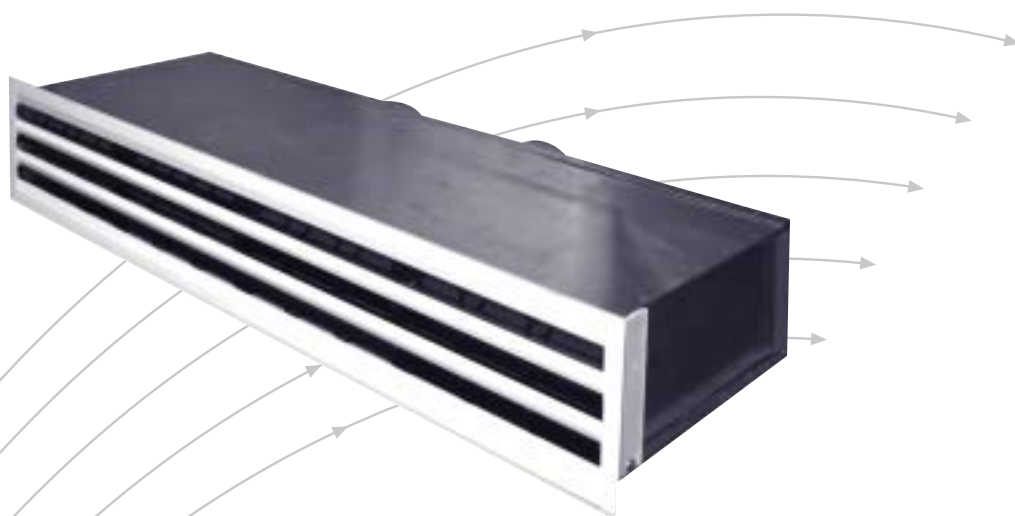


Slot diffusers

- Type VSD35-3-AZ
- Combination for supply and extract air



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Contents · Description

Description	2
Construction · Dimensions	3
Materials	3
Installation · Assembly	4
Nomenclature	5
Technical Data	5
Example	7
Order Details	8

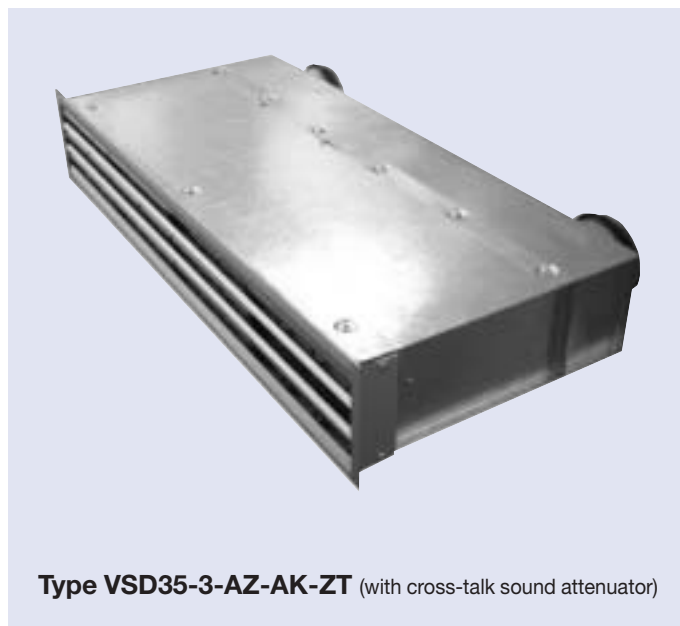
Description

The adjustable slot diffusers type VSD35-3-AZ are designed for horizontal installation in walls or bulkheads. The supply air is discharged through the upper slot and the air stream moves along the ceiling utilising the Coanda effect for enhanced penetration across the space. The extract air is taken out through the two lower slots. The low height and compact construction (110 mm) makes these diffusers ideal for installation in restricted spaces. The three slot diffuser face is extruded in one piece so that there are no visible joint lines. The diffuser face is either screwed in place onto the plenum box or attached with spring clips. The use of spring clips makes it possible for the diffuser face to be attached after installation. The spigots are located outside the air-conditioned space, ideally in the corridor. To minimise cross-talk noise from neighbouring rooms, integration of the optional cross-talk sound attenuator is recommended.

