply air nozzles

Supply air nozzles are designed to supply air into rooms in applications requiring large throw distances and low noise levels. They are suitable for supplying either cold or warm air. They are made of anodised sheet aluminium. On request, they can be powder painted in any of the RAL scale colours. Air supply nozzles are supplied either as single components or assembled into blocks, which considerably increase throw distance.

Supply air nozzles VŠ-1

VŠ-1 supply air nozzles are of a fixed construction. They are supplied either as single components or assembled into blocks.

Supply air nozzles VŠ-4

VŠ-4 supply air nozzles are adjustable. The air jet direction can be adjusted either manually or by means of a motor drive, within a ±30° range.

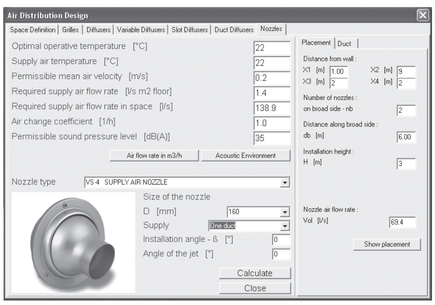
Supply air nozzles VŠ-5

VŠ-5 supply air nozzles can be adjusted in the same way as VŠ-4. Supply air nozzle is integrated into the housig and does not protrude into the room.

Software: KLIMA ADE 5.4

The air supply nozzle calculation and selection software package comprises:

- throw velocity calculation models, developed based on measurements,
- heating and cooling condition models,
- calculation of technical specifications of air supply on one wall or on opposite walls,
- calculation of throw velocities for all VŠ-4 and VŠ-5 sizes.



Software: KLIMA ADE 5.4

Supply air nozzles VŠ-1

VŠ-1

Supply air nozzles VŠ-4

VŠ-4

Supply air nozzles VŠ-5

VŠ-5

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Legend of symbols

Al — Element is made of aluminium profiles, aluminium sheet or aluminium casting.

Element is intended to be built in the wall.

Element is suitable for the supply of cool air (cooling).

St — Element is made of steel sheet.

Element is intended to be built in the ceiling or in the wall.

M — Element allows regulation by electric motor (Belimo electric motors).

RAL 9010 — Element is powder painted in standard RAL 9010 colour. Other desired colour is to be specified in the order.

Element for air conditioning of rooms with floor to ceiling heights room up to 4 m.

F EU... — Element is intended for air filtration. The filter of class ... is built in.

Shady symbol means possibility of optional material, surface protection, motor version, ...

Element for air conditioning of rooms with floor to ceiling heights from 6 to 15 m.

CD — The possibility of the automatic selection and calculation of the technical characteristics of grilles and difusers in regard to the given conditions with the assistance of the Klima ADE program.

Element is intended to be built in the floor.

Element is suitable for the supply of warm air (heating).

INOX — The element is made of stainless sheet steel AISI 304.

Supply air nozzles

Supply air nozzles VŠ-1

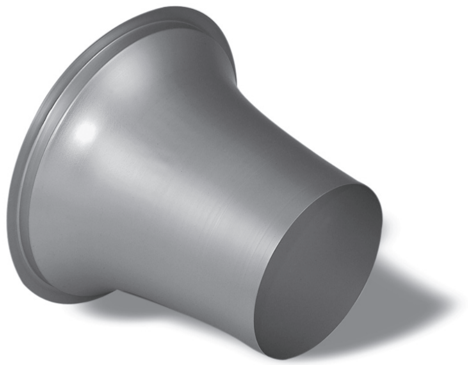
Application
VŠ-1 supply air nozzles are designed to supply airinto rooms in applications requiring large throwdistances and low noise levels. By arranging nozzlesin blocks, the throw distance is considerablyincreased. In terms of materials and shape, blocks ofair nozzles can be designed according to to fit well into room decoration.

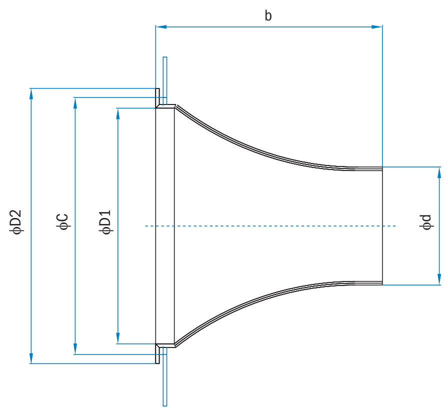
AI
RAL 9010

Description
VŠ-1 supply air nozzles are of a fixed construction.They are made of anodised sheet aluminium. Onrequest, they can be powder painted in any of theRAL scale colours.

Sizes and dimensions
VŠ-1 supply air nozzles are available in six sizes: from 20 to 250.

Installation methods
Size 20 and 50 VŠ-1 supply air nozzles areinstalled by gluing, while size 100, 140, 160 and 250 air supply nozzles are installed by means ofrivets or 3.5 mm self-tapping screws. VŠ-1 supplyair nozzles are supplied without mounting holes.





Size	Φd	ΦD1	ΦD2	b	ΦC	A_{ef} (m²)
20	20	40	52	60	46	0.00025
50	50	100	116	100	108	0.00181
100	100	200	220	160	210	0.00785
140	140	250	290	250	270	0.01496
160	160	250	290	250	270	0.01960
250	250	400	440	350	420	0.04830

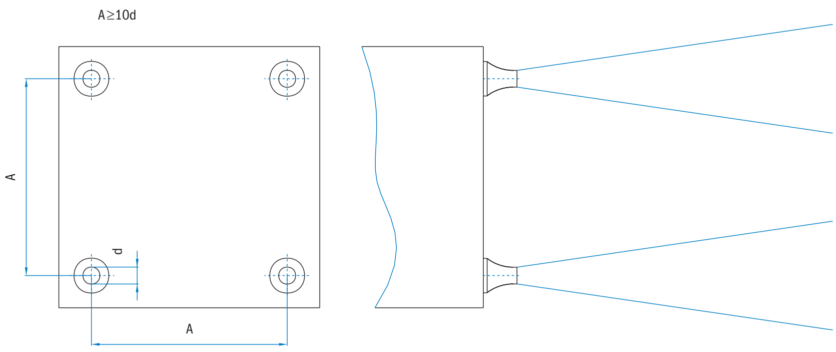
Ordering example

Supply air nozzle type: **VŠ-1**
Size: **100**
Pcs: **25**

Technical data of single supply air nozzles VŠ-1

Supply air nozzle is considered as a single unit when the distance between two adjacent nozzles is A ≥10d.

The most significant data in respect of an air supply nozzle characterization is the turbulence number m.

