

## **DSQ Swirl Diffuser**

High air flow rate and low sound power levels  
due to flat, large-area blades

Minimal installation heights due to special plenum boxes

# DSQ Swirl Diffuser

Description, summary of types, front plate

**DSQ swirl diffuser** for supply air and exhaust air with constant and variable volume flow rates. Square front plate with fixed, large-area radially arranged air deflection blades. The evenly engaged contours of the blades extend into the corners of the diffuser. The smooth, flat surfaces with no disruptive bended edges facilitate high volume flow rates at low flow noises. The velocity of the entering supply air and the temperature differences are reduced very quickly due to the induction effect with the room air. This is the case for heating and also for room cooling with a temperature difference of up to -12 K between room air and supply air.

DSQ swirl diffusers made of galvanised sheet steel. The front plates are given a robust surface made of polyester, which is sintered at a high temperature. This is extremely colour-resistant and antistatic. With powder coating in colour RAL 9010 (white) smooth gloss with a gloss level of 80 to 90% or in another RAL colour.

The **plenum boxes**, made of galvanised sheet steel, are optimized for these swirl diffusers and for low installation heights, also available with powder coating. One or two lateral connecting pieces or one for connection from above as standard. In addition, with dampers and special air deflector plates for optimum air distribution with low flow noises, particularly for supply air. Setting volume flow rate is possible without dismounting of the swirl diffuser. With suspension holes and concealed central fastening.

For closed ceiling systems, grid ceilings and for freely suspended.

## Summary of types

Swirl diffuser and plenum box with	DSQ		
	lateral	two lateral	top
	connecting piece(s)		
• without damper, without air deflector plate	K1	K2	K3
• with damper	K1-D	K2-D	K3-D
• with air deflector plate	K1-L	K2-L	K3-L
• with damper, with air deflector plate	K1-DL	K2-DL	K3-DL

## Piece list

- 1 Plenum box
- 2 Connecting piece
- 3 Damper (optional)
- 4 Air deflector plate (optional)
- 5 Swirl diffuser
- 6 Central fastening
- 7 Adjustment device for damper
- 8 Lip seal (optional)
- 9 Seal

A: Front plate dimension  
F: Clear ceiling cut-out dimension

All dimensions in mm

## Nominal sizes

Nominal size	Hole pattern Plenum box size	∅A [mm]	∅F [mm]	A <sub>free</sub> [m²]	Application ⇒ see page 4
325	325	323	260	0.0264	from 75 [m³/h]
400	400	398	337	0.0452	from 135 [m³/h]
500	500	498	437	0.0781	from 220 [m³/h]
600	600	595	537	0.1198	from 300 [m³/h]
625	600	623	537	0.1198	from 300 [m³/h]

- Nominal sizes correspond to the front plates.
- Hole patterns correspond to the plenum box sizes. They define the free cross-sections A<sub>free</sub> of the swirl diffusers.
- Front plates for supply air and exhaust air are identical.

## Central fastening

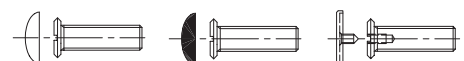
with concealed screws M8x25:

## Colour of swirl diffuser

RAL 9010 | special colour RAL ....

## Colour of cap

white | black | special colour  
RAL 9010 | RAL 9017 | RAL ....