For a detailed description of the slot diffusers type VSD35, please refer to leaflet 2/2.6/EN/...



Type VSD35-3-AZ-AK



Type VSD35-3-AZ-AK-ZT (with cross-talk sound attenuator)



Construction · Dimensions · Materials

Construction

The adjustable slot diffusers type VSD35-3-AZ consist of a three slot diffuser face and the plenum box plus an optional cross-talk sound attenuator. The diffuser face either comes screwed into place on the plenum box (VSD35-3-AZ-AK) or can be fixed with spring clips (VSD35-3-AZ-AS).

The air connection is by means of the supply and extract spigots on the rear. The diffusers are also available with an optional lip seal system and volume flow control damper.

The volume control damper is situated in the spigot with two control cables accessible from the face. The volume flow is adjusted by moving the volume control damper using the cable controls (green = close damper, white = open damper). After the volume flow is set, the cable controls are pushed through the diffuser face inside the plenum box.

Materials

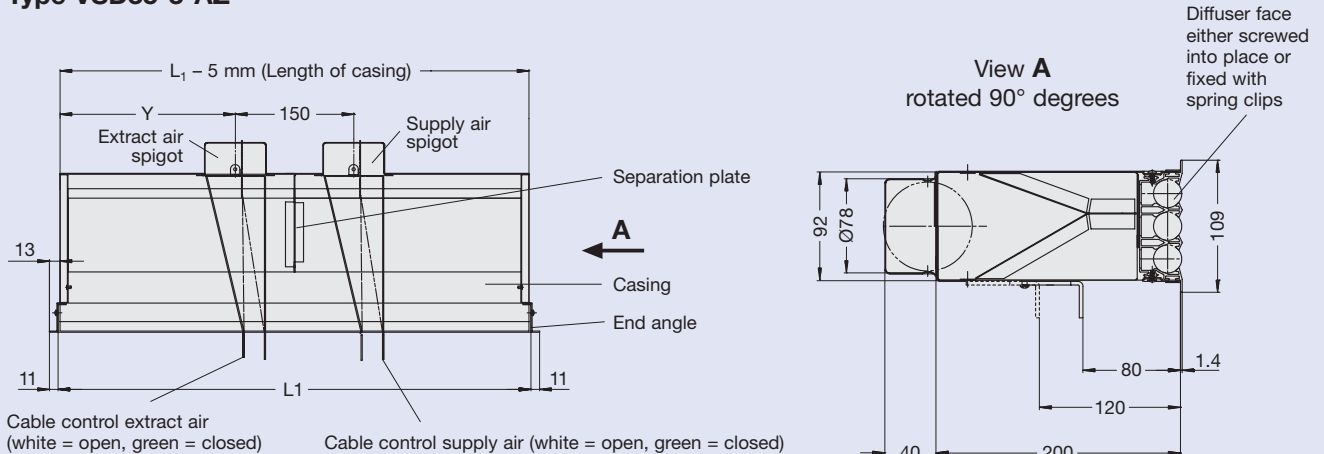
Diffuser face and end angles made of aluminium extrusions, naturally anodised E6-C-0, on request powder-coated to RAL 9006 (gloss level 30 %), RAL 9010 (gloss level 50 %) or any other RAL colour (gloss level 70 %).

Air control blades made of black plastic (polystyrene), colour similar to RAL 9005, on request colour white, similar to RAL 9010.

Plenum box, cross-talk sound attenuator and connection spigots made of galvanised steel sheet, inner lining of cross-talk sound attenuator is mineral wool with glass fibre cover on the exposed face, lip seal made of rubber.