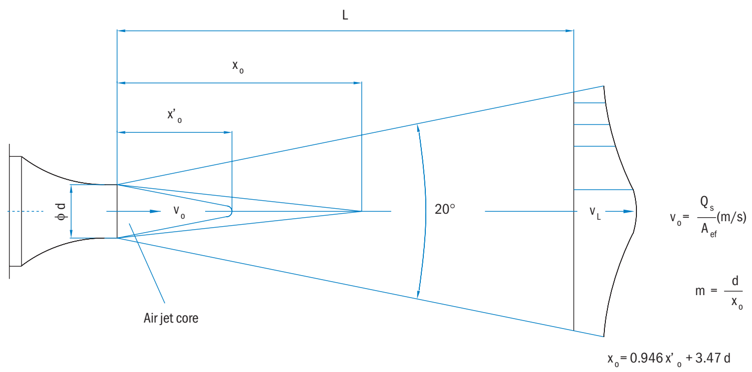


Throw distance of single supply air nozzle:

$$L = \frac{d}{m} + \frac{d}{0.128} \times \left(\frac{v_0}{v_L} - 0.63 \right) \text{ (m)}$$

Method of determining induction:

$$i = 2m \frac{L}{d}$$



Size	m
20	0.180
50	0.155
100	0.150
140	0.145
160	0.145
250	0.150

Definition of symbols

v_0 (m/s)	Discharge air velocity (velocity in the air jet core)
$Q_š$ (m³/s)	Air flow rate per single nozzle
A_{ef} (m²)	Effective nozzle cross-section area
v_L (m/s)	Desired velocity at the throw distance L
L (m)	Desired throw distance
m	Supply air nozzle turbulence number
Δt_L (°C)	Maximum difference between the jet core temperature and the room temperature
Δt_z (°C)	Temperature difference between supply air and room air
i	Induction, i. e. the ratio between the total air jet flow rate and supply air flow rate
A (m)	Distance between nozzles
g (m/s²)	Acceleration of gravity
d (m)	Nozzle diameter
T_p (°K)	Room air absolute temperature

Calculation of the throw distance as a function of the temperature quotient:
In non-isothermal conditions (temperature difference between the supply air and room air) the air jet rise or drop y and temperature quotient shall be considered:

$$\frac{\Delta t_L}{\Delta t_Z}$$

$$y = 0.33 d \cdot m \cdot Ar \left[\frac{L}{d}\right]^3 \quad (m)$$

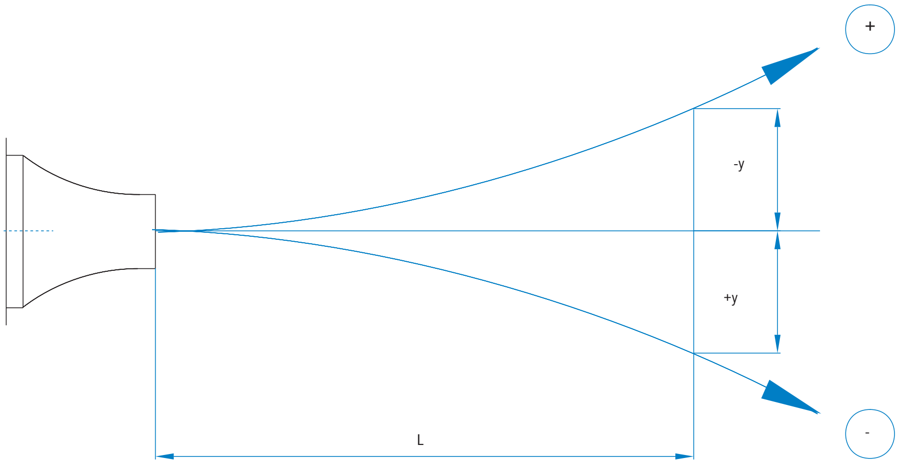
where Ar = Arhchimedean number

$$Ar = \frac{d \cdot \Delta t_Z \cdot g}{v^2 \cdot T_R}$$

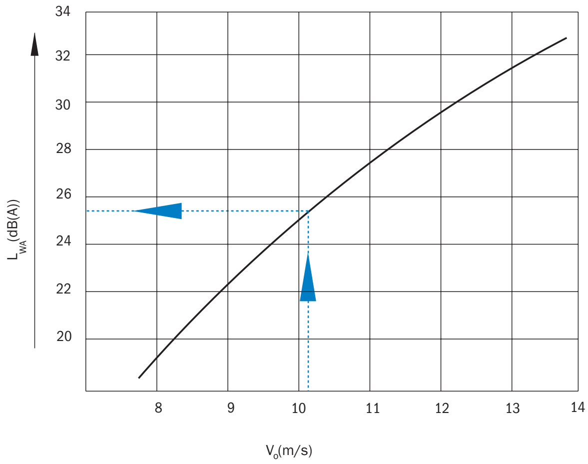
Temperature quotient:

$$\frac{\Delta t_L}{\Delta t_Z} = \frac{3}{4} \cdot \frac{d}{m \cdot L} \quad \text{oz.}$$

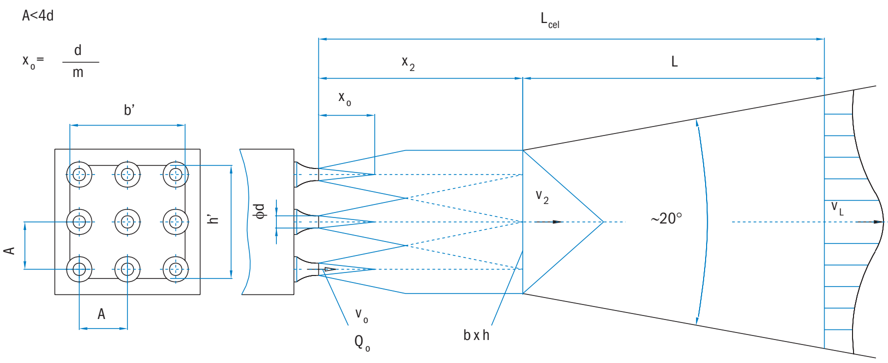
$$\Delta t_L = \frac{3}{4} \cdot \frac{d}{m \cdot L} \cdot \Delta t_Z \quad (^{0}C)$$



Sound power level diagram



Arrangement of supply air nozzles in blocks
When large throw distance or greater air flow rate is required, supply nozzles are installed arranged in blocks.



Definition of symbols

Q_0 (m³/s)	$Q_{\check{S}}$ x n supply air flow rate
n	Number of nozzles in a block
Q_2 (m³/s)	Air flow rate at x_2
v_2 (m/s)	Air velocity at x_2
b (m)	Air jet width at x_2
h (m)	Air jet height at x_2
L (m)	Throw distance of the combined air jet
L_{cel} (m)	Total throw distance
Q_{cel} (m³/s)	Air flow rate at the throw distance L

Isothermal conditions – rectangular array nozzle block
The indicated calculation method is applicable inisothermal conditions and for rectangular blocks of nozzles where b x h < 12. In a case of non-isothermal conditions, the air jet rise or drop due to the temperature difference has to be calculated.

