VZ-41-ZA

Combined supply- and extract air slot diffuser for wall

QUICK FACTS

- Installed as a single unit
- Designed for installation in plasterboard walls
- 1, 2, 3 or 4 slots
- High flexibility with the adjustable air deflectors
- Plenum box with horizontal or vertical duct connection

Swegon

Contents

Technical description

Design

The VZ-41-ZA combination diffuser provides space-saving and effective ventilation by integrating supply and extract air in a single compact product.

Designed as a linear slot diffuser with parallel rows of slots, the VZ-41-ZA has a profile width of 41 mm and is ideal for wall installation. The diffuser is available with 1 to 4 slots, to suit various design and air flow requirements. End pieces and end angles allow for versatile use of the slot diffuser, these can either be mounted on the right, left or both sides of the diffuser.

The diffuser is available with or without support profiles. The slot front rail is fitted with 75 mm long air deflectors featuring rectifier blades and double boomerang profiles, each individually adjustable.

Engineered specifically for installation in plasterboard walls, the plenum box includes acoustic lining to ensure effective sound absorption.

Functionality

Individually adjustable air deflectors on the slot diffuser allow for easy adjustment of the distribution pattern. The air deflectors enables either a uniform air discharge or multiple smaller streams that can be directed within a 180° range. By using smaller air discharge, a rapid velocity can be achieved and a temperature reduction.

Material and surface treatment

Slot diffuser

- Made of extruded aluminium profiles.
- Standard colour:
  - RAL 9003, signal white, gloss 70
- Alternative standard colours:
  - RAL 9010, pure white, gloss 30
  - RAL 9006, white aluminium, gloss 70
  - RAL 9005, jet black, gloss 70
  - RAL 7035, light grey, gloss 70

Air deflectors

- Made of impact-resistant plastic.
- Standard colour (similar to):
  - RAL 9005, jet black
- Alternative standard colours (similar to):
  - RAL 9003, signal white

Plenum box

- Made of galvanised steel.
- Available with perforated commissioning damper in the spigot.

Adaptation

- Other colours available on request.

Accessories

- 1 or 2 box variants.
- Traverse or clip attachment.
- Built-in sound insulation baffles.

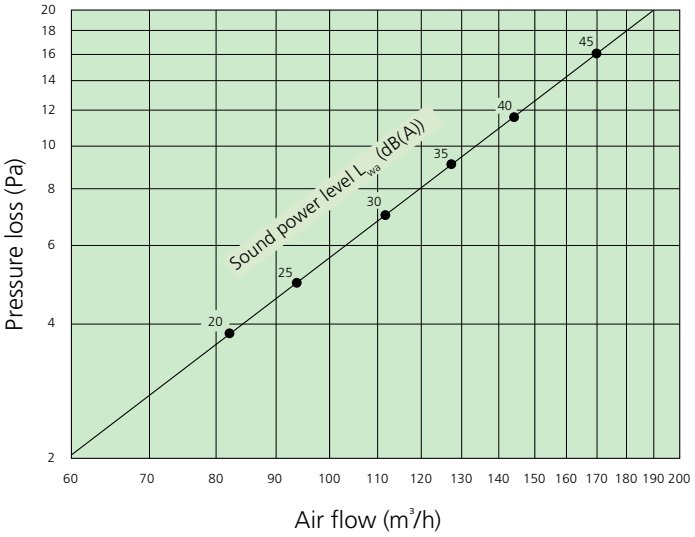
Planning

The recommended airflow range is between 50 m^3/h per metre and 150 m^3/h per metre with temperature differences of +4 K to - 12 K.