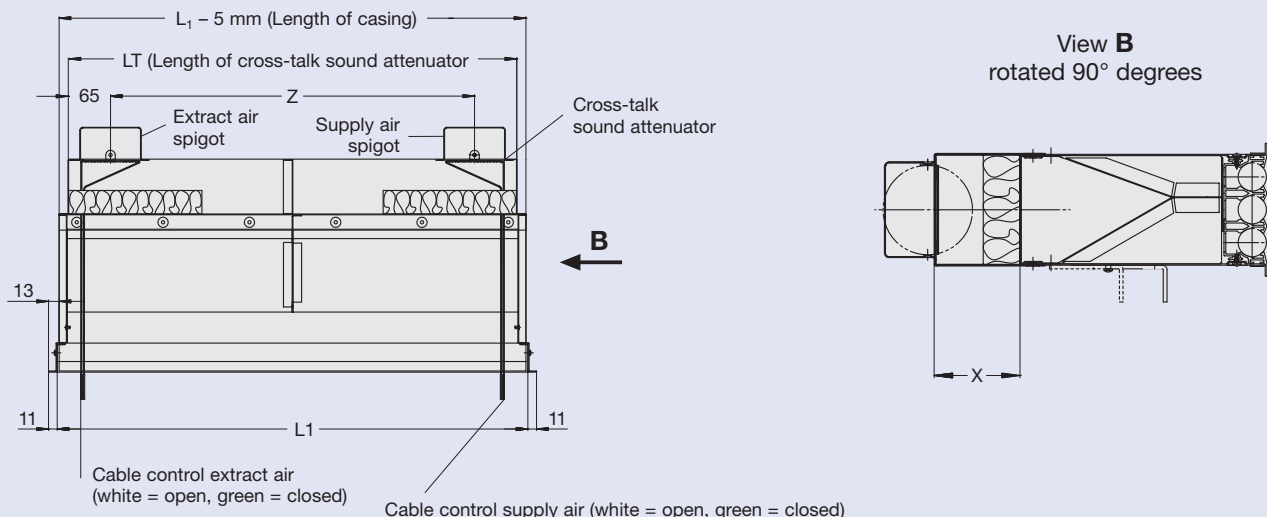
Dimensions in mm				
L ₁	LT	X	Y	Z
600	595	70	222	464
750	595	70	287	464
900	795	90	375	664
1050	795	90	450	664
1200	795	90	522	664

Type VSD35-3-AZ



Type VSD35-3-AZ-...-ZT

with additional cross-talk sound attenuator
(not available after delivery)



Installation · Assembly

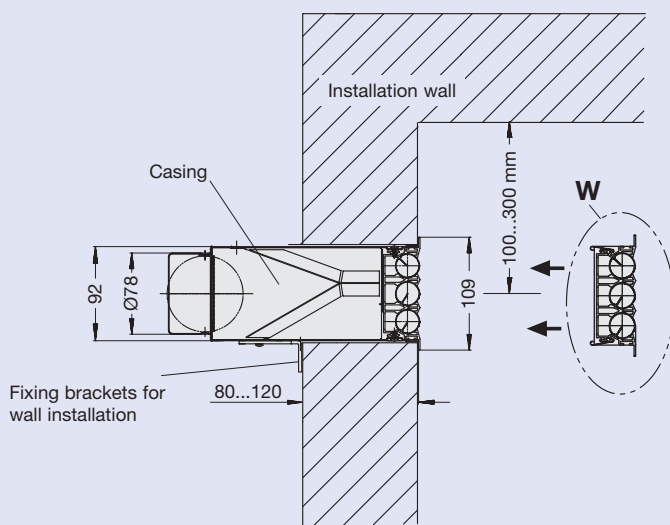
Installation · Assembly

The slot diffusers type VSD35-3-AZ can be attached to the back side of the wall using two optional fixing brackets, supplied separately, which are attached to the bottom of the plenum box.