Calculation method applicable to isothermal conditions and a rectangular array nozzle blocks b / h ≤12

1. Distance from the outlet to the joint air jet:

$$x_2 = 9.5 \cdot \left[A - \frac{d}{2}\right] \ \text{(m)}$$

2. Increase of air flow rate due to induction:

$$Q_2 = \frac{2x_2}{x_0} \cdot Q_0 \left[\frac{m^3}{s}\right]$$

3. Widening of air jet up to the distance x_2:

$$b = b' + 0.2x_2 \ \text{(m)}$$
$$h = h' + 0.2x_2 \ \text{(m)}$$
$$F_2 = b \cdot h \ \text{(m}^2\text{)}$$

4. Air jet velocity at x_2:

$$v_2 = \frac{Q_2}{F_2} \ \text{(m/s)}$$

5. Air jet velocity at the throw distance L:

$$v_L = \frac{v_0 \cdot d \cdot \sqrt[3]{n}}{m \cdot L} \ \text{(m/s)}$$

6. Throw distance:

$$L = \frac{v_0 \cdot d \cdot \sqrt[3]{n}}{m \cdot v_l} \ \text{(m)}$$

7. Total throw distance:

$$L_{cel} = L + X_2 \ \text{(m)}$$

8. Air supply nozzle block induction is calculated as follows:

$$i = \frac{Q_{cel}}{Q_0} \qquad Q_{cel} = 2Q_2 \frac{v_0 \cdot d \cdot \sqrt[3]{n}}{m \cdot v_l}$$

Isothermal conditions - square or circular array nozzle block
In the cases of nozzle blocks not installed in a rectangular array, the adjustments indicated on the left shall be applied.

Calculation method applicable to isothermal conditions and a square or circular array nozzle blocks:

1. Square arrangement of supply air nozzles:

$b = h = a$
$F_2 = a^2$

2. Circular arrangement of supply air nozzles:

$b = h = d$
$F_2 = \pi \times d^2 / 4$
$m = 0.20$

Non-isothermal conditions
In non-isothermal conditions, the air jet rise or drop is calculated according to formulas indicated on the left.

Calculation method applicable in non-isothermal conditions

1. Rectangular arrangement of supply air nozzles:

$$y = 0.4h \cdot \sqrt{m} \cdot Ar \cdot \left[\frac{L}{m}\right]^3$$

2. Circular arrangement of supply air nozzles:

$$y = 0.33 \cdot m \cdot Ar \left[\frac{L}{m}\right]^3 \ (m)$$

Archimedean number (Ar)

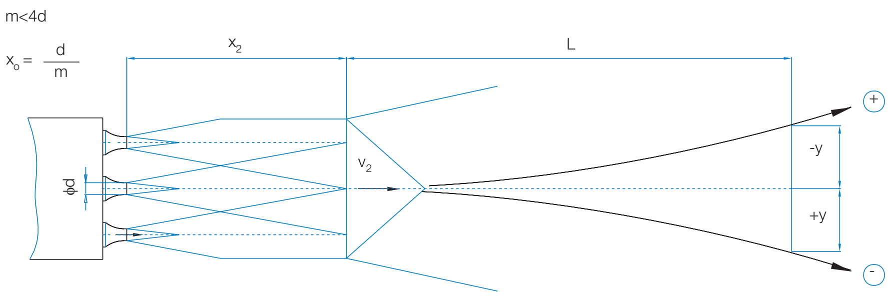
for rectangular supply air nozzle block:

$$Ar = \frac{g \cdot h \cdot \Delta\ t_z}{v_2^2 \cdot T_p}$$

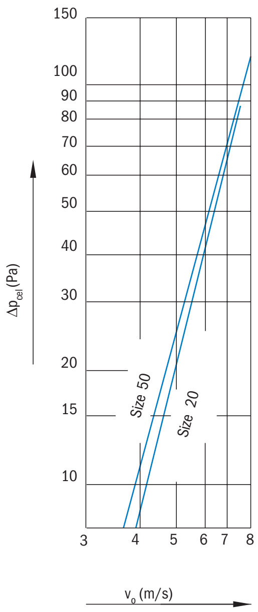
for circular supply air nozzle block:

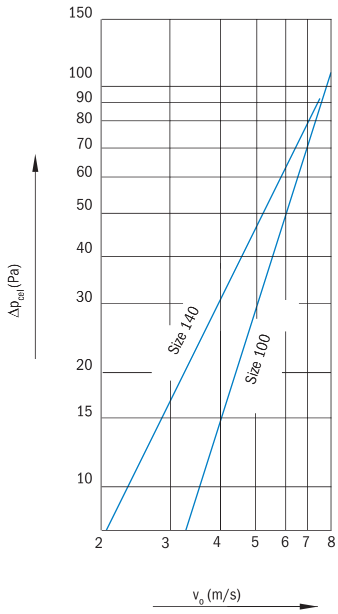
$$Ar = \frac{d \cdot \Delta\ t_z \cdot g}{v_2^2 \cdot T_p}$$

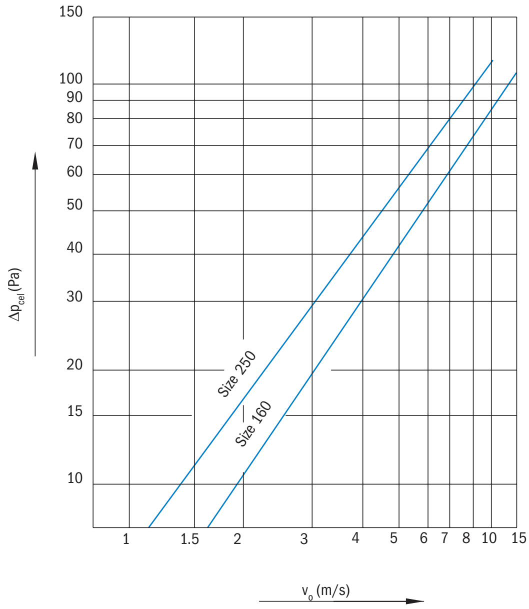
The indicated calculation method provides an approximate result. In cases of sophisticated architectural demands, the designer is invited to consult our factory team for detailed design information. A model test can be carried out on request.



Pressure drop diagrams



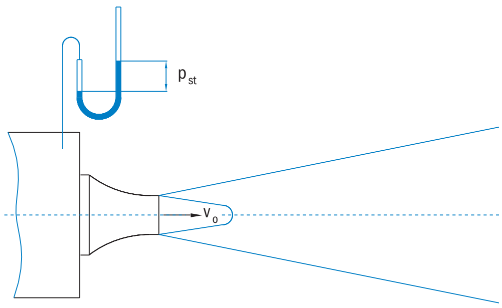




Pressure drop

$$p_{st} = 1.05 \frac{\rho}{2} v_0^2 \quad \text{(Pa)}$$

ρ – air density (kg/m^3)



Definition of symbols

g (m /s)	Acceleration of gravity
d (m)	Circular air jet diameter at x_2
h (m)	Rectangular air jet height at x_2
Δt_z (°C)	Temperature difference between supply air and room air
T_p (°K)	Absolute room air temperature
m	Turbulence number (m=0.25 for rectangular block and m=0.20 For circular block)
L (m)	Throw distance

Calculation example

Required air flow rate into the hall:
15000 m³/h.