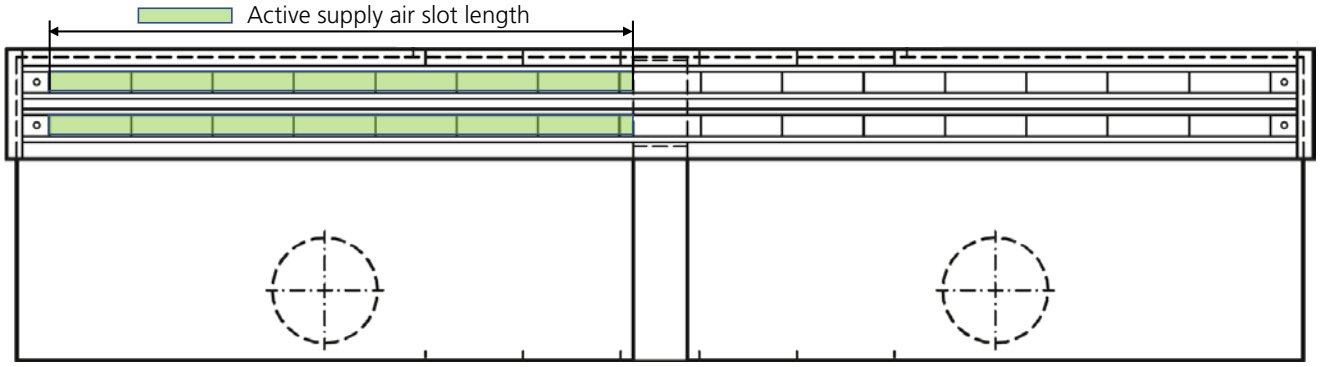
Technical data

Sizing diagram

VZ-41-ZA – 1 slot, supply air slot length: 1000 mm



If the active supply air slot length differs from 1000 mm or if more than one slot is used, the specific load per 1000 mm of active slot length must be determined. The flow data can then also be taken from the above diagram.



Calculation example:

Desired design: 2-slots, active supply air slot length 600 mm (total length 1200 mm).

Desired air flow: 120 m³/h.

⇒ Specific load per metre slot: 100 m³/h (estimated value for the above diagram).

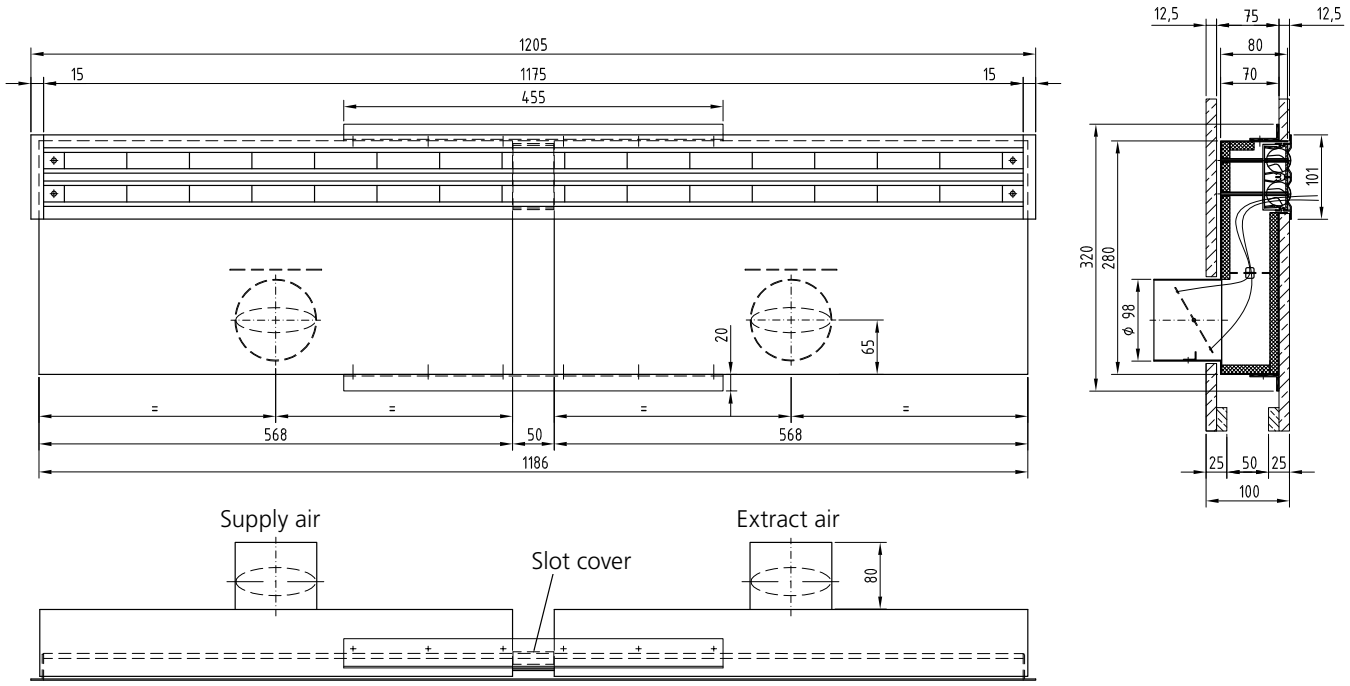
⇒ Δp ≈ 5.5 Pa; Lwa ≈ 30 dB(A)*.

