

# 07



Protection louvres



Supply air/exhaust  
air towers



# External elements

Protection louvres are installed in building fronts (in supply and exhaust air openings) as a protection against the direct ingress of rain, birds, bigger insects etc. They are suitable for all low pressure air-conditioning, heating and ventilation.

Air towers are used for the supply and exhaust of air.

- VENTILATING GRILLES,  
VENTILATING VALVES
- CIRCULAR DIFFUSERS,  
SQUARE DIFFUSERS
- SWIRL DIFFUSERS,  
VARIABLE SWIRL DIFFUSERS
- SLOT DIFFUSERS,  
ROUND DUCT DIFFUSERS
- AIR DISPLACEMENT  
UNITS
- SUPPLY AIR NOZZLES
- EXTERNAL ELEMENTS
- AIR FLOW  
CONTROL UNITS
- SOUND ATTENUATORS,  
SOUND ATTENUATING  
LOUVRES

# Overview

## ■ Protection louvres

Protection louvres are installed in building fronts (in supply and exhaust air openings) as a protection against the direct ingress of rain, birds, bigger insects etc. They are suitable for all low pressure air-conditioning, heating and ventilation. They are made of galvanised steel or aluminium in numerous standard or special dimensions.

### Protection louvres



AZR-3



AZR-4



JZR-6



OZR-1

## ■ Supply air/exhaust air towers

Air towers are used for the supply and exhaust of air. Various construction types can be made of different materials and in different dimensions according to the customer's request.

### Supply air/exhaust air towers



SP - round



SP - rectangular

# Content

	Page
<b>PROTECTION LOUVRES</b>	<b>278</b>
Aluminium protection louvres AZR-3	278
Aluminium protection louvres AZR-4	280
Steel protection louvres JZR-5, JZR-6, JZR-8	282
Circular protection louvres OZR-1	284
<b>SUPPLY AIR/EXHAUST AIR TOWERS</b>	<b>286</b>
Round supply air/exhaust air tower SP	286
Rectangular supply air/exhaust air tower SP	289

VENTILATING GRILLES, VENTILATING VALVES
CIRCULAR DIFFUSERS, SQUARE DIFFUSERS
SWIRL DIFFUSERS, VARIABLE SWIRL DIFFUSERS
SLOT DIFFUSERS, ROUND DUCT DIFFUSERS
AIR DISPLACEMENT UNITS
SUPPLY AIR NOZZLES
<b>EXTERNAL ELEMENTS</b>
AIR FLOW CONTROL UNITS
SOUND ATTENUATORS, SOUND ATTENUATING LOUVRES

# Protection louvres

## Aluminium protection louvres AZR-3

### Application

Aluminium protection louvres AZR-3 are suitable for all low pressure air-conditioning, heating and ventilation where supply and exhaust openings require protection against the direct ingress of rain, birds, bigger insects etc.

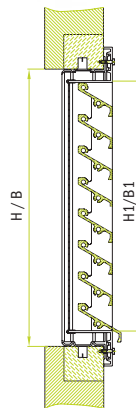
### Description

Aluminium protection louvres AZR-3 are made of extruded aluminium sections galvanised in natural aluminium colour. They consist of supporting frame and specially shaped horizontal vanes and protection screen of galvanised wire. They feature esthetical external appearance.

### Standard sizes

All combinations of B1 and H1 according to the table of dimensions are possible.

Non-standard dimensions are available on request.

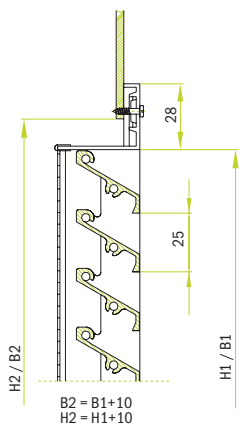


### Sizes AZR-3

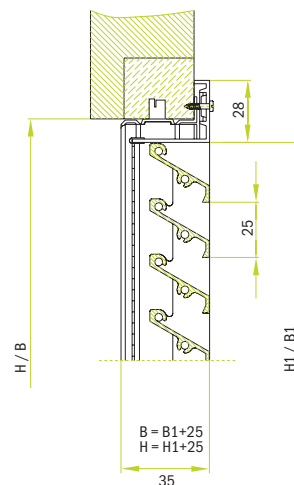
H1 (mm)	100	150	200	250	300	400	500	600	700	800	900	1000	1100	1200
B1 (mm)			200	250	300	400	500	600	700	800	900	1000	1100	1200
n	4	6	8	10	12	16	20	24	28	32	36	40	44	48

n - number of vanes

### Installation types



Protection louvre is fixed with screws directly on duct.  
Designation: AZR-3



Protection louvre is fixed with screws to the built-in frame made of steel angle.  
Designation: AZR-3/2



### Aluminium Protection louvres AZR-4

#### Application

Aluminium protection louvres AZR-4 are suitable for all low pressure air-conditioning, heating and ventilation where supply and exhaust opening require protection against the direct ingress of rain, birds, bigger insects etc.