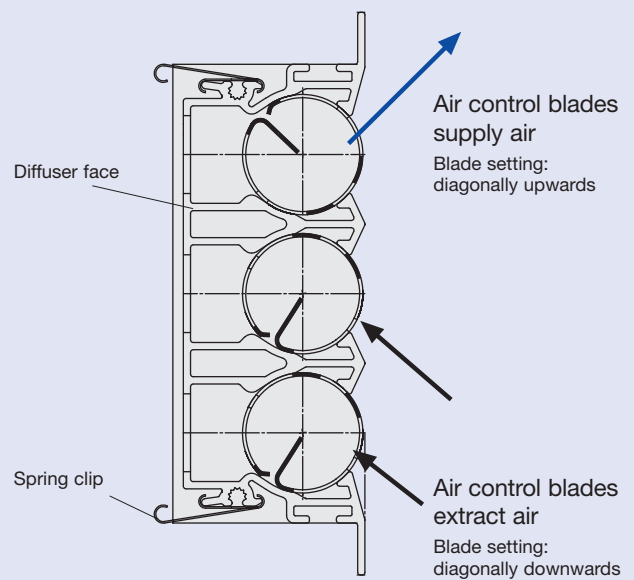
Insert the diffuser, including the plenum box, into the wall from the diffuser face side. Next use the screws provided to fix the brackets to the plenum box by means of the slotted bracket holes and the threaded holes in the underside of the plenum box (wall installation configuration). Finally, fasten the fixing brackets securely to the wall.

For diffusers featuring the spring clips to fix the diffuser face, it is possible to attach the wall installation fixing brackets before inserting the diffuser into the wall. The plenum box without the diffuser face is then inserted through the wall opening from the rear and fixed in place. The diffuser face can be fitted after painting and wallpapering are complete so it is not damaged during the construction phase.

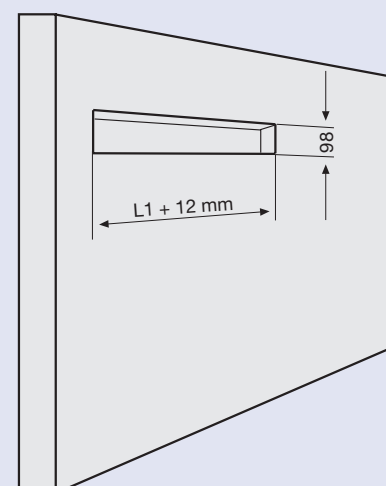
Slot diffuser with spring clips for slot assembly after installation of the plenum



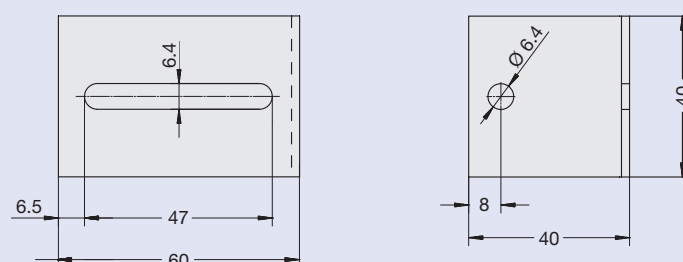
Detail W



Installation opening



Fixing brackets (supplied separately)



Nomenclature · Technical Data

Nomenclature

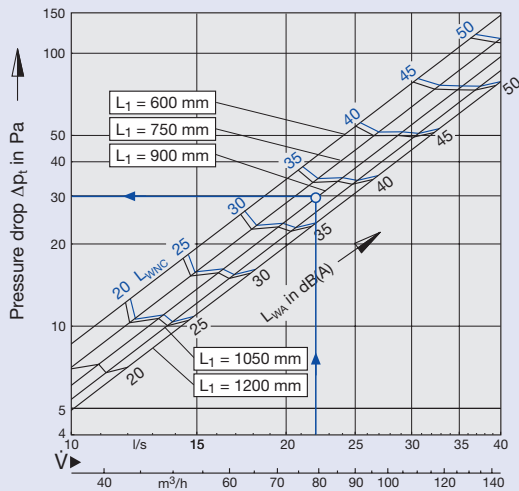
\dot{V}	in l/s or m ³ /h:	Volume flow rate per diffuser
Δp_t	in Pa:	Total pressure drop
L_{WA}	in dB(A):	A-weighted sound power level
L_{WNC}	:	NC rating of the sound power level spectrum
D_t	in dB:	Insertion loss re flow regenerated noise DIN EN ISO 7235-2004
R'	in dB:	Construction sound reduction index
$R_{W'}$	in dB:	Weighted sound reduction index
L_{pA}	in dB(A):	A-weighted sound power level in the room
H_1	in m:	Distance between ceiling and occupied zone
X	in m:	Distance between diffuser centre line and wall
L	in m:	Distance from diffuser ($X + H_1$)
\bar{v}_L	in m/s:	Max. time average air velocity at the wall