*For more than one slot, the logarithmic addition of several sound sources for the sound power level must be observed.

Acoustic assessment
(Example VZ-41-ZA with 2 slots)

Description of the combined slot diffuser

The component is a two-part supply and extract air box connected by a common double slot rail. The width of the box is 1205 mm. The height of the box is 280 mm. The component is intended for installation in a cavity depth of 75 mm. The diameters of the extract and supply air spigots is 98 mm.



Determination of telephony sound insulation

In order to determine the telephony sound insulation, sound transmission was separated into the following three ranges as part of the present consideration:

- Sound transmission from the room via the slot diffuser to the spigot.
- Sound transmission from the plenum box spigot via the shared duct to the plenum box spigot in the adjacent space.
- Sound transmission from the air deflectors via the slot diffuser into the adjacent space.

While sound transmission is measured through the combination slot diffuser in accordance with DIN EN ISO 7235, sound transmission from the plenum box spigot to the adjacent plenum box spigot is calculated in accordance with VDI 2081.

Transmission loss of the combination slot diffuser

The transmission loss was determined according to DIN EN ISO 7235. The dimension was determined separately for sound transmission from the plenum box spigot to the space as well as from the space via the slot diffuser to the plenum box spigot.

Transmission loss from the plenum box spigot into the room

The transmission loss was determined by measurement in accordance with DIN EN ISO 7235 in the reverberation chamber in accordance with ISO 354. For this purpose, a speaker was connected to a duct with a diameter of 10 cm, which was routed from the outside through an opening in the door into the reverberation chamber. During reverberation, the sound level difference was measured in the reverberation chamber with and without the diffuser attached to the end of the duct section. The transmission loss D_t of the diffuser was then determined as follows:

$D_t = D_i + D_{td}$

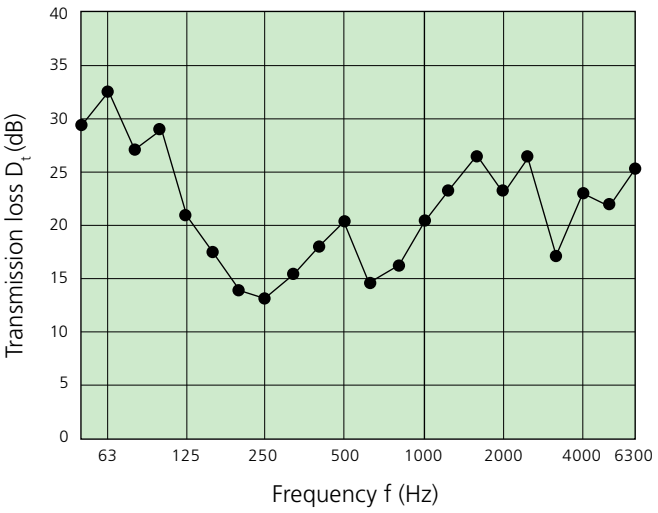
Where:

Di: Insertion loss of the air passage, i.e. sound level difference in the reverberation chamber with and without air passage.

Dtd: Theoretical transmission loss at the open end of a straight, fixed duct from equation B3 in DIN EN ISO 7235 (outlet correction).

The results are plotted as a function of frequency in third-octave bands in the following diagram.

Transmission loss from the plenum box spigot into the room



Transmission loss from the plenum box spigot of the slot diffuser to the room.