#### Description

Aluminium protection louvres AZR-4 are made of extruded aluminium sections galvanised in natural aluminium colour. They consist of supporting frame and specially shaped horizontal vanes and protection screen of galvanised wire. They feature esthetical external appearance.

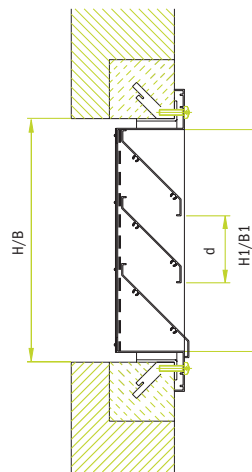
#### Standard sizes

All combinations of B1 and H1 according to the table of dimensions are possible.

Non-standard dimensions are available on request.

In the case of order where we proceed from the dimension of the hole in the wall or the dimension of the duct, the following combinations of B2 x H2 are possible:

- B2: 200, 300, 400, ..., 2000
- H2: 200, 300, 400, ..., 2000

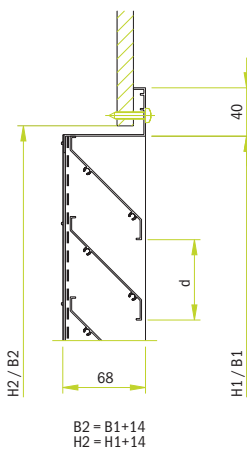


#### Sizes AZR-4

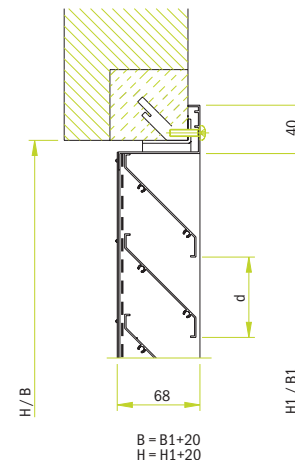
H1 (mm)	200	250	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000
B1 (mm)	200	250	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000
n	3	4	4	6	7	8	9	11	12	14	15	16	18	19	21	22	23	25	26	27

n - number of vanes

#### Installation types



Protection louvre is fixed with screws directly on duct.  
Designation: AZR-4



Protection louvre is fixed with screws to the built-in frame made of steel angle.  
Designation: AZR-4/3



**Steel protection louvres JZR-5, JZR-6, JZR-8**

**Application**

Steel protection louvres JZR-5, JZR-6 and JZR-8 are suitable for all low pressure air-conditioning, heating and ventilation where supply and exhaust opening require protection against the direct ingress of rain, birds, bigger insects etc.

**Description**

Steel protection louvres JZR-5, JZR-6 and JZR-8 consist of supporting frame and specially shaped horizontal vanes made of galvanised sheet steel with attached protection screen of galvanised wire. At customer's request, steel protection louvers can be powder painted.

Steel protection louvers JZR-5 are classical protection louvers, the only difference being a clearance between the blades, which equals 50 mm, with the depth of the louvers being 50 mm and the width of the edge being 28 mm. Due to their appearance (smaller clearance), they are suitable for smaller openings.



**Dimensions JZR-5**

Within the range B1 x H1 from 200 x 100 to 1500 x 1000, we produce louvers of optional dimensions.

**Dimensions JZR-6 in JZR-8**

All combinations of B1 and H1 according to the table of dimensions are possible.

Non-standard dimensions are available on request.

**Sizes JZR-5**

<b>H1 (mm)</b>	100	150	200	250	300	400	500	600	700	800	900	1000							
<b>B1 (mm)</b>			200	250	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500		
<b>n</b>	2	3	4	5	6	8	10	12	14	16	18	20							

n - number of vanes

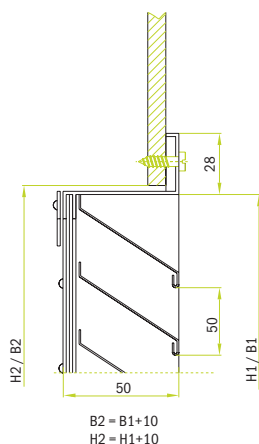
**Sizes JZR-6, JZR-8**

<b>H1 (mm)</b>	200	250	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000
<b>B1 (mm)</b>	200	250	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000
<b>n</b>	3	3	4	5	7	8	9	11	12	13	15	16	17	19	20	21	23	24	25	27