For aerodynamic data, refer to leaflet 2/2.6/EN/... for slot diffusers.

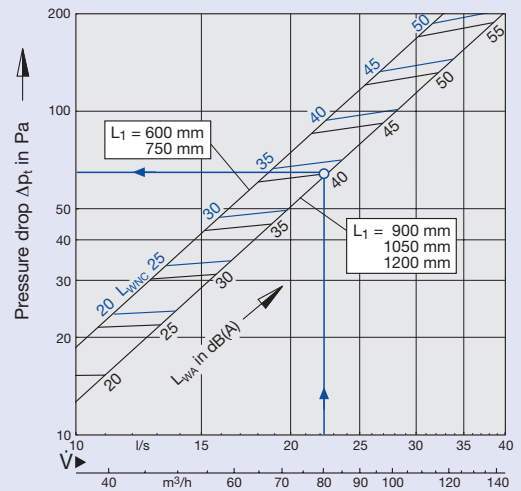
The data for one-way horizontal operation of the VSD35-1 is applicable here.

Correction factors damper setting					
Type		Δp_t		L_{WA} (dB)	
		45°	closed	45°	closed
with cross-talk sound attenuation	Supply air	x 1.2	x 2.1	+ 0	+ 1
	Extract air	x 1.3	x 2.4	+ 2	+ 4
without cross-talk sound attenuation	Supply air	x 1.6	x 4.4	+ 2	+ 9
	Extract air	x 1.8	x 5.0	+ 6	+ 12

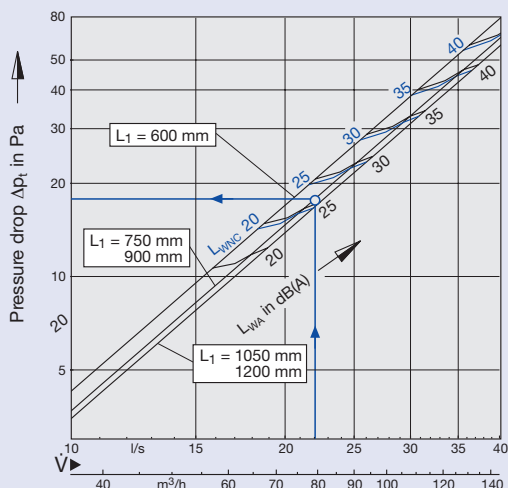
1 Sound power and pressure drop without cross-talk sound attenuation
Supply air



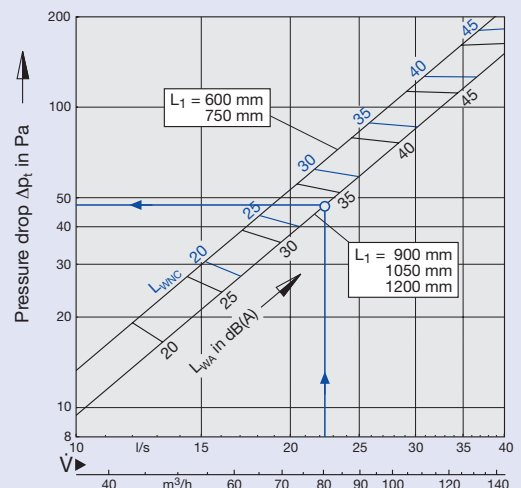
3 Sound power and pressure drop with cross-talk sound attenuation
Supply air



