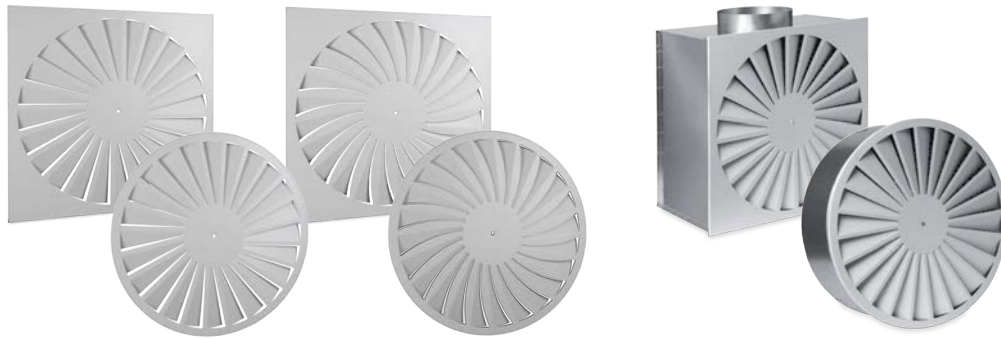


VVKN

Swirl Ceiling Diffuser with Fixed Blades



Ordering Codes

Type	VVKN-	A	B
Diffuser face circular		R	
Diffuser face square		S	
Size		300	400
		500	600
		600	625
Surface (and material) finish *		AISI304	AISI316
		RALxxxx	

Ordering Code Example:

VVKN-A-S-600-RAL5012 2 pcs

The product contains of a square box with a type A square diffuser face. The size 600 square diffuser face is powder-painted with a RAL5012 baking enamel.

NOTE: * If no material or surface finish is defined, the galvanised diffuser will be delivered with RAL9010 gloss 30 powder coating as standard.

Description

The VVKN swirl diffuser with fixed blades is a comfortable air distribution element. The diffuser face is supplied with a radially aligned set of variously shaped blades (types A, B, see fig. 2), which guarantee an even distribution of swirl supply air into the occupied zone. The VVKN swirl diffuser can be installed onto an air duct using a plenum box with a horizontal or a vertical connection by a flexible circular tube or the SPIRO duct. VVKN can be used for both, supply or extract air. It can be used for ventilation, as well as supplying cold or warm air.

Information about accessories for VVKN is available on page 9.

- PB-VVK - Plenum box
- PB-VVKU - Universal plenum box



Fig. 1: Isothermal air flow visualisation

Design

The diffuser can be manufactured with a circular or a square diffuser face made of galvanized steel. It is also possible to manufacture from stainless steel AISI304 or AISI316. The surface is powder-painted with a white RAL 9010 gloss 30% by default, other RAL types can be applied upon request. In the diffuser's center there is an opening for mounting of the diffuser face using a screw. Every VVKN face includes a screw with a decorative white cap for its mounting onto a plenum box as well as a self-adhering seal, which needs to be placed onto the diffuser plate inner side during the mounting.

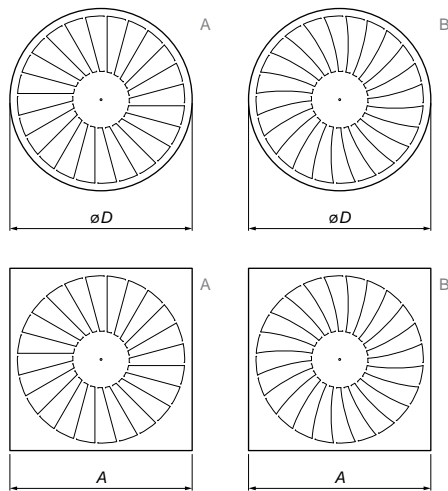


Fig. 2: Diffuser types and shapes

Dimensions

Size	$\square A$	$\varnothing D$	m_s	m_R
	(mm)		(kg)	
300	296	298	0,9	0,7
400	396	398	1,5	1,2
500	496	498	2,2	1,8
600	596	598	3,0	2,4
625	621	623	3,2	2,6

Tab. 1: Diffuser dimensions and weight

Size	A_v (m ²)	
	Type A	Type B
300	0,0091	0,0107
400	0,0225	0,0239
500	0,0431	0,0414
600	0,0735	0,0681
625	0,0735	0,0681

Tab. 2: Free area of diffuser faces A_v (m²)