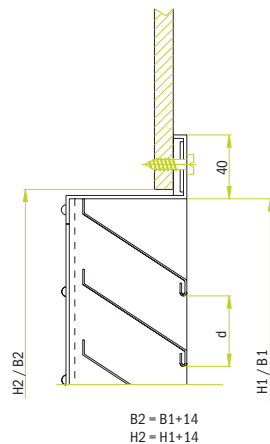
n - number of vanes

**Installation types**

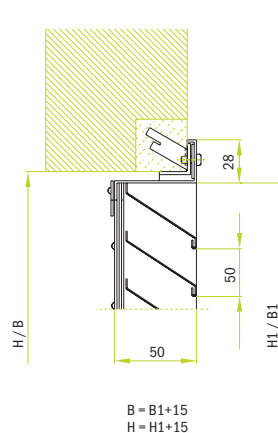
**JZR-5**



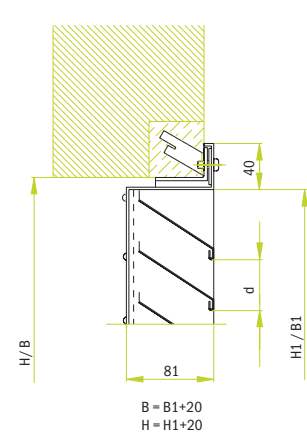
**JZR-6, JZR-8**



**JZR-5/2**



**JZR-6/3, JZR-8/3**



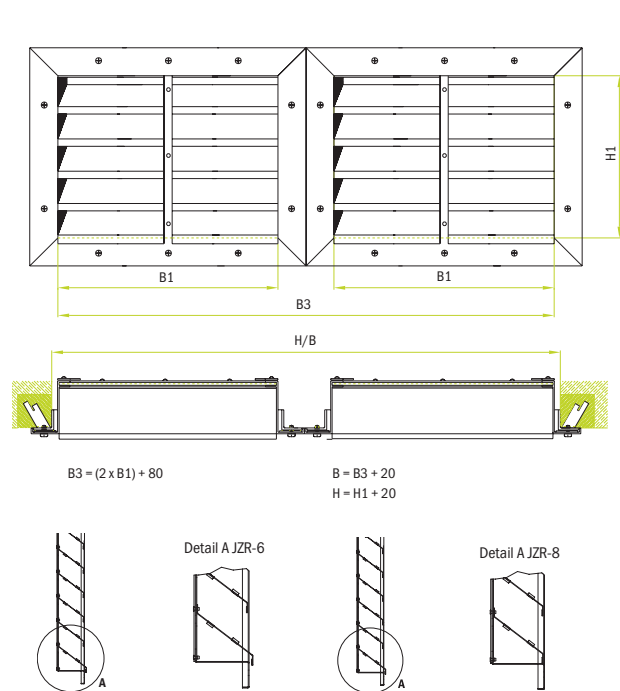
Protection louvre is fixed with screws directly on duct.  
Designation: JZR-5, JZR-6, JZR-8

Protection louvre is fixed with screws to the built-in frame made of steel angle.

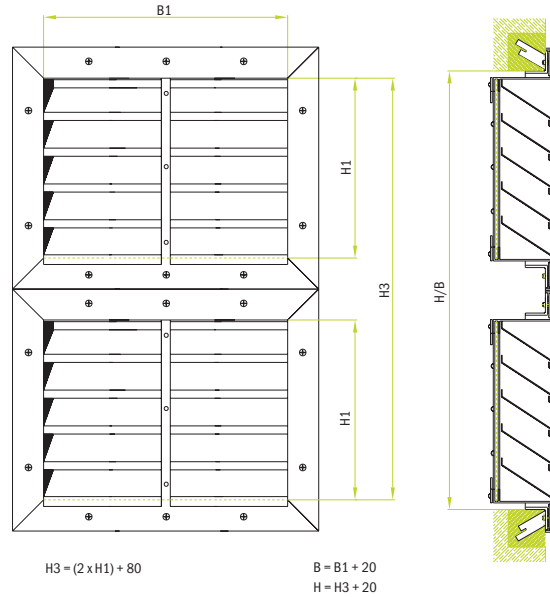
Designation: JZR-5/2, JZR-6/3, JZR-8/3

### Installation of larger aluminium protection louvres JZR-6 and JZR-8

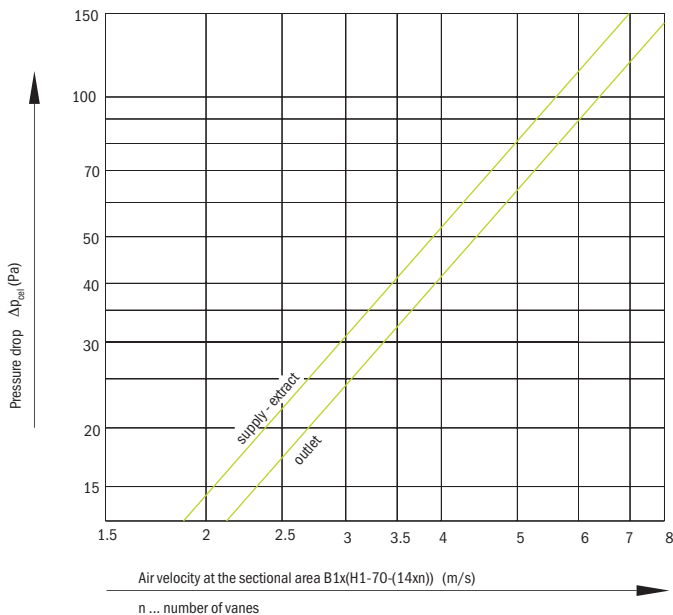
**The combination by width:**  
Max. width B1 = 2000mm



**The combination by height:**  
Max. height H1 = 2000 mm



### Pressure drop diagram



Use the diagram to determine the total pressure drop in respect of air velocity at the free sectional area.