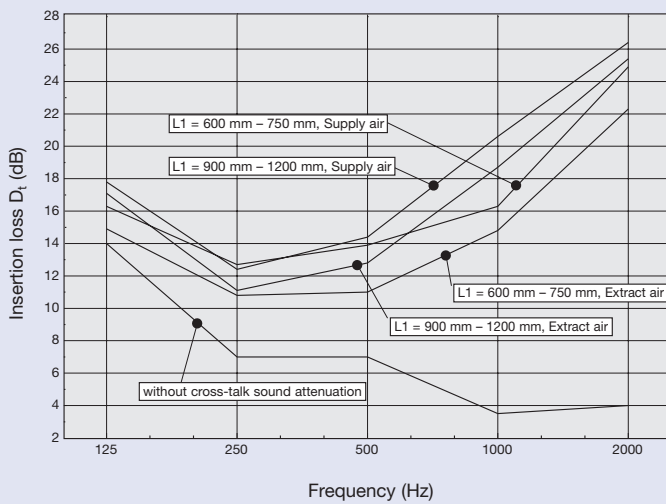
2 Sound power and pressure drop without cross-talk sound attenuation
Extract air



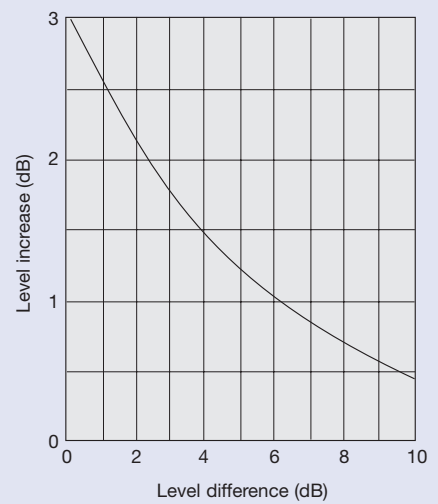
4 Sound power and pressure drop with cross-talk sound attenuation
Extract air



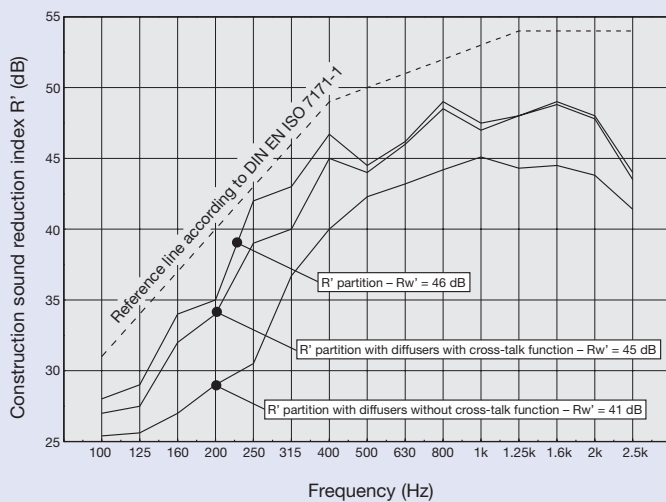
5 Insertion loss



7 Summation of sound levels



6 Influence of the slot diffuser on the partition sound reduction index



Example

A room with a modular width of 1.2 m, a ceiling height of 2.7 m and a room depth of 5 m is to be ventilated from the corridor side with one supply/exhaust combination diffuser of the type VSD35-3-AZ/900 per modular width.

The design is based on a volume control damper position of 45° to balance air flow to the diffuser. A sound pressure level of 35 dB(A) at 8 dB room attenuation must not be exceeded, and compliance with the DIN EN 13779 comfort criteria must be ensured. A cooling capacity of 45 W/m² is required at a supply air temperature difference of -10 K. The overall cooling capacity to be achieved for the floor space of 6 m² per modular width is 270 W. This requires a supply air volume flow of approximately 80 m³/h.