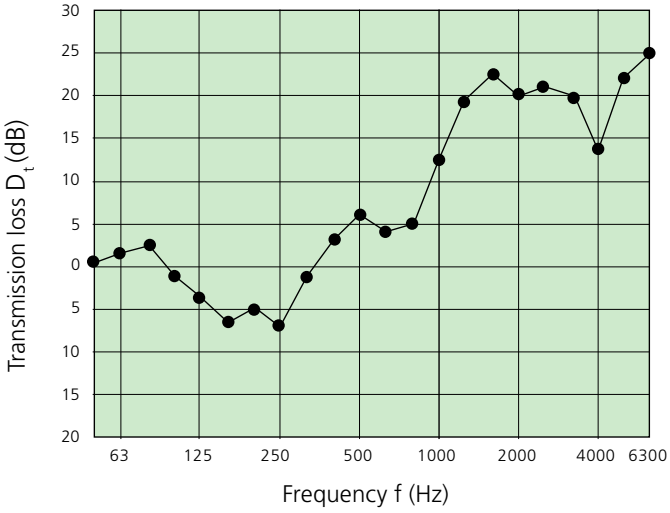
Transmission loss from the room to the plenum box spigot

The transmission loss from the room to the plenum box spigot was also determined by measurement in the reverberation chamber in accordance with ISO 354.

The measurement arrangement was comparable to the measurement arrangement to the left. However, the loudspeaker on the duct was replaced by a sump as a sink. Reverberation takes place with a dodecahedron in the reverberation chamber. In the present case, the transmission loss is determined from the sound level difference in the duct with open end and with the vent applied. No correction was made for the sound transmission into the mouth of the duct.

The measurement result is plotted in the following diagram as a function of frequency in third-octave bands:

Transmission loss from the room to the connection spigot



Transmission loss from the room to the plenum box spigot of the slot diffuser.

Telephony sound insulation

The element standard sound level difference $D_{n,e}$ as a measure for the telephony sound insulation is calculated taking into account Formula 61 from Sheet 1 to VDI 2081:

$$D_{n,e} = L_1 - L_3 + 10\,\lg\,(10\,m^2/\,A_3)\;mit$$

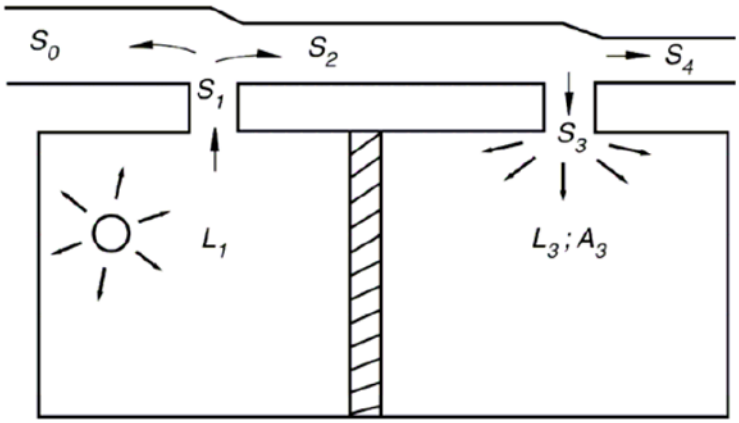
$$L_3 = L_1 + 10\,lg\,\frac{S_1 \times S_2 \times S_3}{(S_0 + S_2)\,(S_3 + S_4)\,A_3}$$