### Example of calculation

#### JZR-5

$A_{ef} = B_1 \times (H_1 - 40 - (14 \times n))$  expressed in  $m^2$  where n is a number of vanes.

$B_1 = 500$  mm,  $H_1 = 400$  mm,  $n = 8$

$Q = 1000$   $m^3/h$

$A_{ef} = 500 \times (400 - 40 - (14 \times 8)) = 124000$   $mm^2 \Rightarrow 0,124$   $m^2$

$v = (Q / 3600) / A_{ef} = (1000 / 3600) / 0,124 = 2,24$   $m/s$

$\Delta p_{cel}$ from diagram	Supply	18 Pa
	Outlet	<12 Pa

#### JZR-6 and JZR-8

$A_{ef} = B_1 \times (H_1 - 60 - (14 \times n))$  in  $m^2$  where n is a number of vanes.

$B_1 = 1600$  mm,  $H_1 = 1800$  mm,  $n = 34$

$Q = 20000$   $m^3/h$

$A_{ef} = 1600 \times (1800 - 60 - (14 \times 34)) = 2022400$   $mm^2 \Rightarrow 2$   $m^2$

$v = (Q / 3600) / A_{ef} = (20000 / 3600) / 2 = 2,7$   $m/s$

$\Delta p_{cel}$ from diagram	Supply	25 Pa
	Outlet	20 Pa

### Ordering example

Steel protective louvre with

installation frame: **JZR-6/3 B1xH1**

Size: **B1 = 1600 H1 = 1800**

Pcs: **4**

### Circular protection louvres OZR-1

#### Application

Circular protection louvres OZR-1 are suitable for all low pressure air-conditioning, heating and ventilation where supply and exhaust opening require protection against the direct ingress of rain, birds, bigger insects etc.

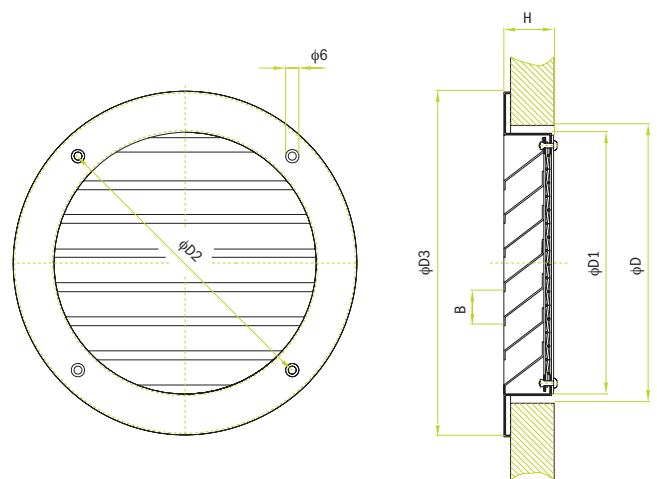
#### Description

Circular protection louvres OZR-1 consist of supporting frame and specially designed horizontal vanes. They are made of sheet steel or sheet aluminium and screen of galvanised steel wire. Upon customer's wish, they can be coloured in any colour or galvanized.

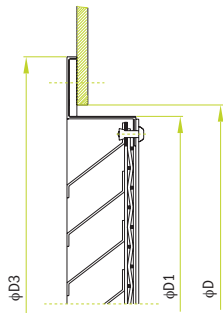


#### Standard sizes

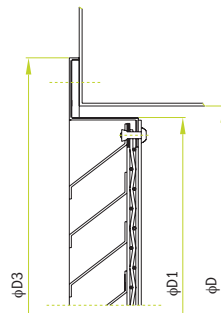
Size	ΦD	ΦD1	ΦD2	ΦD3	B	H
160	160	150	178	208	27.5	32
200	200	190	218	248	25	32
250	250	240	268	298	25	32
315	315	305	333	363	26.5	32
355	355	345	373	403	25.4	32
400	400	390	419	450	25	32
500	500	490	519	550	25	40
630	630	620	649	680	25.2	40
800	800	790	819	850	25	40



#### Installation types



Protection louvre is screw-connected directly to wall or duct.



Protection louvre is screw-fastened to the round duct via the flange.



# Supply air/exhaust air towers

## ■ Circular supply air/exhaust air tower SP

### Application

Towers SP are designed for supply and exhaust of air from rooms. In case of high noise level, air displacement tower can be fitted with sound attenuator.