Technical Details

Terminology

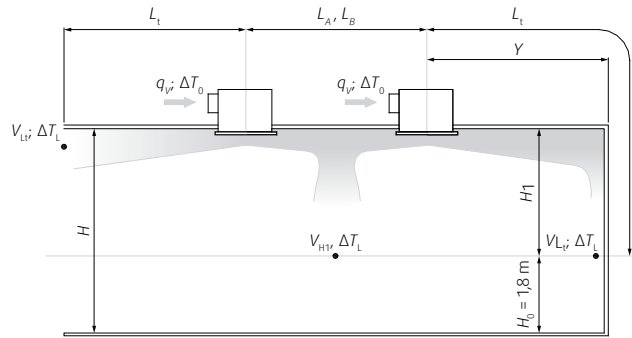
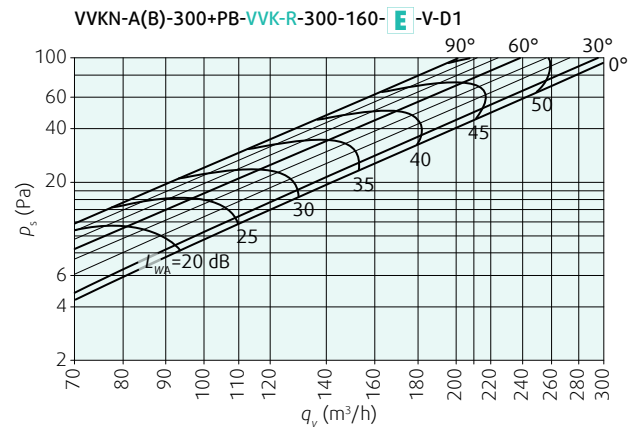
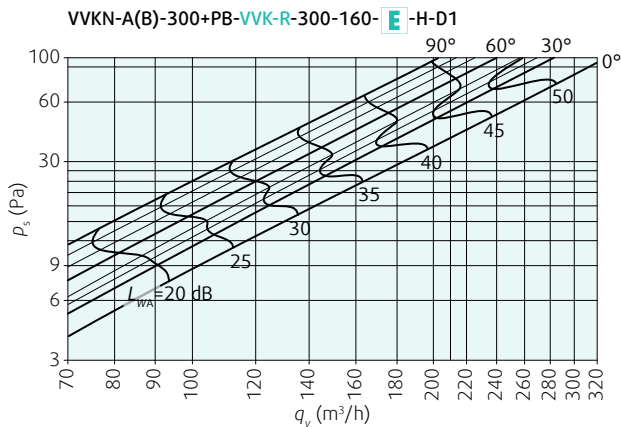
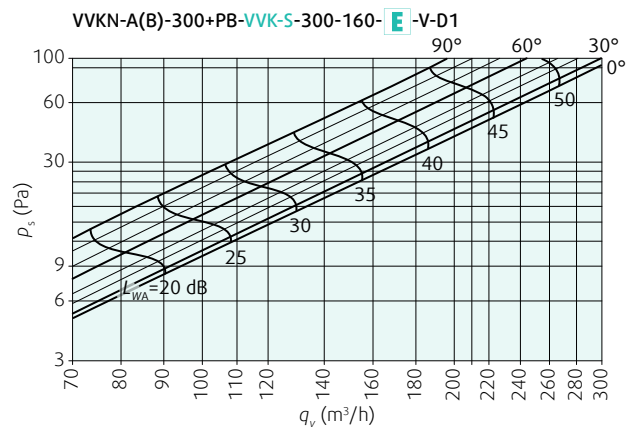
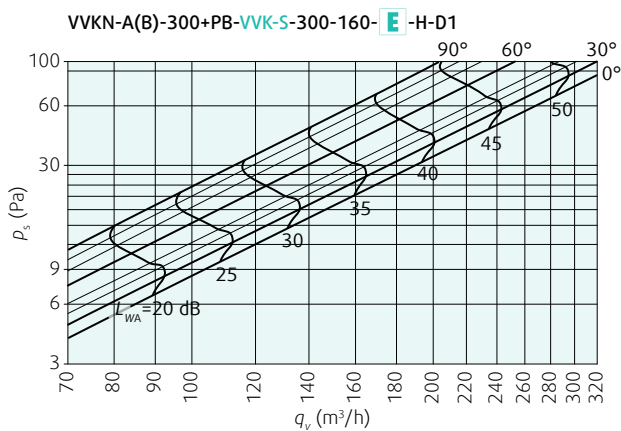
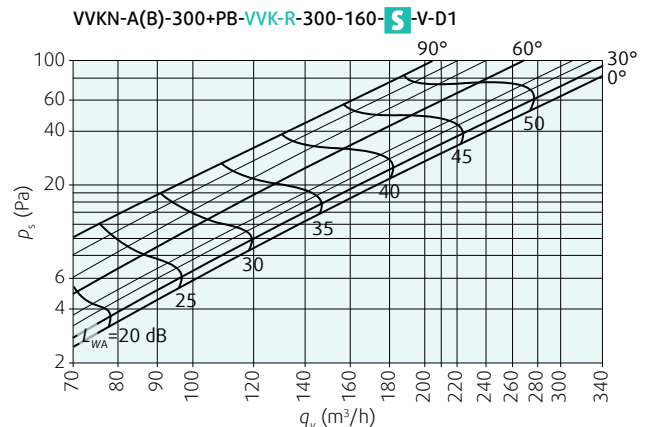
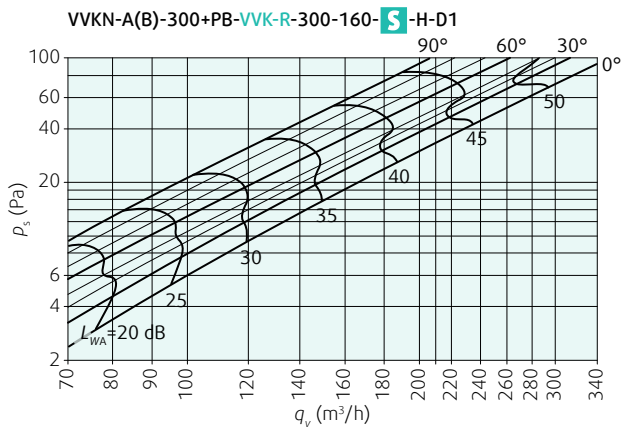
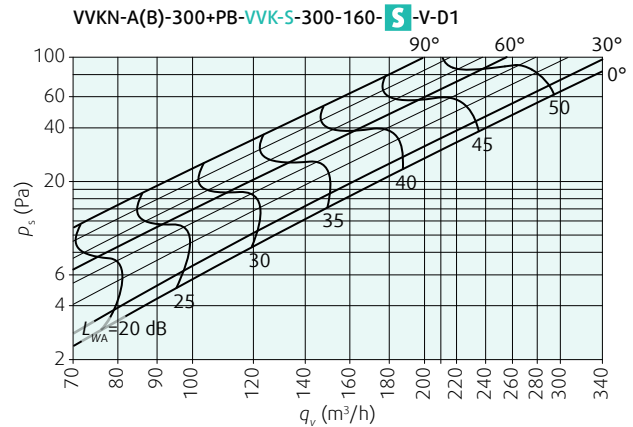
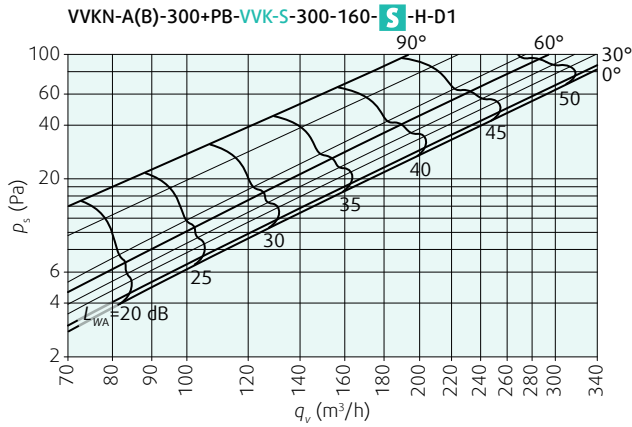


Fig. 3: Air flow inside the room

Legend

q_v	(m ³ /h)	- Air flow volume per 1 diffuser
Y	(m)	- Horizontal distance to the wall
H	(m)	- Room height
H_1	(m)	- Distance from the ceiling to the occupied zone
H_0	(m)	- Occupied zone
L_t	(m)	- Throw distance: by the wall - $L_t = H_1 + Y$ between diffusers - $L_t = H_1 + A/2$
V_{L_t}, V_{H_1}	(m/s)	- Air velocity at throw distance L_t , at distance H_1
ΔT_0	(K)	- Temperature difference between the supply and room air
ΔT_L	(K)	- Difference between the airflow core and room air temperature
Δp_t	(Pa)	- Pressure drop
L_{WA}	(dB)	- Sound power level
$L_{A, B}$	(m)	- Distance between diffusers by length and by width of the room (A = distance between columns, B = distance between rows)