S: Inflow area

A: equivalent absorption area of the room

L: Sound pressure level in the room,

ΔLW level reduction through the duct network



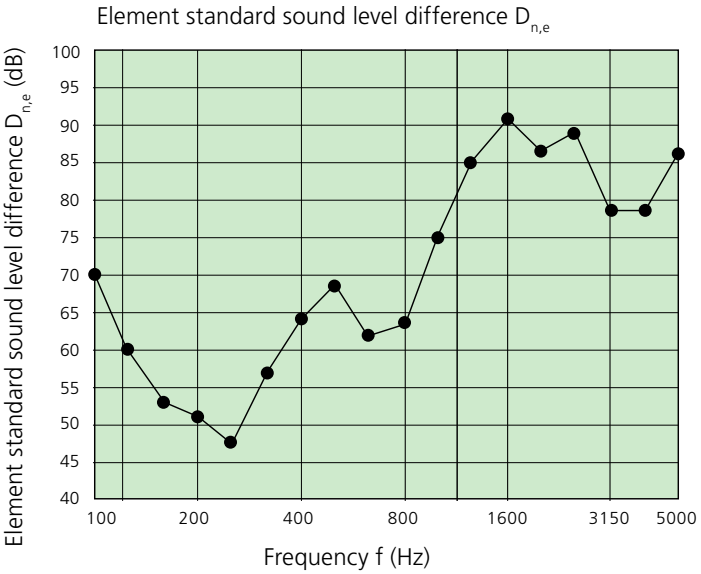
Excerpt from sheet 1 to VDI 2081.

The following areas were used for the calculations:

Cross-sectional area of the plenum box spigot: $S_1 = S_3 = \pi$ (0.05 m)^2

Cross-sectional area of the duct: $S_0 = S_2 = S_4 = 0.69$ m x 0.29 m

For the level reduction ΔLw, the addition of the transmission loss is set according to Fig. 3 and Fig. 4. No further attempts were made to reduce noise levels by means of deflection or damping on the straight section of the duct.



Element standard sound level difference $D_{n,e}$ as a measure of telephone sound insulation during transmission through the supply or extract duct.

Based on the data obtained from measurements and the planned installation configuration, taking into account telephonic sound transmission via both the supply- and extract air ducts, the following rated element standard sound level difference $D_{n,e,w}$ can be expected:

- Telephony sound insulation via the diffuser $Dn_{,e,w}$ = 65 dB

During the assessment, it must be noted that the telephony sound transmission occurs both through the supply air and through the extract duct. The information on the evaluated element standard sound level difference $Dn_{,e,w}$ is related to a reference area of 10 m^2.

Dimensions

Number of slots supply air + extract air	B (mm)	ø d (mm)	C (mm)	H (mm)	h (mm)
1	41	98	100	250	120
		123	100	250	145
2	81	123	100	280	145
		138	100	280	160
3	121	138	100	340	160
		158	100	340	180
4	161	158	100	420	180
		198	100	420	220

The specified measurements refer to the external dimensions (mm). These can be adjusted within functional limits to meet specific requirements.

L1 = Spigot length 50 mm.

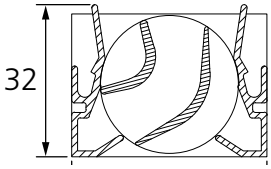


Figure 1. 1-slot, without support profiles (mm).

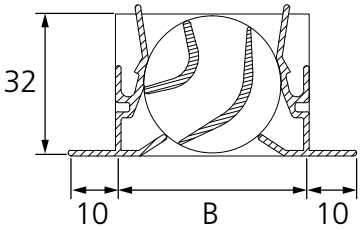


Figure 3. 1-slot, with support profiles (mm).

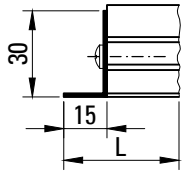


Figure 2. With end angle (mm).