### Description

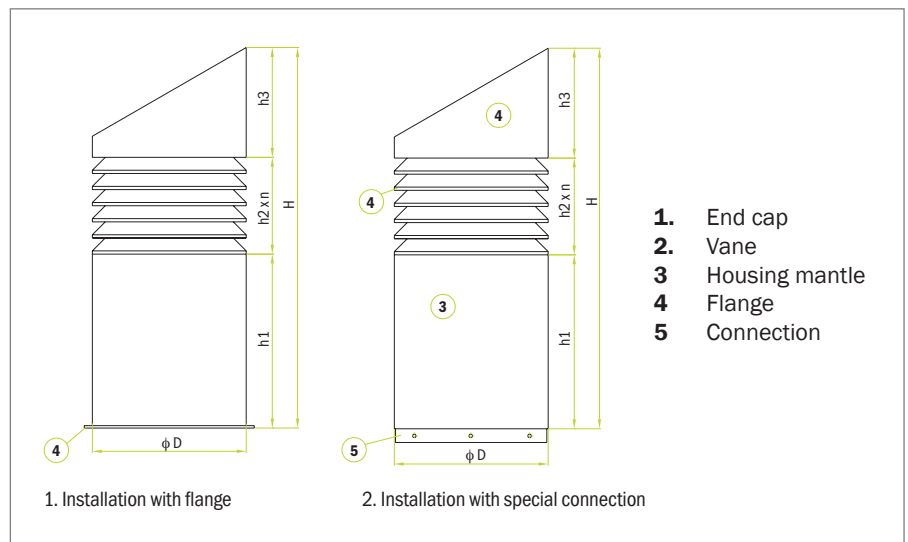
They are available in circular and square versions. They consist of three parts:

- **Housing mantle** with attached flange or special connection
- **Vane** is fitted at any height and under any inclination. Number of blades depends on required effective area.
- **Cap** is available in three forms: (flat, pointed or inclined).

Materials and dimensions of product are determined by the customer. Possible materials & colours: aluminium, steel or rust-resistant coated (polished). Air displacement towers can be painted in any RAL colour.

### Types of installation

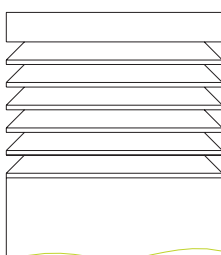
Tower is installed via the flange or special connection. If special connection is being used, air displacement tower is fixed on concrete duct with screws.



## Types of end cap

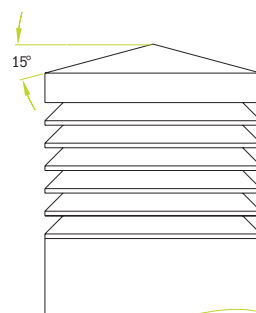
### Type 1

Flat end cap



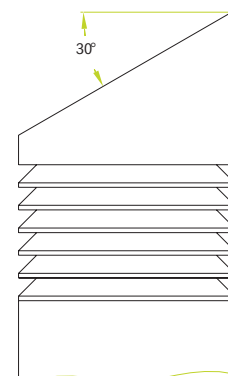
### Type 2

Pointed end cap: inclination 15°



### Type 3

Inclined end cap: inclination 30°



Dimensions

Size	d	d1	d2	d3	h3		
					Cap1	Cap2	3
140	137	113	173	233		88	149
200	193	170	230	290		96	181
250	249	225	285	345	70	103	214
300	305	281	340	400		111	246
360	361	336	396	456		118	278
400	400	395	455	515		124	301
500	500	495	555	615		137	359
700	700	695	755	815		164	474
900	900	895	955	1015		191	589
1000	1000	995	1055	1115		204	647
1300	1300	1295	1355	1415		244	820

Note: Air tower SP is also available in square or rectangular cross-sections (AxB).

Technical data

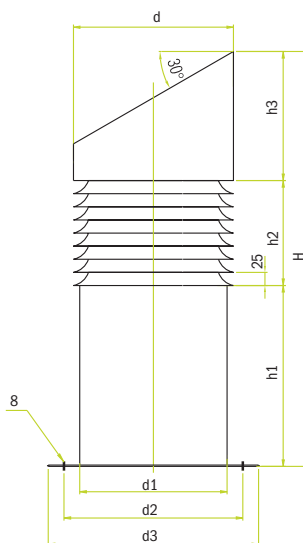
All necessary technical data are provided according to the project on the basis of the customer's requests (required dimensions, air flow, etc.).