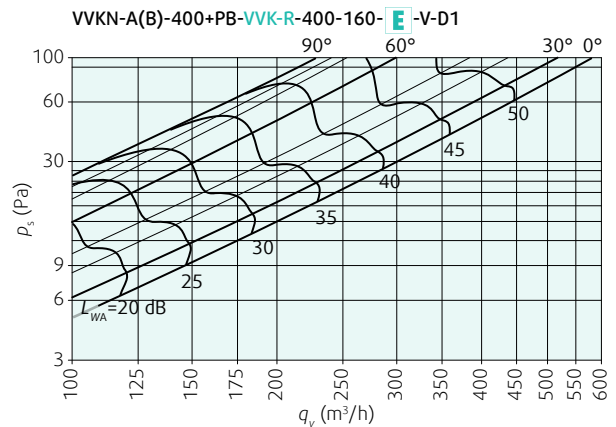
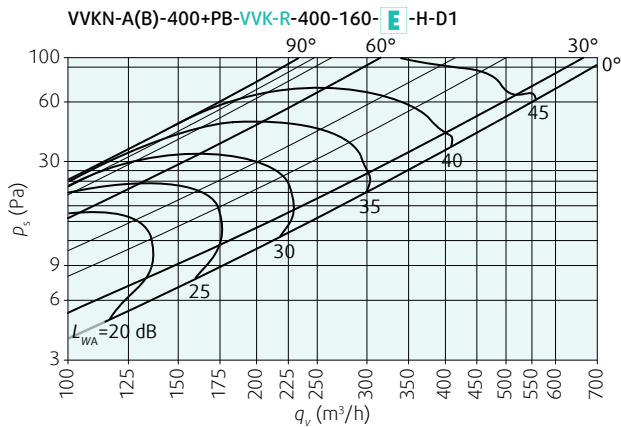
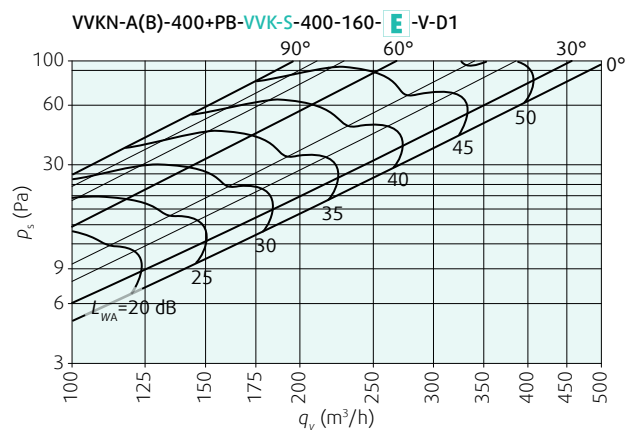
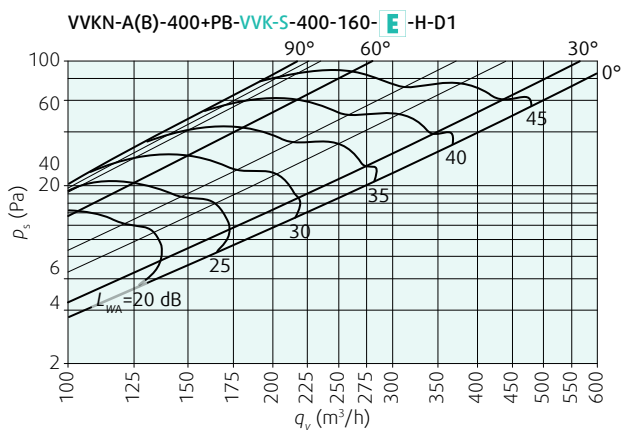
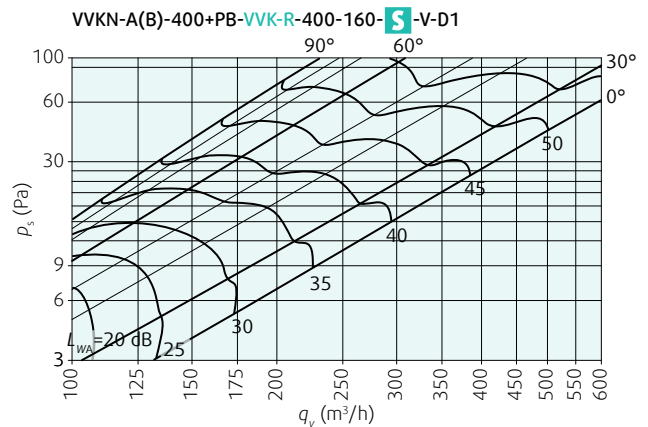
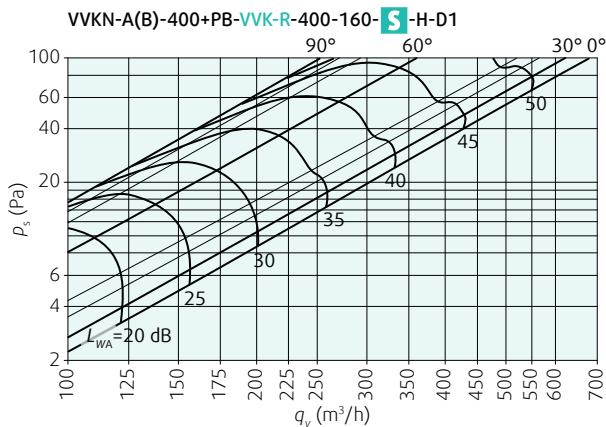
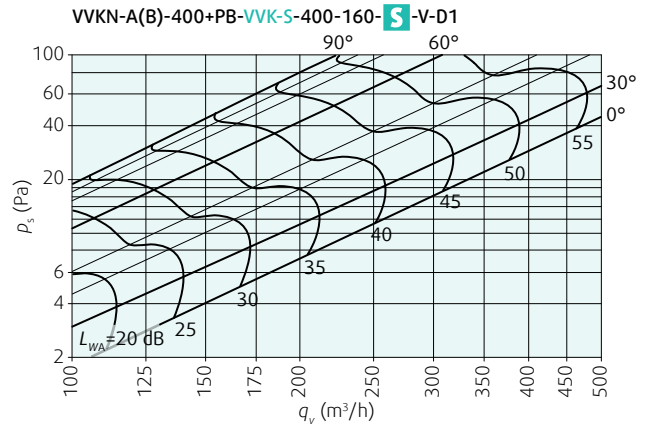
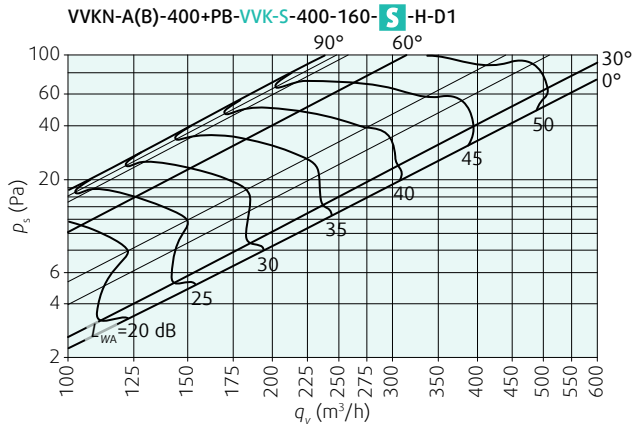
Diagrams: Pressure loss and A-weighted sound power level depending on air flow volume



S Supply: By plenum box PB-VVK (PB-VVK-R = circular box, PB-VVK-S = rectangular box) with horizontal (H) or vertical (V) connection, adjustment damper (D1) fully (0°) open to fully (90°) closed.

E Exhaust: By plenum box PB-VVK (PB-VVK-R = circular box, PB-VVK-S = rectangular box) with horizontal (H) or vertical (V) connection, adjustment damper (D1) fully (0°) open to fully (90°) closed.