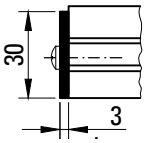
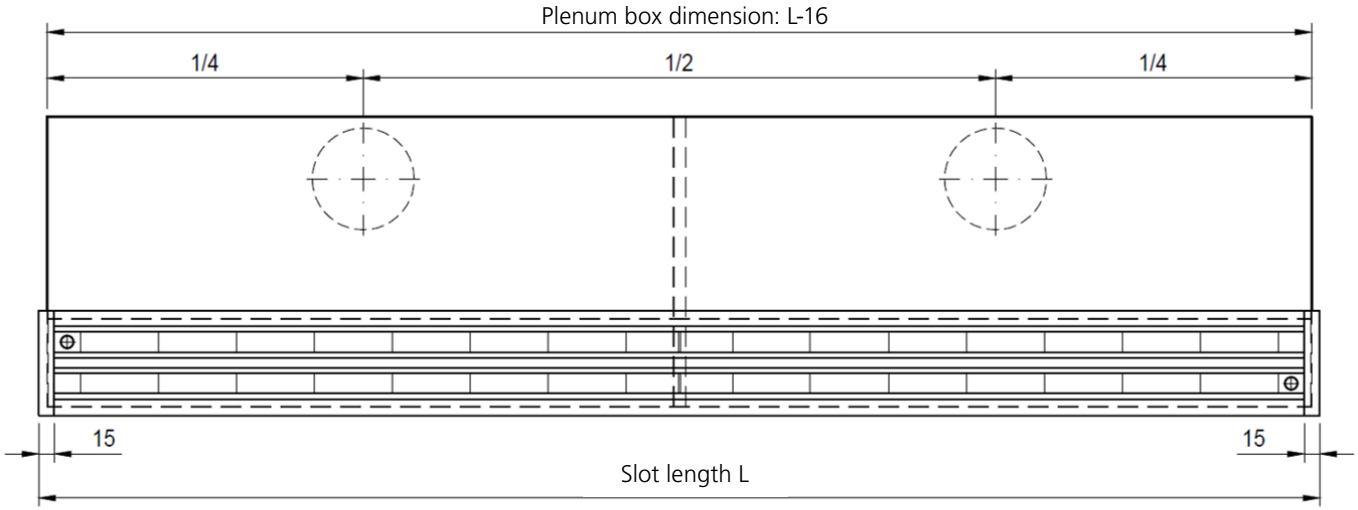
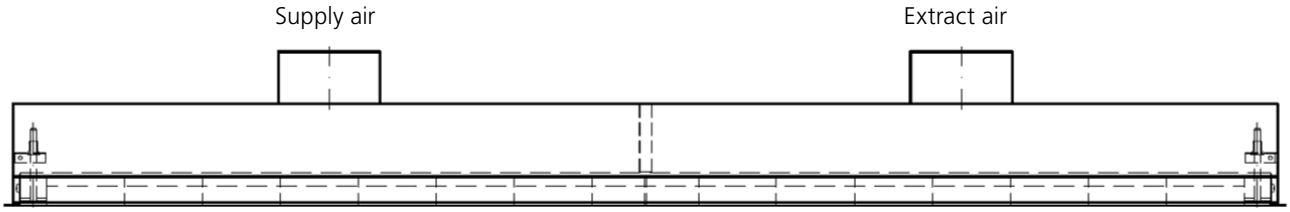
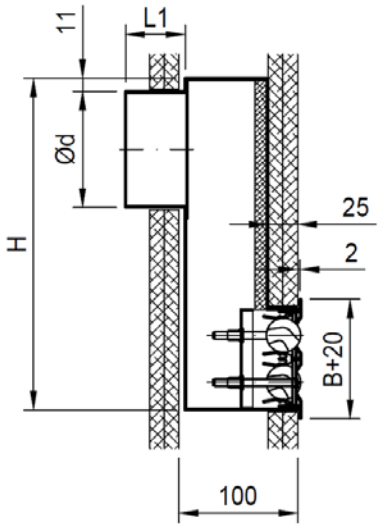


Figure 4. With end piece (mm).