Variant with the sound attenuator

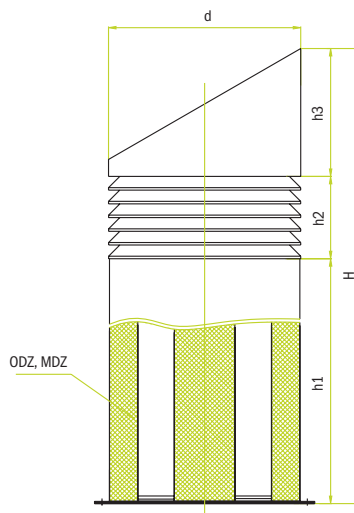
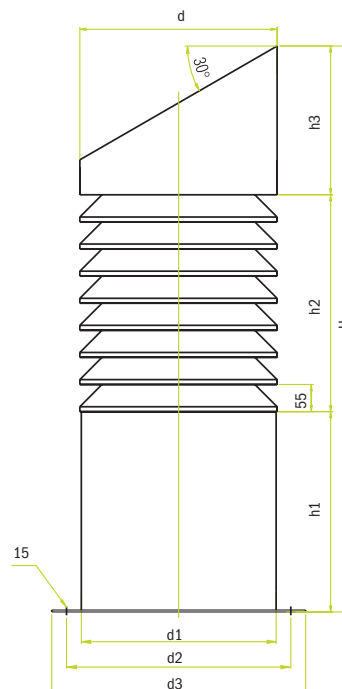
The sound attenuator is mounted in the housing mantle of the supply air/exhaust air tower.

For the determination of technical data, see the chapter: Sound Attenuators, Type MDZ.

Sizes 140-360

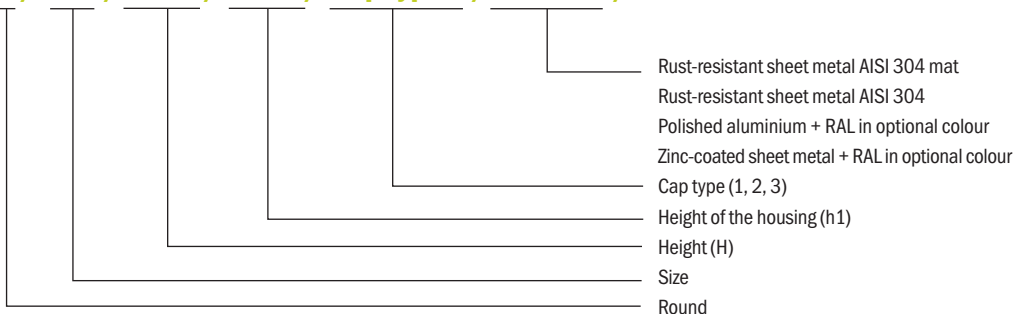


Sizes 400-1300



Ordering key

SP-R / 400 / 1851 / 1000 / Cap type 3 / material / flow rate



ODZ and MDZ on customer's request.  
When d>400, vanes are made of aluminium.

Print out of selection programme

Supply	Velocity in duct	Return
●	2.00	●

Maximal velocity can not exceed 10m/s.

Input data		
Q	3000	m <sup>3</sup> /h
v <sub>ef</sub>	3.30	m/s

Maximal effektiv velocity can not exceed 4m/s.

d	895	mm
h1	1000	mm
Maximal number of vanes is 17.		
n	5	kos
h2	275	mm
h3	587	mm
h	1862	mm

Total height is to big. Strengthened flange. Lying transport.