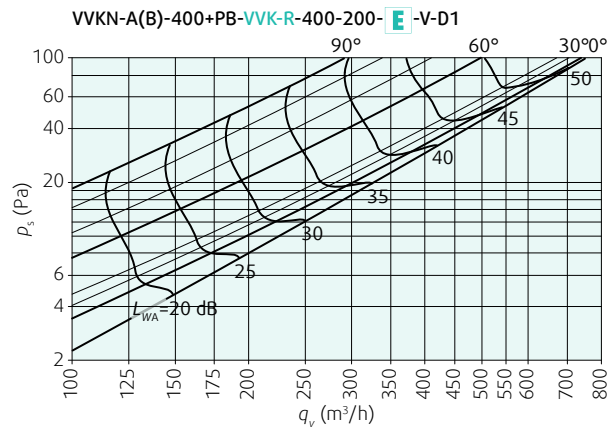
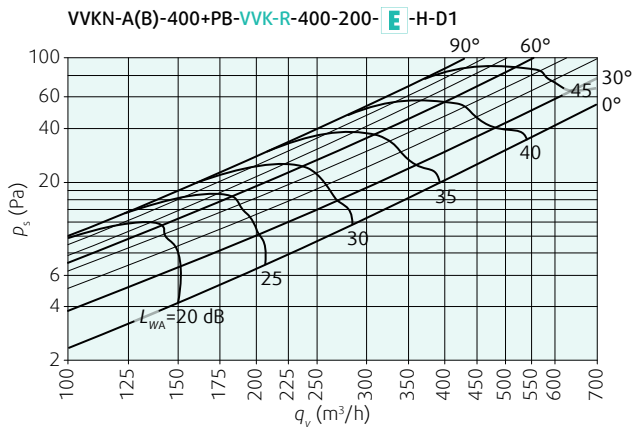
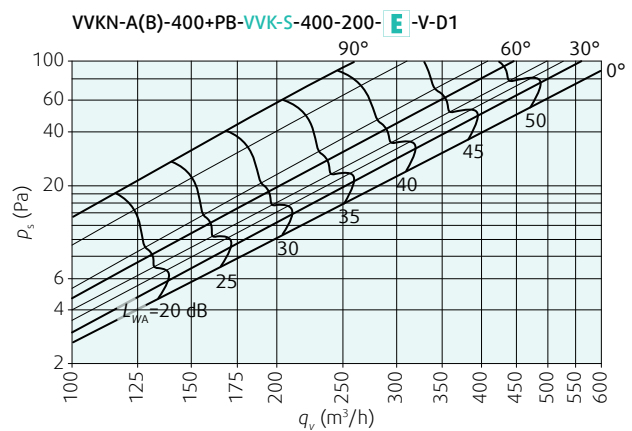
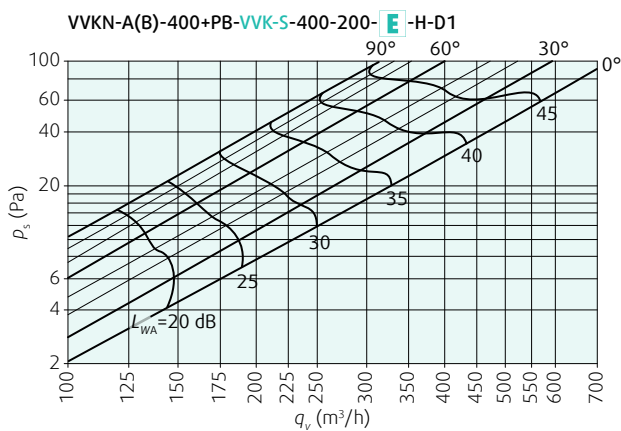
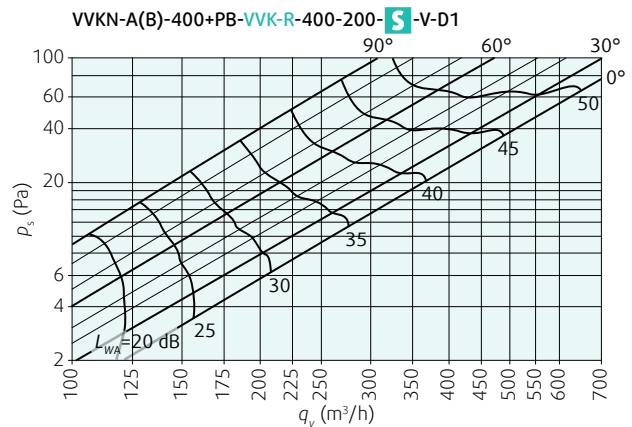
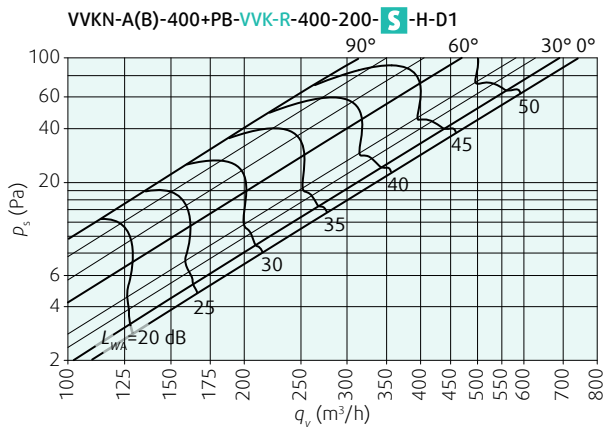
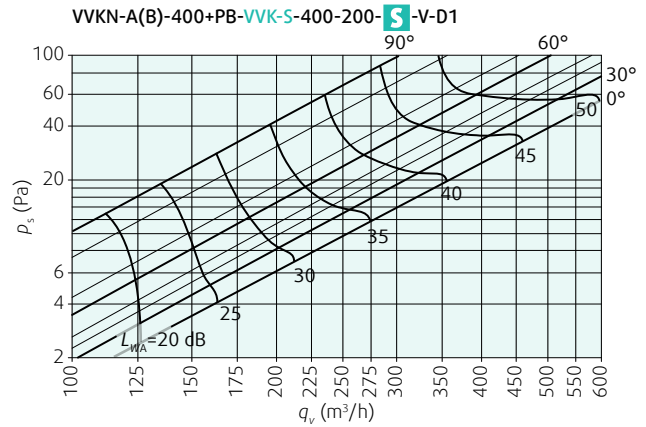
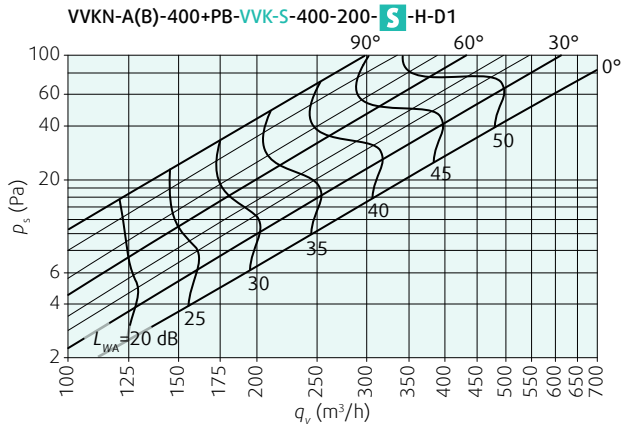
Diagrams: Pressure loss and A-weighted sound power level depending on air flow volume



S Supply: By plenum box PB-VVK (PB-VVK-R = circular box, PB-VVK-S = rectangular box) with horizontal (H) or vertical (V) connection, adjustment damper (D1) fully (0°) open to fully (90°) closed.

E Exhaust: By plenum box PB-VVK (PB-VVK-R = circular box, PB-VVK-S = rectangular box) with horizontal (H) or vertical (V) connection, adjustment damper (D1) fully (0°) open to fully (90°) closed.