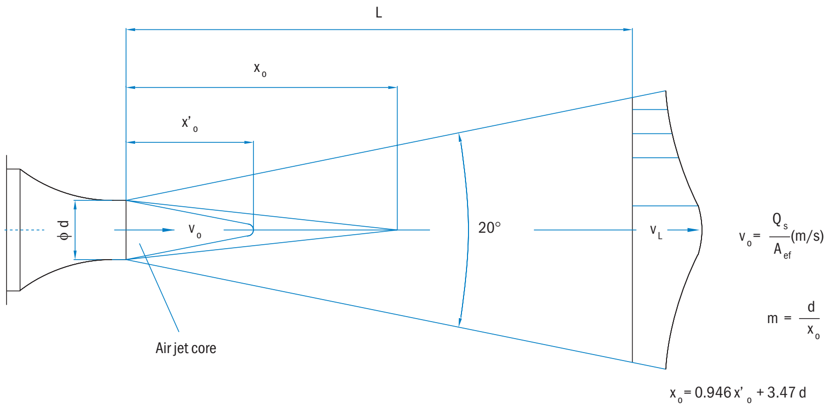
Room temperature:
t_p = 20 °C

Supply air temperature:
t_z = 26 °C

Air velocity in occupied zone:
v_L = 0.5 m/s

Solution:
52 pcs individually installed air supply nozzles VŠ-1 of size 100 are required. Air flow rate per each air supply nozzle is calculated as follows:

$$Q_S = \frac{15000}{52} = 292\ m^3/h = 0.08011\ m^3/s$$



1. Supply air velocity:

$$V_0 = \frac{Q_S}{A_{ef}} = \frac{0.08011}{0.00785} = 10.2\ m/s$$

2. Throw distance:

$$L = \frac{0.1}{0.15} + \frac{0.1}{0.128}\left[\frac{10.2}{0.5} - 0.63\right] = 16\ m$$

3. Archimedean number:

$$Ar = \frac{(0.1) \times (-6) \times (9.81)}{(10.2)^2 \times 293} = \frac{-5.885}{3.047} \times 10^{-4} =$$

$$= -1.931 \times 10^{-4}$$

4. Air jet rise:

$$y = 0.33 \times 0.1 \times 0.15 \times (-1.931 \times 10^4) \times \left[\frac{16}{0.1}\right]^3 =$$

$$= -3.9\ m$$

5. Temperature quotient:

$$\frac{\Delta t_L}{\Delta t_Z} = \frac{3}{4} \times \frac{0.1}{0.15 \times 16} = 0.031$$

6. Pressure drop:

$$p_{st} = 1.05 \times \frac{1.15}{2}(10.2)^2 = 62.7\ Pa$$

7. Self-noise level:

Determined from the diagram at
v_0 = 10.2 m/s
L_{wa} = 25 dB (A)

Supply air nozzle VŠ-4

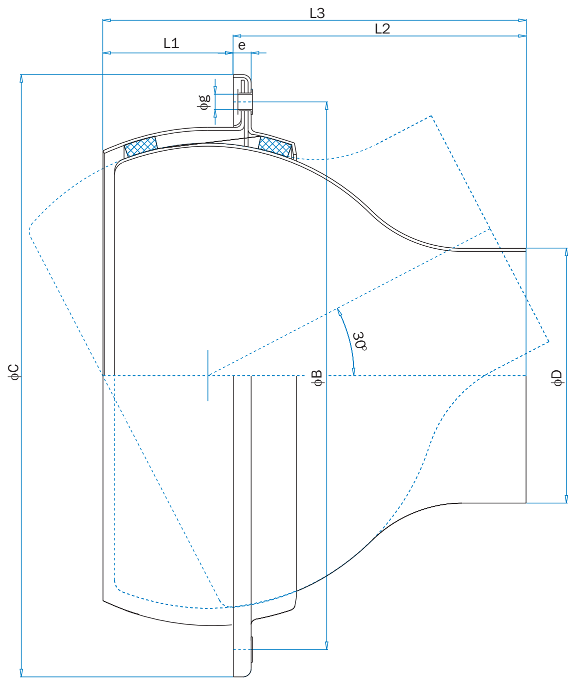
Application
VŠ-4 supply air nozzles are suitable for supplying either cold or warm air into rooms in applications requiring large throw distances and low noise levels. By arranging several nozzles in a block, the throw distance can be increased accordingly. Several installation methods are applicable.

AI
RAL 9010
M
CD

Description
Supply air nozzles VŠ-4 are adjustable.
The air jet injection can be adjusted either:

- manually within ±30° in all directions or
- with electromotor within ±30° in vertical or horizontal direction.

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.

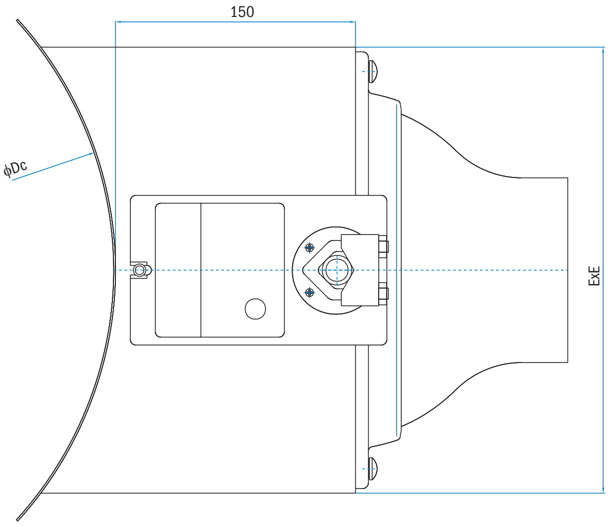


Sizes and dimensions

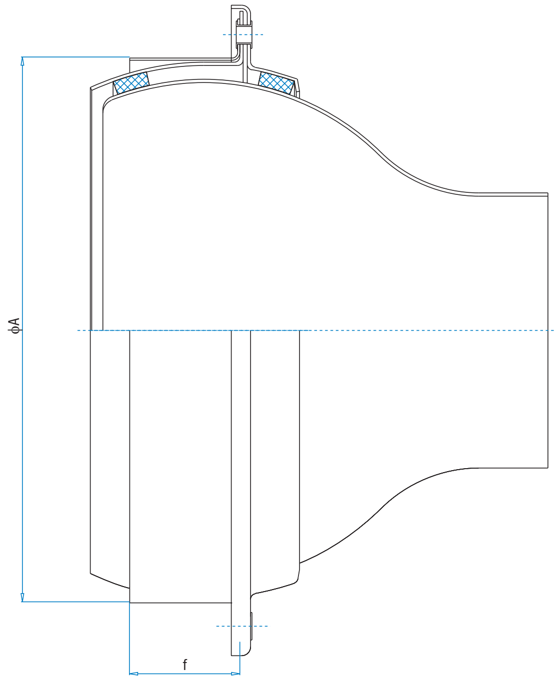
Size	ΦD	ΦB	Φc	e	L1	L2	L3	Φg	n	A_{ef} (m²)
80	80	175	196.5	7	43	96	139	6.5	3	0.004778
100	100	215	236.5	7	51	115	166	6.5	3	0.007543
125	125	265	286.5	7	52	142	194	6.5	3	0.011882
160	160	340	361.5	9	75	180	255	6.5	4	0.019607
220	220	425	446.5	9	95	219	314	6.5	4	0.037325

n – number of fixing boreholes

VŠ-4/D/B



VŠ-4/E



Installation methods

- Mounting on a circular duct (marking **D**)
- Mounting on a tube (marking **E**)

Size	ExE	ΦDc$_{min}$	ΦA	f
80	200	200	158	40
100	240	250	198	40
125	290	300	248	40
160	365	380	313	40
220	450	500	398	65

When ordering, please specify ΦDc.