VZ-41-ZA

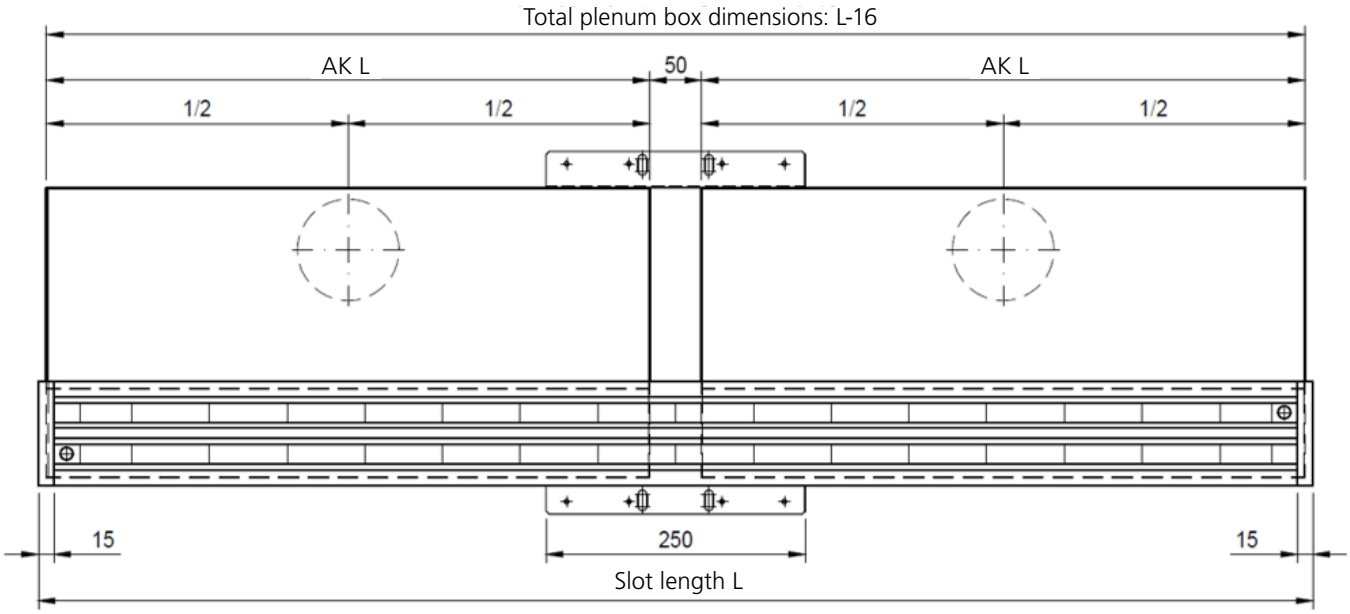


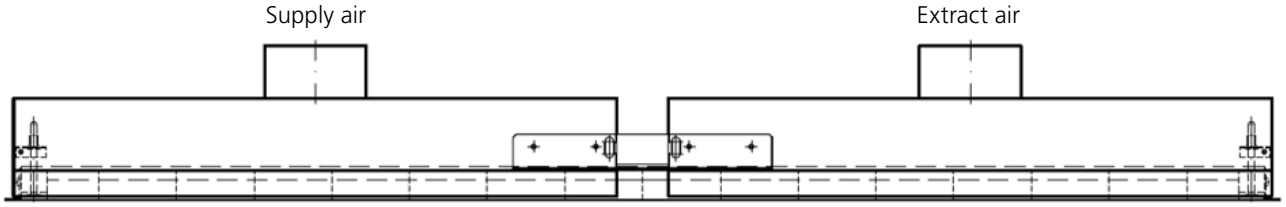


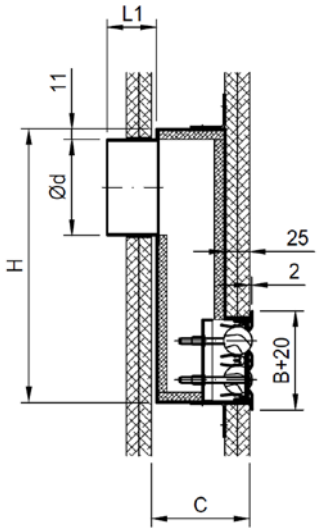


Cut-out dimensions: L-10 / B+20-12

Cut-out dimensions for the version with clip fastening: L-10 / B+20-8



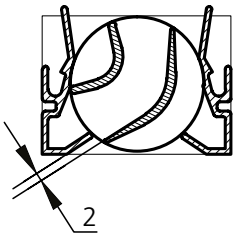




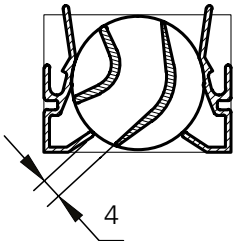
Cut-out dimensions: L-10 / B+20-12

Cut-out dimensions for the version with clip fastening: L-10 / B+20-8

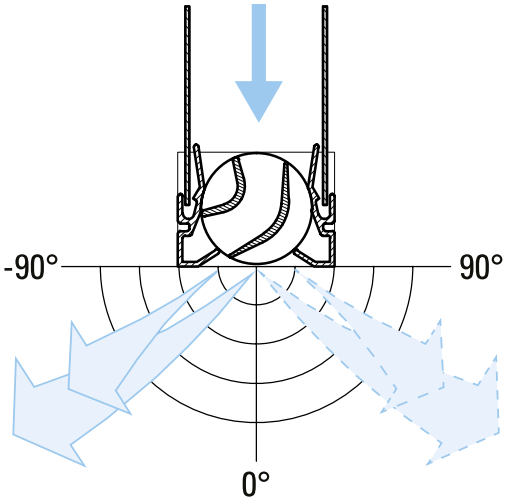
Adjustable air discharge directions

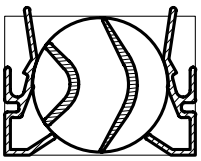


Position 1:
single or double-sided
close to ceiling

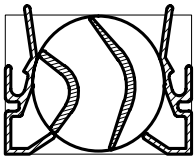


Position 2:
One-sided or double-sided
30° and 45° individual air discharge

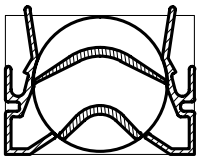




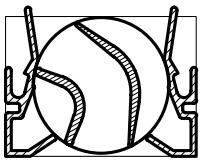
Position 3:
vertical, 45° expansion



Position 4:
vertical, 35° expansion