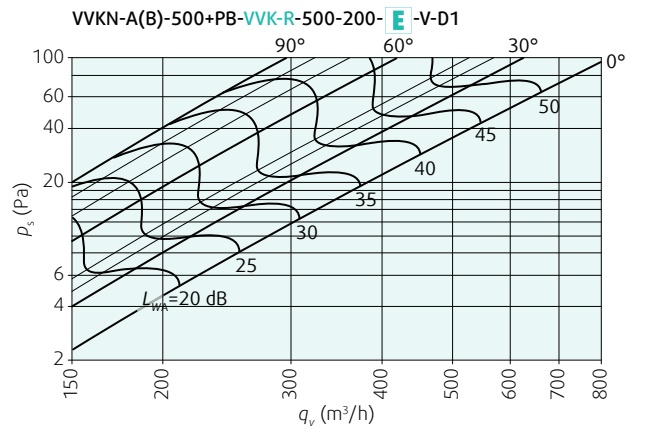
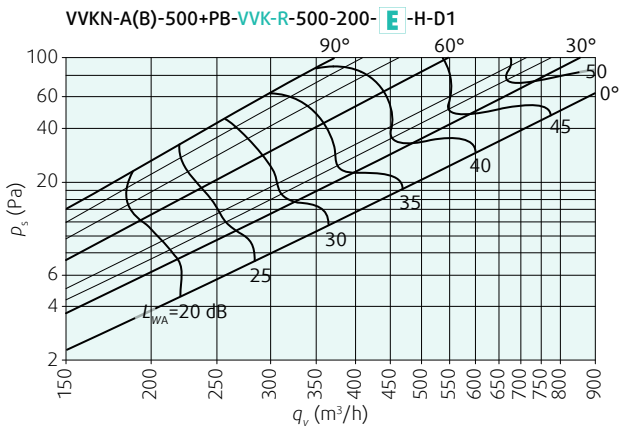
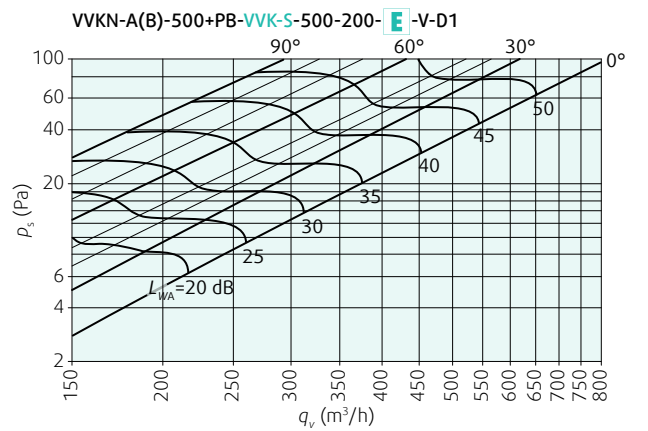
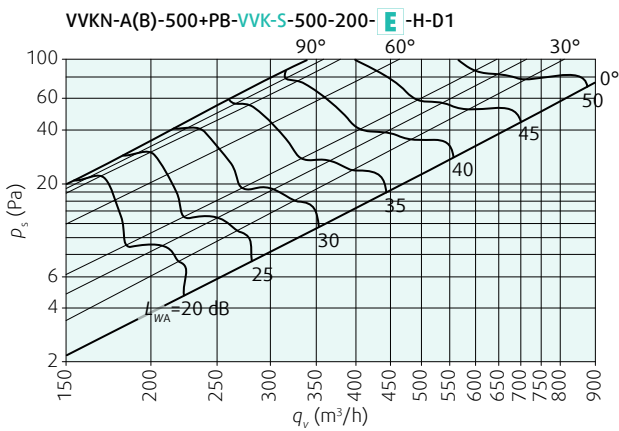
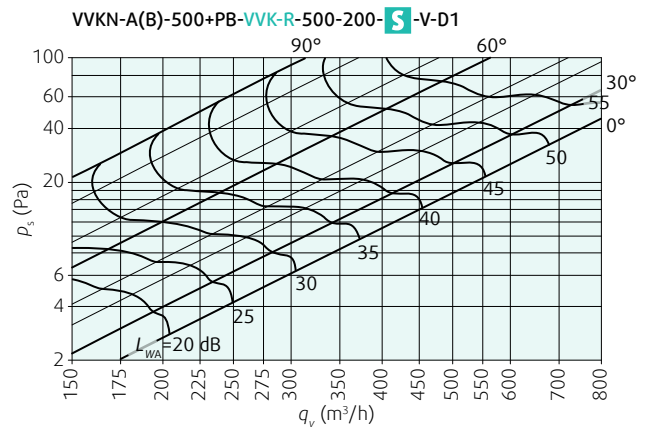
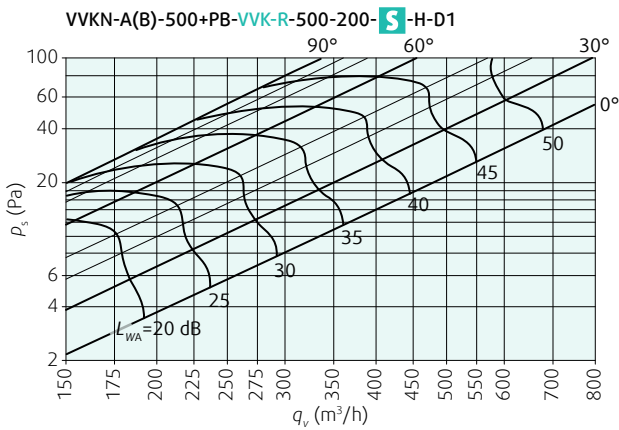
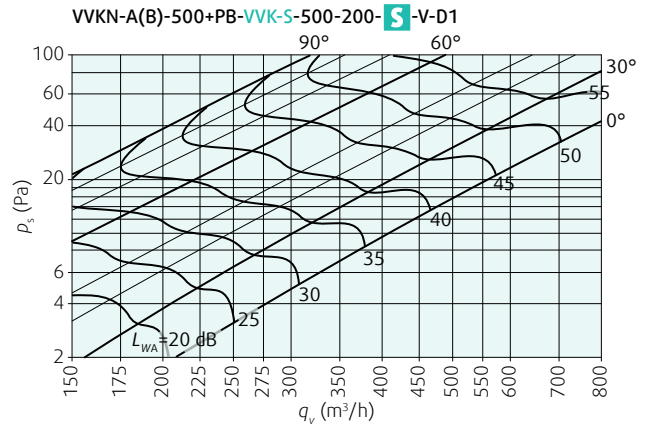
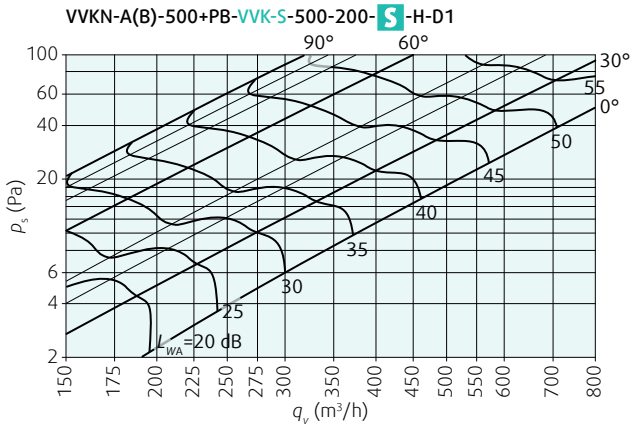
Diagrams: Pressure loss and A-weighted sound power level depending on air flow volume



S Supply: By plenum box PB-VVK (PB-VVK-R = circular box, PB-VVK-S = rectangular box) with horizontal (H) or vertical (V) connection, adjustment damper (D1) fully (0°) open to fully (90°) closed.

E Exhaust: By plenum box PB-VVK (PB-VVK-R = circular box, PB-VVK-S = rectangular box) with horizontal (H) or vertical (V) connection, adjustment damper (D1) fully (0°) open to fully (90°) closed.