Ordering key

VŠ-4/D 300/B Size 125

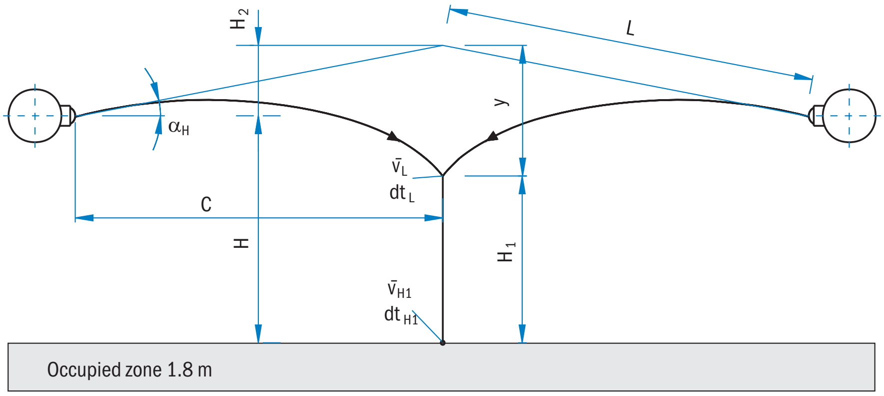
Standard sizes 80, 100, 125, 160, 220

R Manual adjustment
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

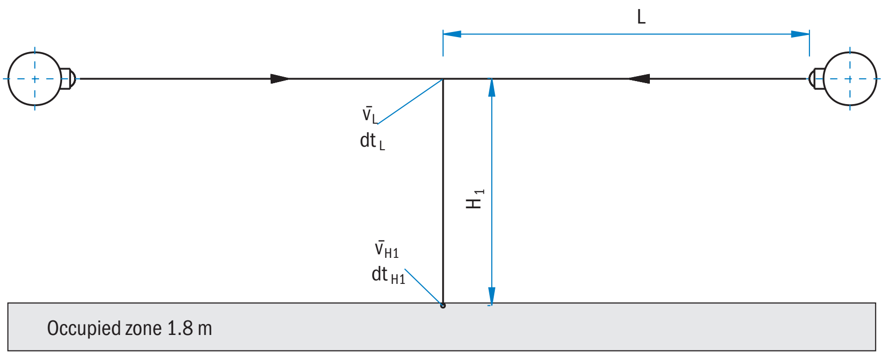
Duct diameter Φc

D Mounting on a round duct
E Mounting on a tube

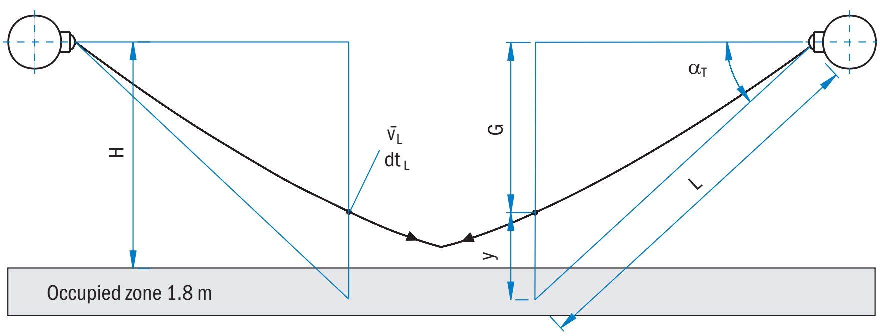
Cooling



Isothermal ventilation



Heating



Definition of symbols

L (m)	Throw distance in isothermal condition
α_H (°)	Set angle in cooling mode
α_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