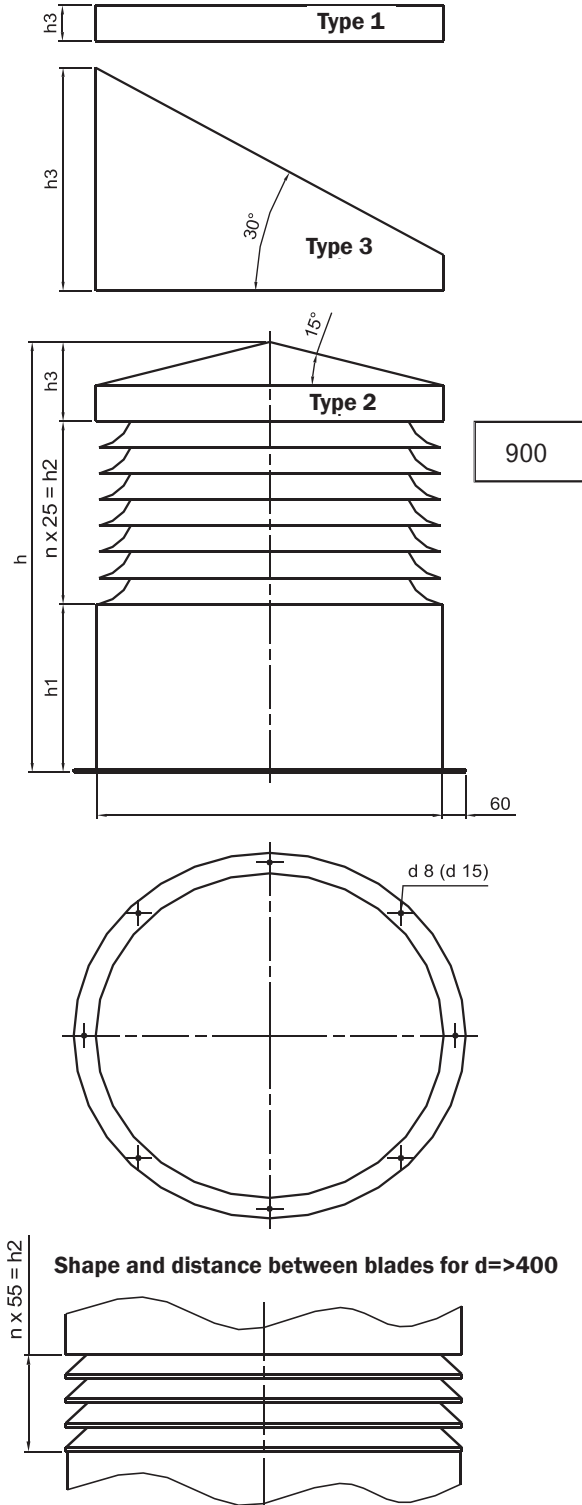
Cap		
Type 1	Type 2	Type 3
○	●	○

Material	
d>=400 vanes are always made of aluminium and coloured.	
Housing	
galvanized steel+powder coated	●
aluminium+powder coated	○
stainless steel ASI 304 matt	○
stainless steel ASI 304 polished	○

Pressure drop Δp [Pa]
4

Sound power level LWA [dB(A)]
22

Discount in %	100
Price [EUR/pcs]	



**Rectangular supply/exhaust air tower SP**

**Application**

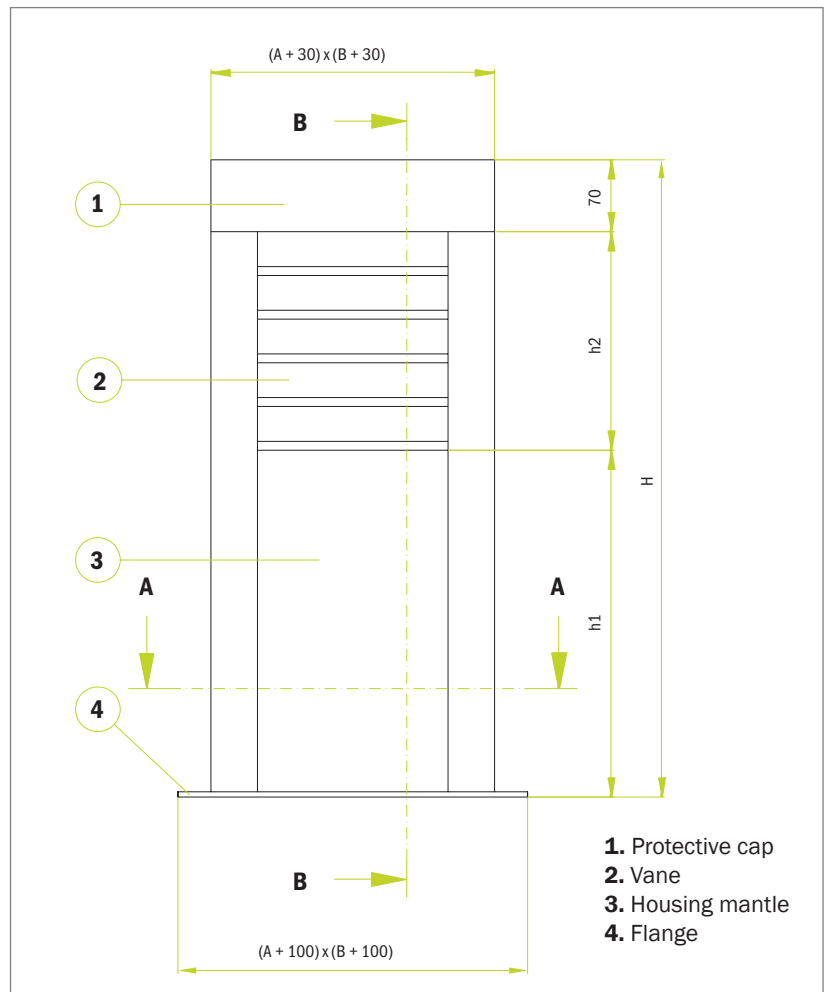
Air towers are designed for the supply and exhausting of air.

**Description**

- Possible air flow up to 30000 m<sup>3</sup>/h.
- Construction elements are joined together so as to reduce the possibility of corrosion to the minimum.
- The vane provides protection from external influences, such as rain, birds and large insects.
- The flange is always manufactured from rust-resistant sheet metal.
- Uniform design of the end cap.
- The optional installation of a DZ-2 or DZ-3 sound attenuator, the calculation of attenuation is performed according to the project on the basis of the customer's requirements.
- The optional installation of fabric filters of filter class G3 or G4. The calculation of flow rates and the selection of the pre-filter is performed according to the project on the basis of customer's requirements. Optional filter replacement with a special door on the air tower housing mantle from the outside.

**Manner of installation**

Air towers are installed with flanges on the concrete duct.