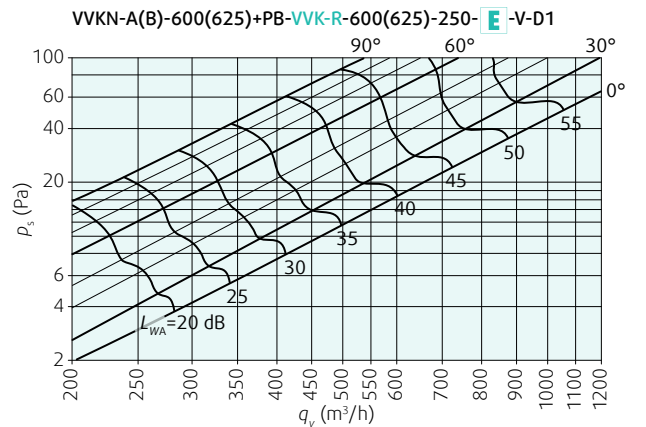
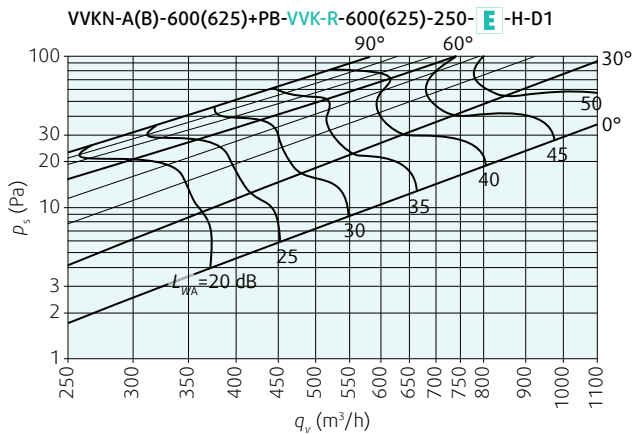
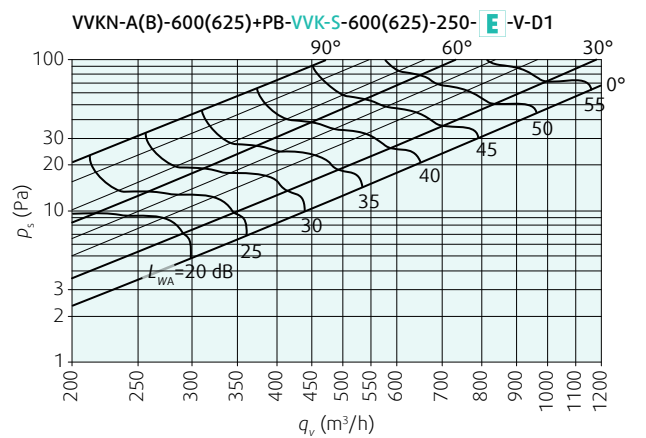
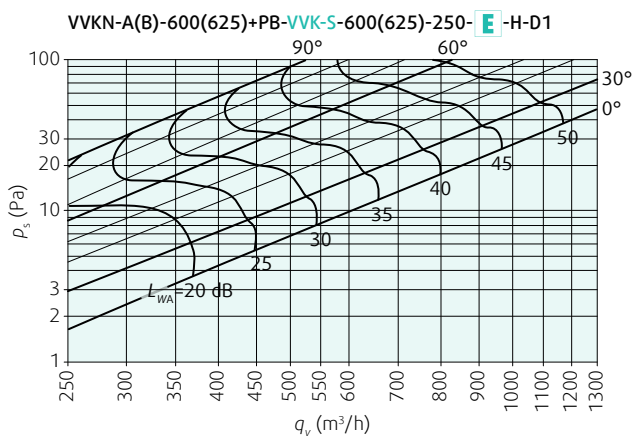
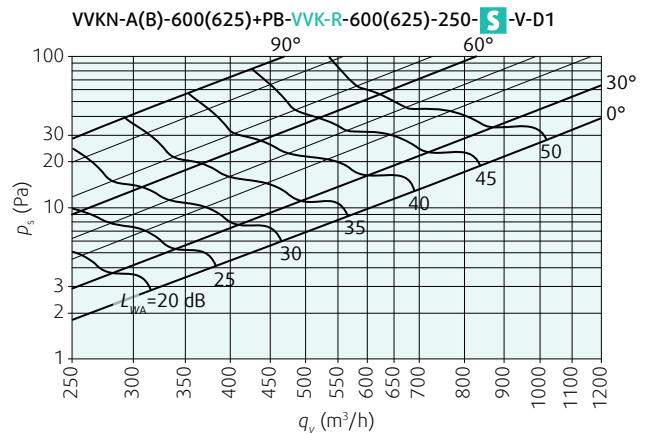
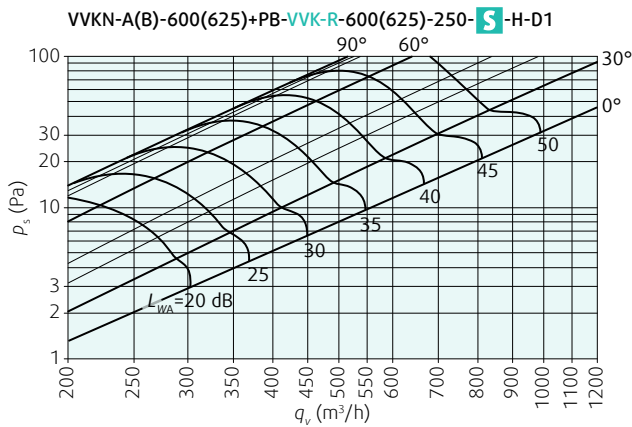
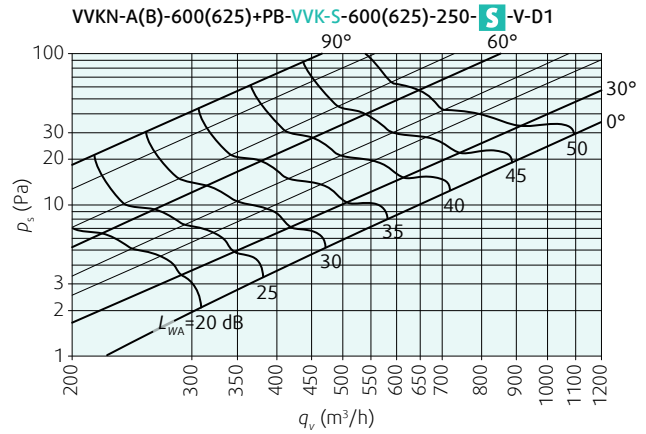
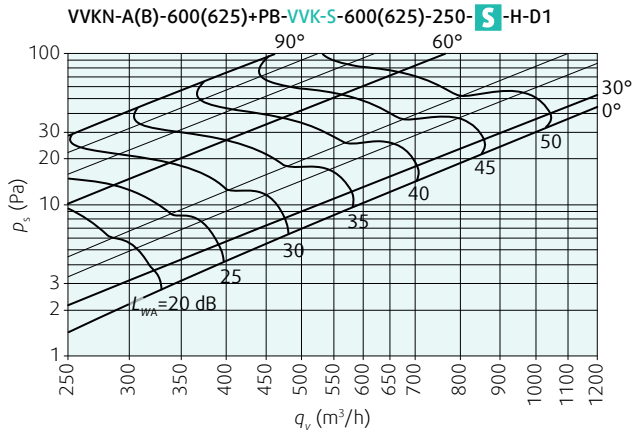
Diagrams: Pressure loss and A-weighted sound power level depending on air flow volume



S Supply: By plenum box PB-VVK (PB-VVK-R = circular box, PB-VVK-S = rectangular box) with horizontal (H) or vertical (V) connection, adjustment damper (D1) fully (0°) open to fully (90°) closed.

E Exhaust: By plenum box PB-VVK (PB-VVK-R = circular box, PB-VVK-S = rectangular box) with horizontal (H) or vertical (V) connection, adjustment damper (D1) fully (0°) open to fully (90°) closed.