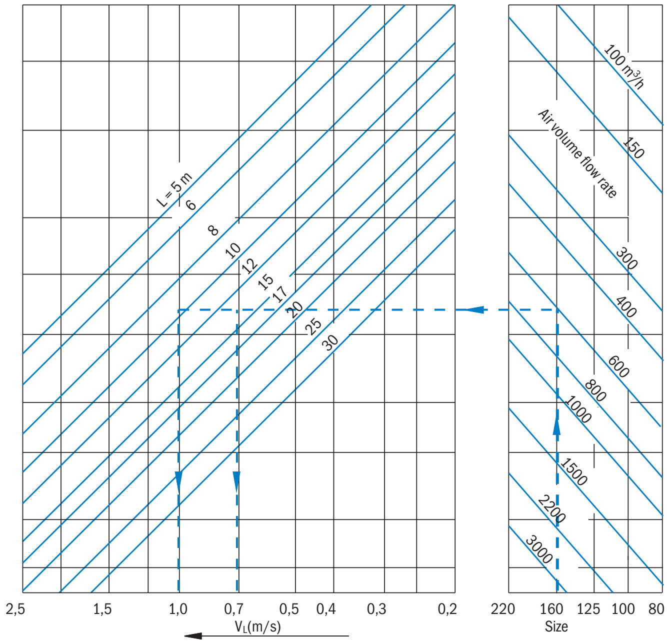


Diagram 2: Air jet deflection

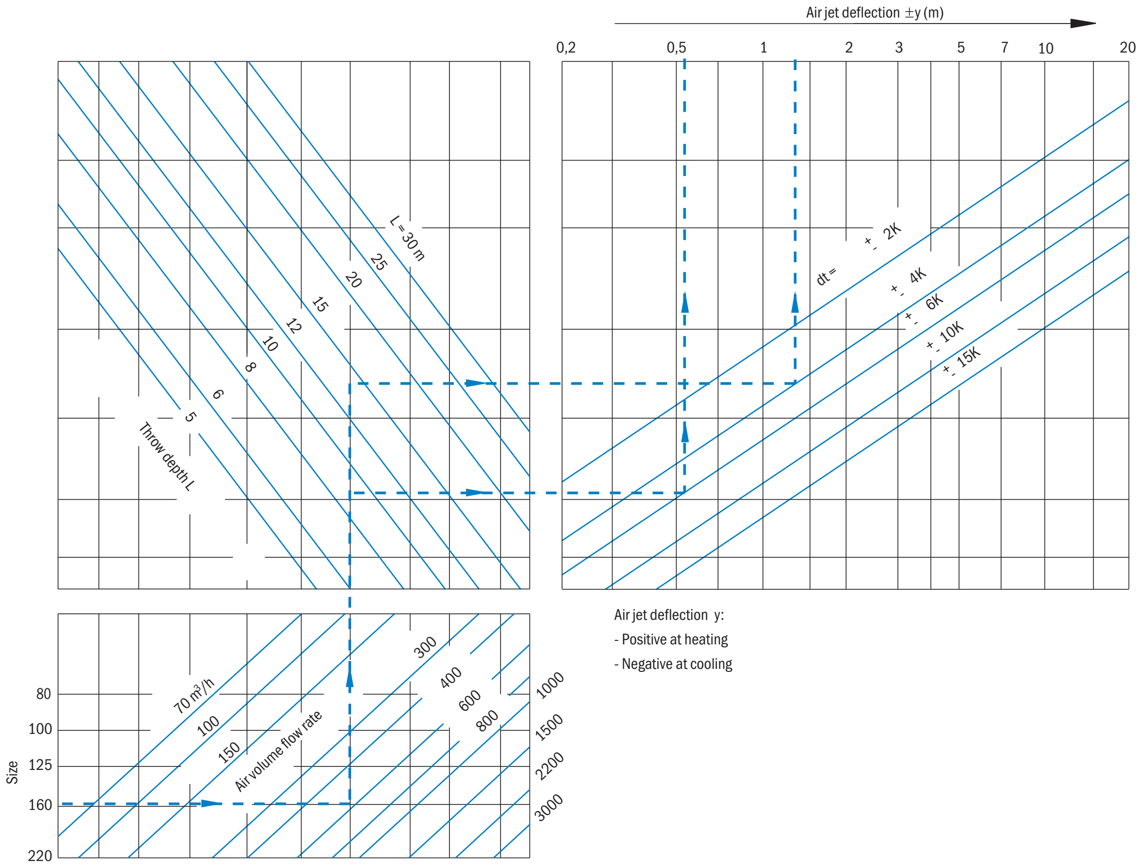


Diagram 3: Velocity at the air jet axis

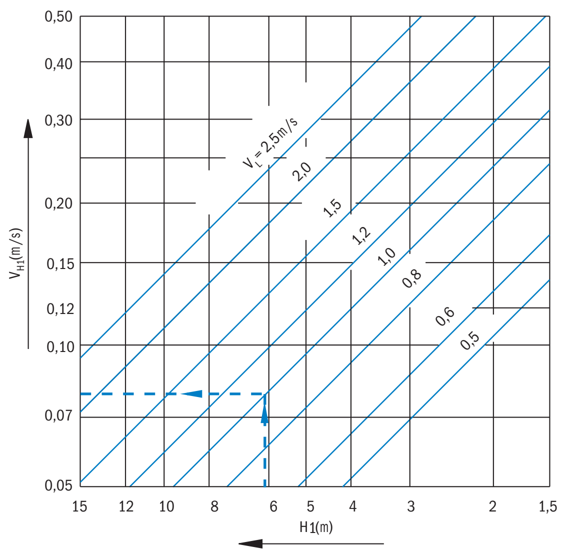


Diagram 4: Temperature quotient

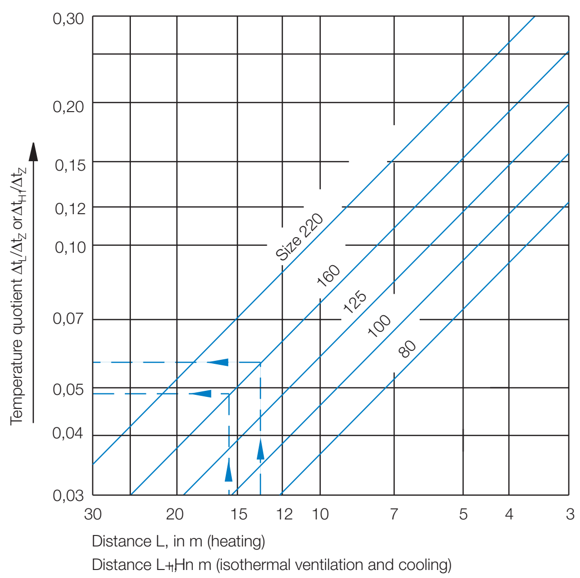


Diagram 5: Pressure drops and sound levels

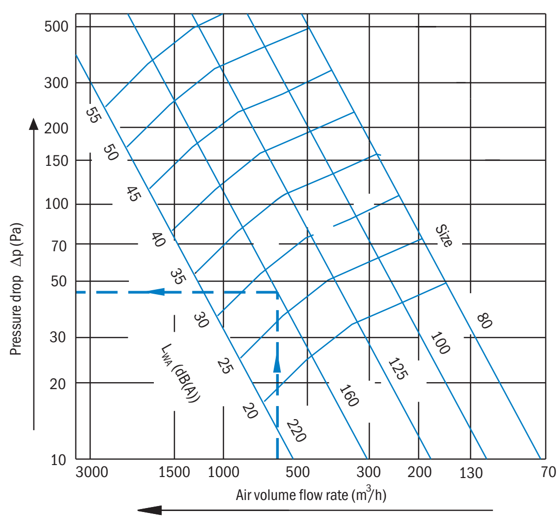
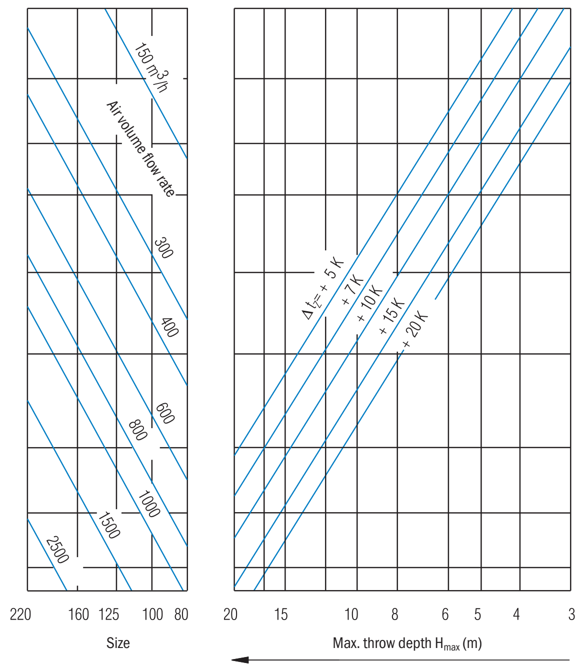


Diagram 6: Maximum warm air throw depth at vertical supply



Calculation example
with regard to different air supply angles

Cooling (α_H)

a) Select air supply angle (α_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 $\frac{\Delta t_L}{\Delta t_Z}$:

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

Calculation example
Isothermal ventilation

Apply diagram 1 and 3.

Heating (α_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:

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

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

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

Note:
In the case of the distance between nozzles smaller than 0,14 x C, velocity v_L and Δt_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)
Δt_z = -6K (summer)
Δt_z = +4K (winter)
Selected: nozzle VŠ-4, size 160

Cooling: $(-\alpha_H) = 10°$
a) Distance L:L = c/cos α = 9/0.985 = 9.14 m (table 1)
b) Height H_2: $H_2 = tg(\alpha_H)$ x 9= 0.176x9=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: $H_1 = H + H_2 - y$ 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 x (-6)= -0.288 K

Heating: (Φ)
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 (α_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:

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

f) From diagram 5, sound power level L_{WA} at the source can be established:
L_{WA} = 27 dB(A)
Δp_t = 43 Pa

Table 1

α_H	$\cos(\alpha_H)$	$tg(\alpha_H)$	α_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

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:

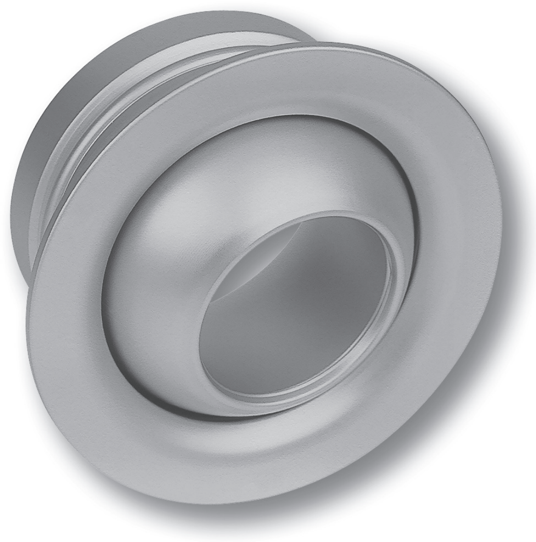
- manually, in all directions, within a ±30° range
- by means of an electric motor or thermostat element, in horizontal and vertical direction, within a ±30° range.