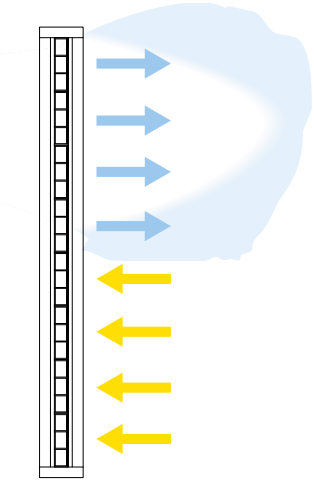


Position 6:
closed

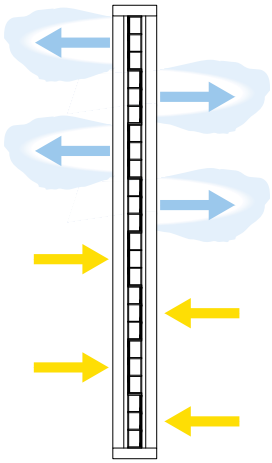


Position 5:
vertical

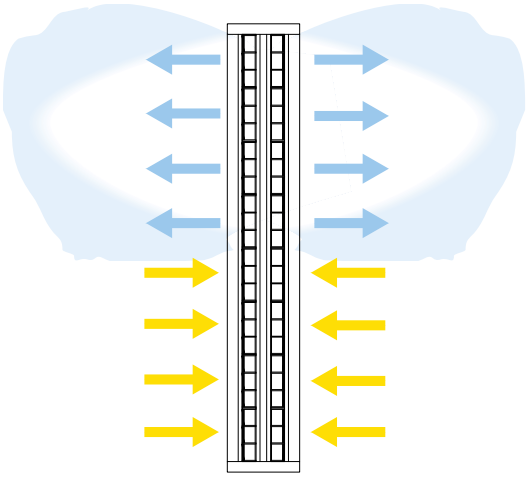
Distribution patterns



1-way



diffuse



2-way

Specification

For ordering, contact your local Swegon sales office.

Specification text

Combined supply- and extract air slot diffuser VZ-41-ZA with a system width of 41 mm, with the following features:

- Available with 1 to 4 slots.
- Profile rails with rotatable air deflectors.
- Profile rails made of aluminium extruded profiles, standard colour white (RAL 9003).
- Air deflectors made of impact-resistant plastic, standard colour black.
- Plenum box made of galvanised steel, lined with sound-absorbing material to reduce the sound transmission from the duct or for crosstalk attenuation.
- The plenum box for supply and extract air is thermally separated.