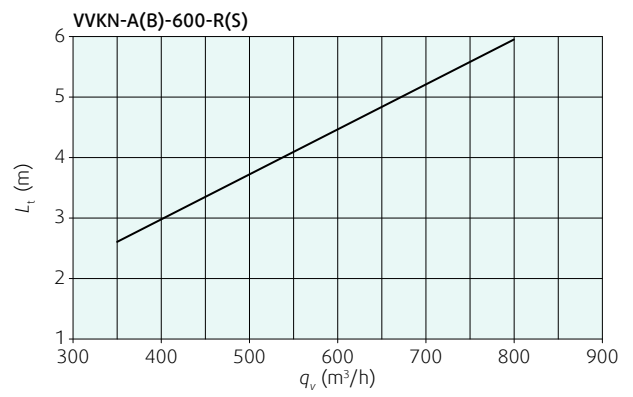
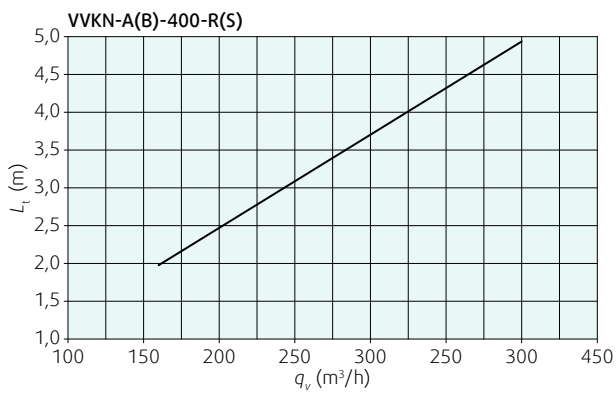
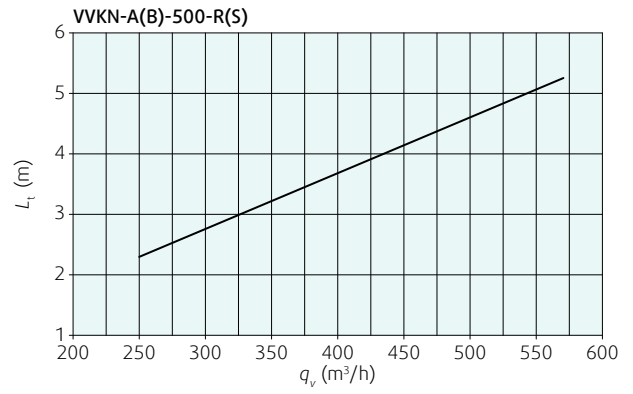
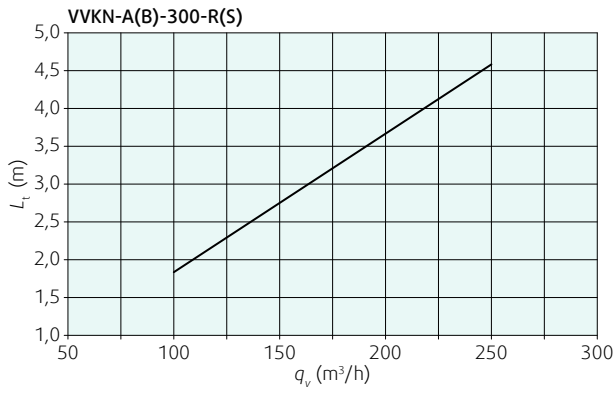
Diagrams: Pressure loss and A-weighted sound power level depending on air flow volume



S Supply: By plenum box PB-VVK (PB-VVK-R = circular box, PB-VVK-S = rectangular box) with horizontal (H) or vertical (V) connection, adjustment damper (D1) fully (0°) open to fully (90°) closed.

E Exhaust: By plenum box PB-VVK (PB-VVK-R = circular box, PB-VVK-S = rectangular box) with horizontal (H) or vertical (V) connection, adjustment damper (D1) fully (0°) open to fully (90°) closed.

Diagrams: Air throw length with terminal velocity 0,2 m/s depending on air flow volume



NOTE: L_t is measured for terminal velocity v_{tt} of 0,2 m/s

Accessories

PB-VVK

Plenum box



Ordering codes

	PB-VVK-	
Plenum box face round ³	R	
Plenum box face square ³	S	
Size	300 - 825	
Spigot nominal size	160 - 315	
Supply with mesh screen	S	
Extract without mesh screen	E	
Horizontal connection (from the side)	H	
Vertical connection (from the top)	V	
Untight spigot with a perforated damper ¹	D1	
Pressed tight spigot with the Zeus damper ¹	D2	
With internal insulation, 14 mm ²	I2	
With external insulation ²	J	

Ordering codes example:

PB-VVK - S - 300 - S - H - I2

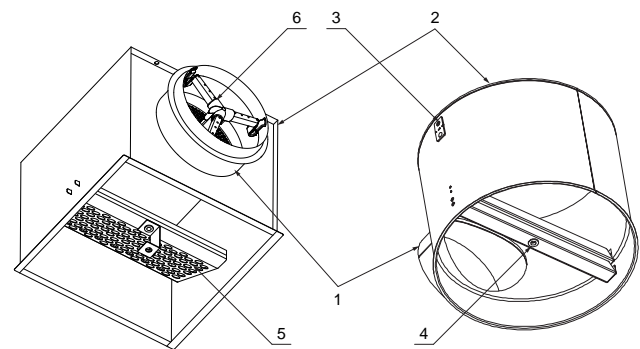
Square plenum box with size 300, supply with mesh screen, horizontal connection (from the side), spigot type D1, internal insulation.

1. If the spigot type is not entered in the ordering code, type "D1" will be supplied by default. It is not possible to order the Zeus damper for the product PB-VVK-R with horizontal connection. Plenum boxes with a vertical spigot D2 are supplied without a mesh screen.
2. In case the insulation type is not entered in the ordering code, the product PB-VVK will be supplied without insulation.
3. The circular plenum box PB-VVK-R can be used with both, circular and square diffuser plates. The square shaped plenum box PB-VVK-S can be used only with square diffuser plates.

The PB-VVK is produced in 2 types of shapes round (PB-VVK-R) or square (PB-VVK-S), with a horizontal or a vertical connection and with internal or external insulation. The plenum box is made of galvanized sheet as a standard.

There are 2 types of connection:

- D1: a simple spigot without a seal, with a perforated sheet damper
- D2: a pressed spigot with a seal including the Zeus damper (damper information available on page 15)



Product parts description:

1. Spigot
2. Casing
3. Hanging bracket
4. Bridge with a rivet nut for connection to a diffuser
5. Mesh screen with a rivet nut for connection
6. Damper

Fig. 4: Product PB-VVK

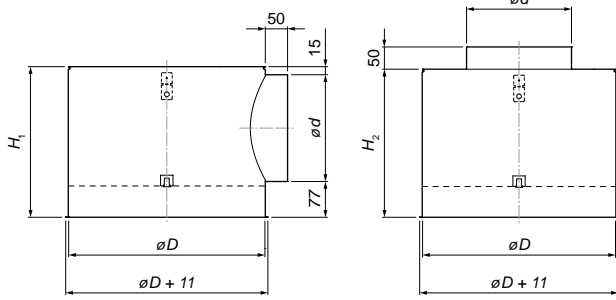


Fig. 5: Main dimensions of the PB-VVK-R

Size	$\varnothing D$	H_{hor}	H_{ver}	$\varnothing d$	m_{hor}	m_{ver}
	(mm)				(kg)	
300-160	275	250	200	158	2,3	2,0
400-200	364	290	200	198	3,3	2,8
500-200	470	290	200	198	4,7	3,9
600-200	575	290	300	198	6,2	6,3
600-250	575	340	300	248	6,7	6,2
625-200	595	290	300	198	6,5	6,9
625-250	595	340	300	248	7,0	6,6
800-315	775	405	300	313	11,4	10,5
825-315	795	405	300	313	11,8	10,9