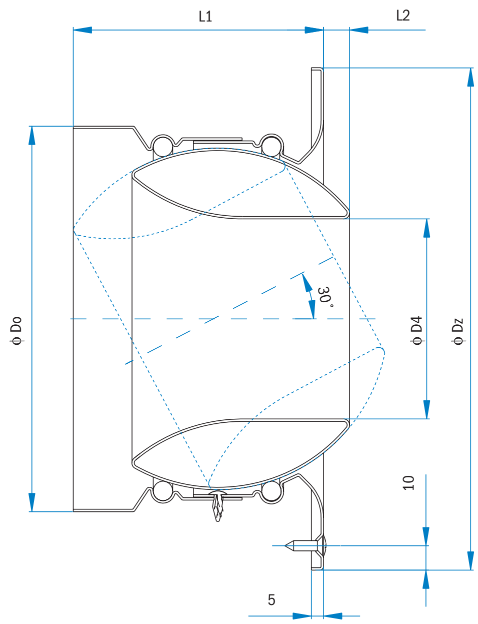
The nozzle setting depends on the supplied air temperature.

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.

AI
RAL 9010
M
CD





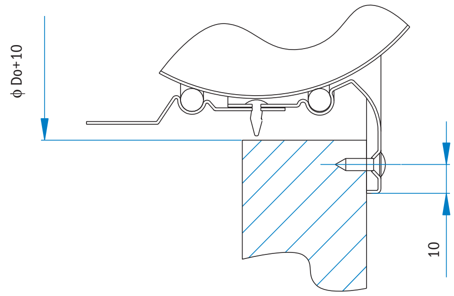
Sizes and dimensions

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:

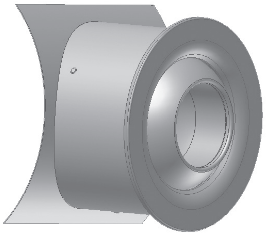
- **Standalone nozzle (V)**
  A nozzle without extensions is mounted by means of three bolts from its face. The mounting opening dimension is ΦDo+10mm.

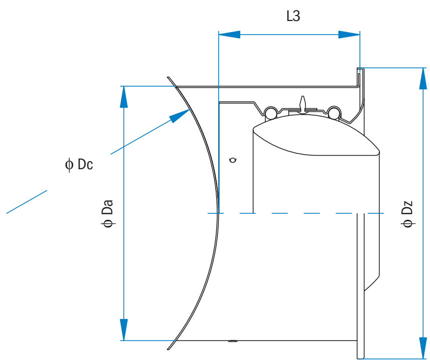


- **Mounting with extensions (designations D,K,E)**
  Visible nozzle mounting by means of an extension. The nozzle is supplied with the extension already installed. The installation technician mounts the extension to a round or rectangular duct by means of rivets or self-tapping screws. On customer's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

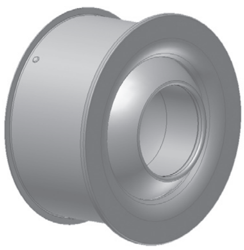
  The extension is mounted separately. A standard dimension duct is attached to the extension connector.

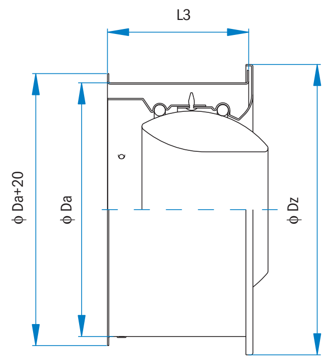
Mounting to a round duct (D)



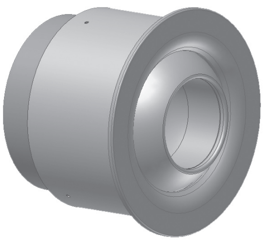


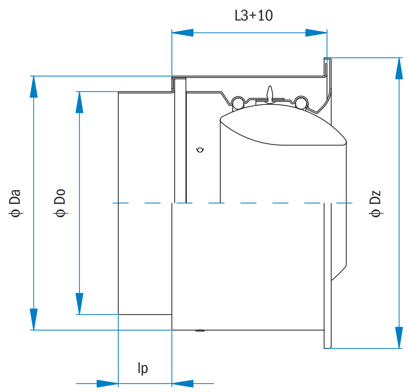
Mounting to a rectangular duct (K)



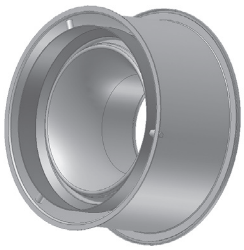


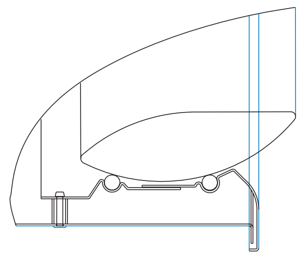
Mounting with a connector to a duct (E)





- **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.

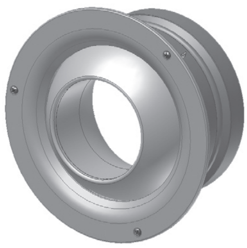




Size	ΦDo	ΦDz	ΦDa	ΦDa+20	L3	ΦDc min	lp
100	98	146	118	138	90	125	63
125	123	171	143	163	95	150	63
160	158	206	178	198	100	180	63
200	198	252	224	244	110	224	83
250	248	312	284	304	120	315	78
315	313	377	349	369	150	355	78
400	398	472	444	464	170	450	73

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

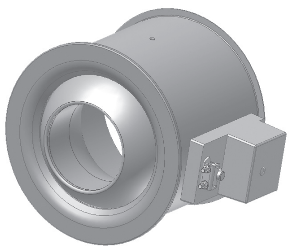
  J4 motor Joventa DAS 1

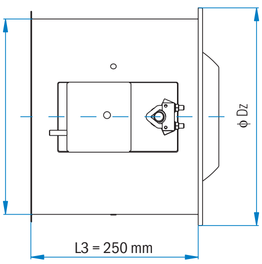
  J5 motor Joventa DAS 2

  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

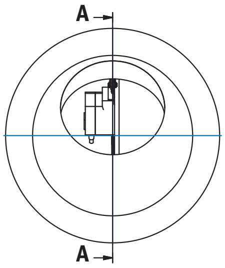
  B2 LH motor Belimo LH 230A 100

  B3 LH motor Belimo LH 24A SR

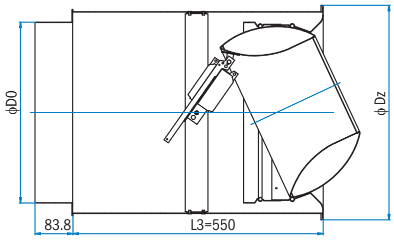
  B4 LH motor Belimo LH 24A MP100

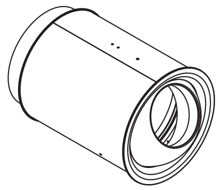
  Variants D, K and E available.