**Definition of symbols**

- H** Total height of the air tower
- h1** Housing mandrel height
- h2** Vane height
- A x B** Nominal dimensions, as seen in the  
A – A cross-section

VENTILATING GRILLES,  
VENTILATING VALVES

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VARIABLE SWIRL DIFFUSERS

SLOT DIFFUSERS,  
ROUND DUCT DIFFUSERS

AIR DISPLACEMENT  
UNITS

SUPPLY AIR NOZZLES

**EXTERNAL ELEMENTS**

AIR FLOW  
CONTROL UNITS

SOUND ATTENUATORS,  
SOUND ATTENUATING  
LOUVRES

### Dimension limits

**H** The total height of the air tower is limited to 3000 mm  
**A x B** nominal dimensions are limited to a maximum of 1000 mm x 1000 mm and a minimum of 300 mm x 300 mm

### Maximum speed limit

#### Speed limit in the housing mantle, $v_{SP}$ :

Due to noise level and pressure drop, the speed is limited to  $v_{SP} \leq 10$  m/s.

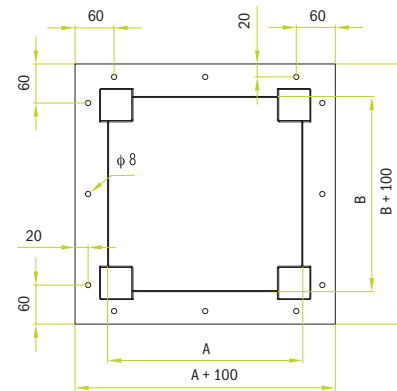
$$v_{SP} \leq 10 \text{ m/s}$$

$$v_{SP} \leq Q / ((A-0,08) * (B-0,08) * 3600) \text{ [m/s]}$$

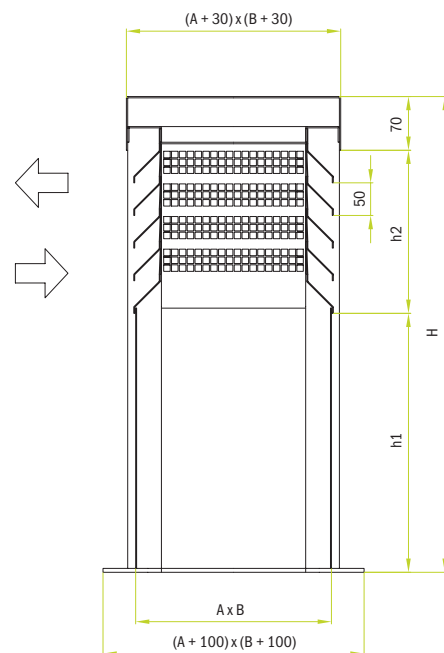
#### Speed limits on the vanes, $v_{EF}$ :

- maximum  $v_{EF}$  when supply 3 m/s
- maximum  $v_{EF}$  when exhaust 4 m/s
- optimal velocity is 2,8 m/s, in this case pressured drop < 60 Pa and small sound power level

**A-A cross section**



**B-B cross section**



### Definition of symbols

$v_{SP}$ [m/s]	speed in narrow part of housing
$Q$ [m <sup>3</sup> /h]	air flow
<b>A, B</b> [m]	nominal dimensions

### Number of vanes

The number of vanes  $n$  [/] depends on the nominal dimensions **A x B** [m], flow rate  $Q$  [m<sup>3</sup>/h] and speed on the vanes  $v_{EF}$  [m/s].

$$n = 1 + Q / (A_{VANE} * v_{EF}) \text{ [/]}$$

where the surface of one vane

$$A_{VANE} = ((2 * (A - 0,08) + 2 * (B - 0,08)) * 0,04 * 0,694 \text{ [m}^2\text{]})$$

The calculated number of vanes  $n$  is always rounded to the first whole value.

### Calculation of the total height

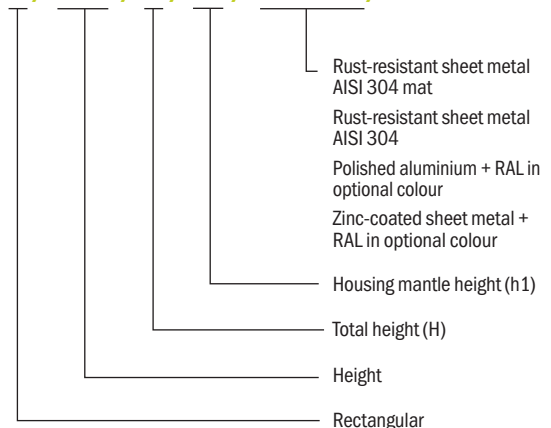
$$H = h1 + h2 + 70 \text{ mm [mm]}$$

where the height of vane part  $h2$  depends on the number of vanes  $n$ .

$$h2 = n * 50 \text{ mm}$$

### Ordering key

**SP - K / A x B / H / h1 / material / flow rate**



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ROUND DUCT DIFFUSERS

AIR DISPLACEMENT  
UNITS

SUPPLY AIR NOZZLES

EXTERNAL ELEMENTS

AIR FLOW  
CONTROL UNITS

SOUND ATTENUATORS,  
SOUND ATTENUATING  
LOUVRES