Tab. 3: Main dimensions of the PB-VVK-R

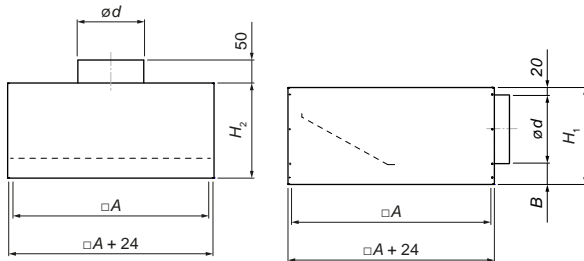
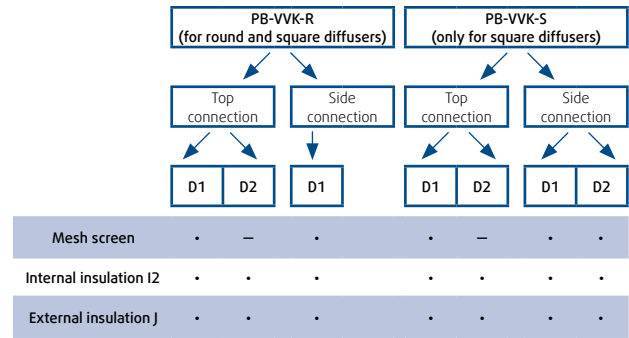


Fig. 6: Main dimensions of PB-VVK-S

Size	A	H_{hor}	H_{ver}	$\varnothing d$	B	m_{hor}	m_{ver}
	(mm)					(kg)	
300-160	266	240	200	158	62	2,6	2,4
400-160	366	240	200	158		3,6	3,4
400-200	366	280	200	198		4,0	3,6
500-200	466	280	200	198		5,3	4,7
600-200	566	280	300	198		6,7	7,2
600-250	566	330	300	248		7,4	7,3
625-200	591	280	300	198		7,1	7,6
625-250	591	330	300	248		7,8	7,7
800-315	766	400	300	313	67	13,6	12,0
825-315	791	400	300	313		14,2	12,6

Tab. 4: Main dimensions of the PB-VVK-S

Plenum box selection diagram

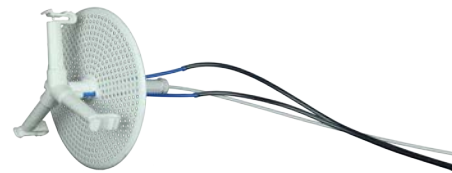


Legend

D1	- Untight socket with a perforated sheet-metal control damper
D2	- Pressed tight socket with a Zeus damper
xxxx	- Defined selection option
•	- Option to add a position to the selection
–	- Not possible to add a position to the selection

The Zeus damper

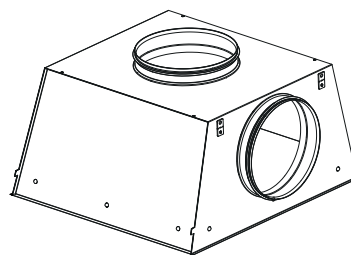
The Zeus control damper contains impulse tubes for measuring differential pressure using a portable measuring device. It can be adjusted manually using a cable gearing.



NOTE: In case of using PB-VVK-R with horizontal connection it is not possible to use the Zeus damper.

PB-VVKU

Universal plenum box



The PB-VVKU is a universal box which is possible to use for installation on various types of air terminal devices, though only square shaped ones (no circular shape possible). The PB-VVKU is manufactured from galvanized sheet. Upon customer's request it is possible to apply a powder-paint RAL surface finish. The box is optimized for use with both horizontal and vertical connection. When in storage, the PB-VVKU provides the advantage of stacking, thus saving storage space.

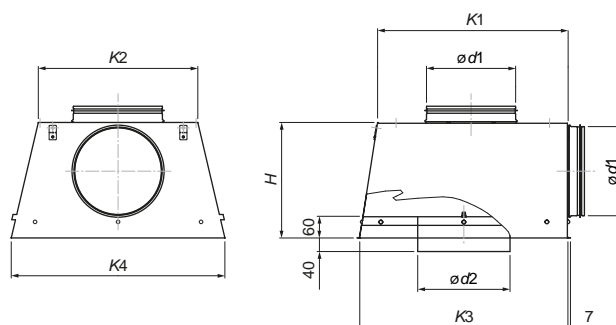


Fig. 7: Main dimensions of the PB-VVKU

Ordering codes

	PB-VVKU-				
Layout	Not insulated - horizontal	OH			
	Not insulated - vertical	OV			
	Insulated - horizontal	IH			
	Insulated - vertical	IV			
Size	300 - 625				
Spigot nominal size	100 - 315				
Connection type	Mounting Frame	R			
	Mesh screen	S			
	Spigot and socket joint	U			
Spigot type	No Sealing	A			
	Sealing	B			
	Sealing and Damper	C			

Ordering codes example:

PB-VVKU - OH - 300 - 100 - S - B

Universal plenum box, not insulated with horizontal supply, size 300, connection dimension 100, mesh screen, sealed socket.

NOTE: When using the PB-VVKU plenum box, it is recommended to read the technical documentation for the product TPI-07.

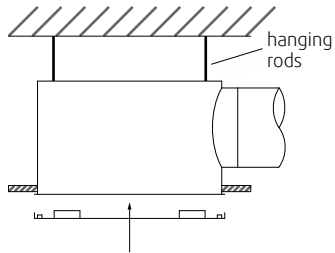
Size	A ₁	A ₂	A ₃	A ₄	H	ød	m
	(mm)						(kg)
300-100	250	200	278	292	190	98	1.95
300-125	247	200	278	292	215	123	2,2
300-160	242	185	278	292	250	158	2,5
400-160	340	279	378	392	240	158	4.1
400-200	334	260	378	392	280	198	4.5
500-160	438	375	478	492	250	158	5.9
500-200	432	356	478	492	290	198	6,1
500-250	432	336	478	492	320	248	6.5
600-200	535	465	578	592	270	198	6.7
600-250	528	442	578	592	320	248	7,7
600-315	500	400	578	592	385	313	8,9
625-200	560	490	603	617	270	198	8.7
625-250	553	467	603	617	320	248	9,1
625-315	540	440	603	617	385	313	9,7

Tab. 5: Main dimensions and weight of the PB-VVKU

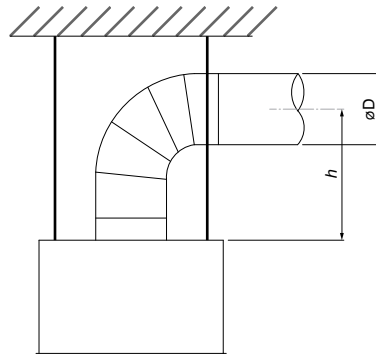
Mounting

The VVKN swirl diffuser is most commonly installed onto a ventilation duct as illustrated on Fig. 8. The mounting consists of installing the plenum box to the ceiling using draw-bars and mounting the diffuser face onto the plenum box using a centric screw which is included in the delivery.

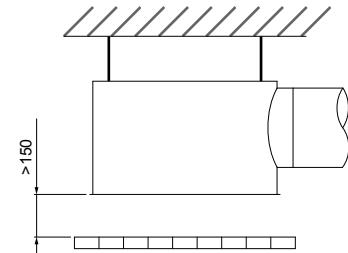
Fig. 8 depicts various methods of installing the VVKN onto the ceiling. When mounted into a suspended grid ceiling the supply air swirl is expected to be partially reduced. It is therefore needed to respect the minimum distance of the diffuser - at least 150 mm from the grid ceiling.



1. Flush mounted for continuous suspended ceiling



2. Free hanging installation onto ceiling
 $h_{\min} > (3 \sim 5) D$



3. Installation between the ceiling and the suspended grid ceiling

Fig. 8: Examples of mounting

Diffusers – Related Products

VVKR

Swirl Ceiling Diffuser with Adjustable Blades

Product information is available in the technical documentation for TPI-19.



VVT

Swirl Ceiling Diffuser with Thermostatic Control

Product information is available in the technical documentation for TPI-41.