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



A-A (0,25 : 1)



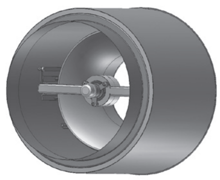


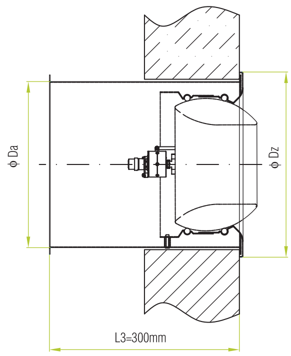
- **Termostatic regulation**

  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

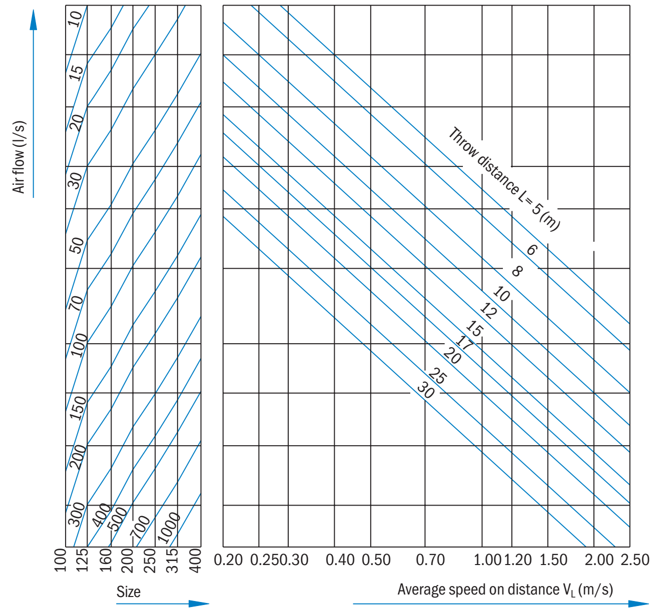
C0 Eloxal treated, in the original Al colour (C0)
RAL Standard RAL 9010 (30 % gloss)
(on customer's request, any RAL scale colour)

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*	

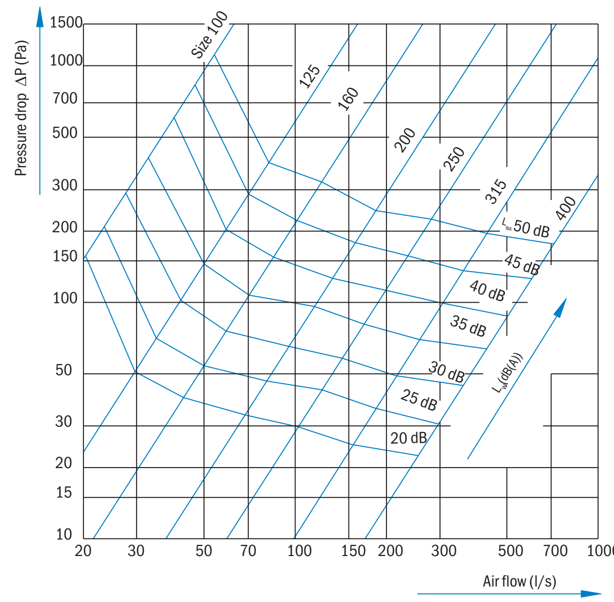
V Nozzle without extension – mounting with three bolts
D mounting to a round duct (specify Φc in the order)
K mounting to a rectangular duct
E mounting with a connector to a duct

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

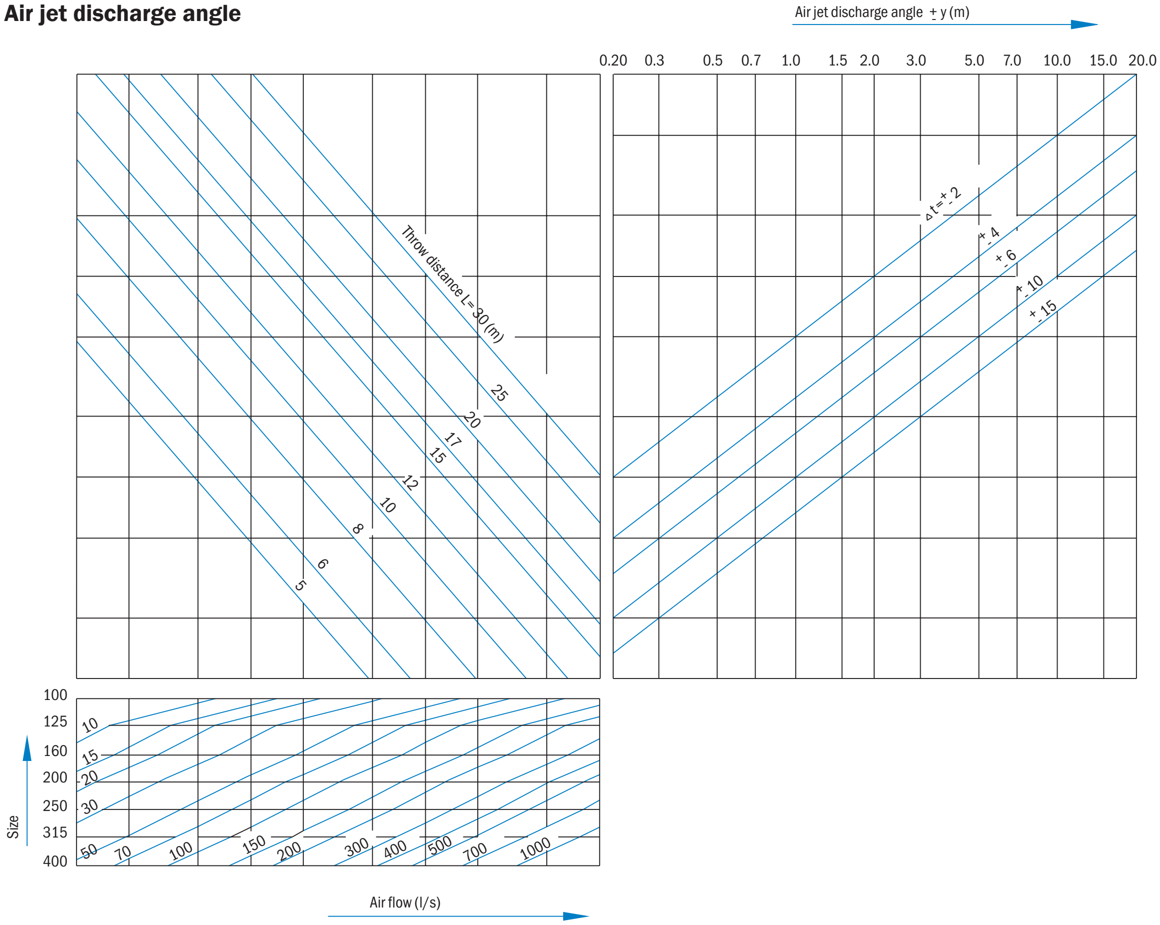
Air velocity in the air jet centre and throw distance



Pressure drops and noise levels



Air jet discharge angle



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