Aerodynamic Data

See leaflet 2/2.6/EN/... or the AirWaterSystems selection program at www.trox.de (VSD35-1, one-sided horizontal air discharge)

$$L = X + H_1 = 5 + 0.9 \text{ m} = 5.9 \text{ m}$$

$$\bar{v}_L = 0.36 \text{ m/s based on a linear configuration}$$

Correction for single slot with finite length

$$\bar{v}_L = 0.71 \times \bar{v}_L (\text{line}) = 0.26 \text{ m/s}$$

As the velocity in the occupied zone approximately 0.5 m from the façade is $\leq 50\%$ of \bar{v}_L (= 0.13 m/s), the comfort criteria have been met.

Sound power and pressure loss without cross-talk sound attenuator:

Diagram 1:

$$\Delta p_t (\text{supply}) = 30 \text{ Pa}$$

$$L_{WA} (\text{supply}) = 38 \text{ dB(A)}$$

Correction for damper setting of 45°:

$$\Delta p_t (\text{supply}) = 30 \text{ Pa} \times 1.6 = 48 \text{ Pa}$$

$$L_{WA} (\text{supply}) = 38 + 2 \text{ dB(A)} = 40 \text{ dB(A)}$$

Diagram 2:

$$\Delta p_t (\text{extract}) = 19 \text{ Pa}$$

$$L_{WA} (\text{extract}) = 27 \text{ dB(A)}$$

Correction for damper setting of 45°:

$$\Delta p_t (\text{extract}) = 19 \text{ Pa} \times 1.8 = 34 \text{ Pa}$$

$$L_{WA} (\text{extract}) = 27 + 6 \text{ dB(A)} = 33 \text{ dB(A)}$$

The difference in the sound power levels of the supply and extract air is 7 dB. For this reason, approximately 1 dB should be added to the greater value in calculating the total levels (see diagram 7), yielding a total sound power level of 41 dB(A). With a room attenuation of 8 dB, this yields a sound pressure level in the room of 33 dB(A), which is permissible.

As diagram 6 shows, the sound reduction index of the wall is significantly weakened by the installation of a diffuser without a cross-talk sound attenuator. To prevent this and minimise cross-talk to neighbouring rooms through the ventilation ducts, a cross-talk sound attenuator should be added. Analysis should be carried out to check whether the sound pressure levels in the room can be maintained even when using the diffuser with the added cross-talk sound attenuator, because although the attenuator significantly improves the room-to-room attenuation (see diagram 5), it creates additional air regenerated noise.

Sound power and pressure loss with cross-talk sound attenuator:

Diagram 3:

$$\Delta p_t (\text{supply}) = 60 \text{ Pa}$$

$$L_{WA} (\text{supply}) = 40 \text{ dB(A)}$$

Correction for damper setting of 45°:

$$\Delta p_t (\text{supply}) = 60 \text{ Pa} \times 1.2 = 72 \text{ Pa}$$

$$L_{WA} (\text{supply}) = 40 + 0 \text{ dB(A)} = 40 \text{ dB(A)}$$

Diagram 4:

$$\Delta p_t (\text{extract}) = 48 \text{ Pa}$$

$$L_{WA} (\text{extract}) = 34 \text{ dB(A)}$$

Correction for damper setting of 45°:

$$\Delta p_t (\text{extract}) = 48 \text{ Pa} \times 1.3 = 62 \text{ Pa}$$

$$L_{WA} (\text{extract}) = 34 + 2 \text{ dB(A)} = 36 \text{ dB(A)}$$

The difference in the sound power levels of the supply and extract air is 4 dB. For this reason, approximately 2 dB should be added to the greater value in calculating the total levels (see diagram 7), yielding a total sound power level of 42 dB(A). With a room attenuation of 8 dB, this yields a sound pressure level in the room of 34 dB(A), which is 1 dB louder than without a cross-talk sound attenuator but still within the permissible range.

Order Details

Specification Text

Adjustable slot diffusers with aesthetically designed face sections offer a combined supply/extract diffuser for wall installation. The top slot provides a horizontal supply air discharge along the ceiling with Coanda effect enhancing the penetration across the space. The lower two slots provide a low velocity air extract from the space thus optimising room air circulation.

Consists of a three slot face section which can be screwed to the plenum box or can be spring clip fixed after installation, end angles, integrated preset air control blades and a plenum box with supply and extract spigots, plus optional lip seal and front-operated volume flow control damper.

Additional cross-talk sound attenuator consisting of a casing and inner lining.

On request a wall installation kit can be provided, consisting of threaded holes on the bottom of the plenum box, two fixing brackets and two screws, supplied separately.

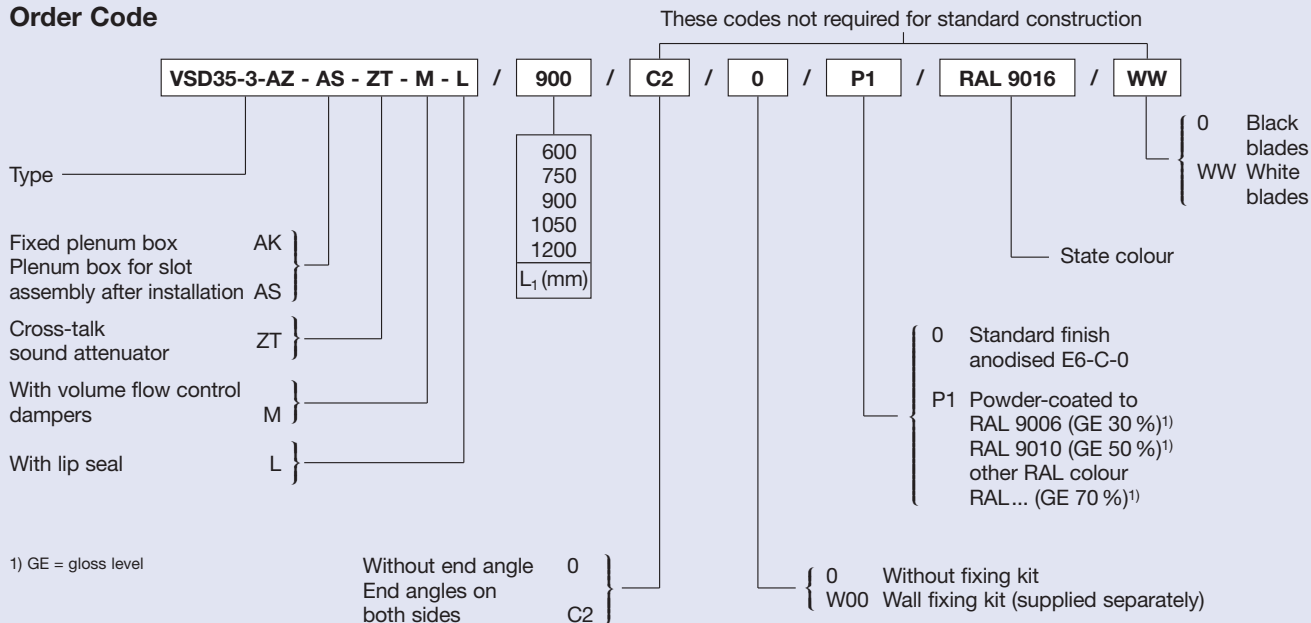
Materials

Diffuser face and end angles made of aluminium extrusions, naturally anodised E6-C-0, on request powder-coated to RAL 9006 (gloss level 30 %), RAL 9010 (gloss level 50 %) or any other RAL colour (gloss level 70 %).

Air control blades made of black plastic (polystyrene), colour similar to RAL 9005, on request colour white, similar to RAL 9010.

Plenum box and connection spigots made of galvanised steel sheet, inner lining of cross-talk sound attenuator made of mineral wool with glass fibre cover on the exposed face, lip seal made of rubber.

Order Code



Order example

Make: TROX
Type: VSD35-3-AZ - AS - ZT - M - L / 900 / C2 / W00 / P1 / RAL 9016 / WW