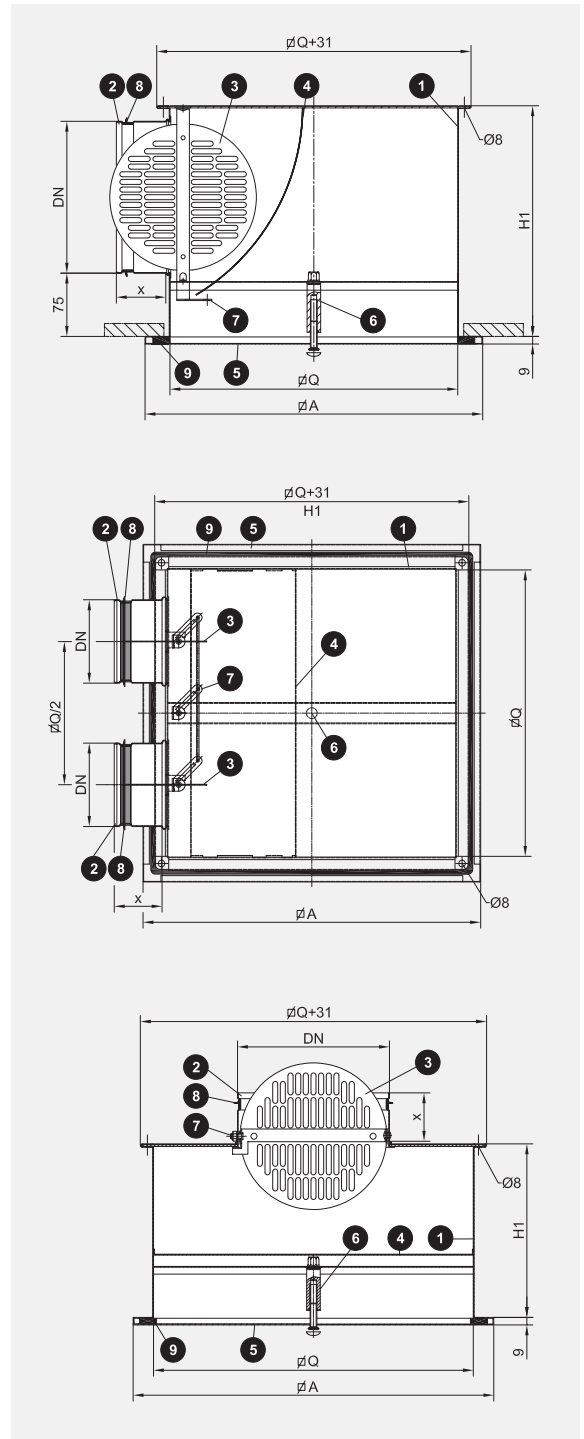


regarding colours ⇒ see page 14

# DSQ Swirl Diffuser

Plenum boxes for closed ceiling systems, grid ceilings and for freely suspended

**K1 - with lateral connecting piece**



**K2 - with two lateral connecting pieces for high volume flow rates at lowest possible box height H1**



**K3 - with top connecting piece**



## Plenum box heights H1 [mm]

Standard connecting pieces and heights of the plenum boxes K1 are in bold type

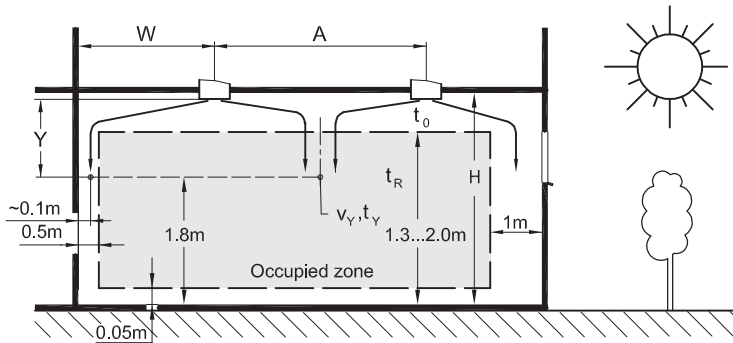
Plenum box size Hole pattern	Ø Q	Plenum box K1 with connecting piece DN											K2 with DN						K3 with DN					
		100	125	150	<b>160</b>	180	<b>200</b>	224	<b>250</b>	280	300	315	100	125	150	160	180	200	224	160	200	250		
325	260	190	215	240	<b>250</b>	270	290	-	-	-	-	-	190	-	-	-	-	-	-	-	-	190	-	-
400	337	-	215	240	250	270	<b>290</b>	314	-	-	-	-	190	215	-	-	-	-	-	-	-	-	190	-
500	437	-	-	240	250	270	<b>290</b>	314	340	370	-	-	-	215	240	250	270	-	-	-	-	-	190	-
600 <sup>1)</sup>	537	-	-	240	250	270	290	314	<b>340</b>	370	390	405	-	215	240	250	270	290	314	-	-	-	-	200
connecting piece length x		40	40	40	40	40	40	60	60	60	60	60	40	40	40	40	40	40	60			40	40	60

<sup>1)</sup> Plenum box size 600 is for swirl diffusers with nominal sizes 600 and 625 (hole pattern 600).

Front plate dimension Ø A and piece list ⇒ see page 2

# DSQ Swirl Diffuser

Selection of room flow, range of application



### Occupied zone in accordance with EN 13779

In accordance with EN 13779, the occupied zone is defined as a room section. It is necessary to meet comfort criteria in this zone.

In most areas of application the height is 1.30 to 2.00 m. As standard, the permissible flow velocities  $v_Y$  are to be defined for a height of 1.80 m. Higher velocities are permissible outside of the occupied zone, that is at distances of up to 0.5 m from internal walls and up to 1.0 m from external walls with windows.

### Selection of DSQ swirl diffusers

Depending on the hole patterns, the flow velocity  $v_Y$  is defined by the free cross-section  $A_{free}$  of the swirl diffuser, the volume flow rate  $V$ , the room height  $H$ , the orthogonal distances  $A$  and  $B$  of the swirl diffusers to each other and their distance from the wall  $W$ . In addition to the absolute distance dimensions  $A$  and  $B$ , the relationship of  $A$  to  $B$  is also important. Swirl diffusers in extremely rectangular layouts with  $A \gg B$  or  $B \gg A$ , which may also be single-row layouts, produce significantly different flow velocities  $v_Y$  in comparison to square and slightly rectangular layouts.

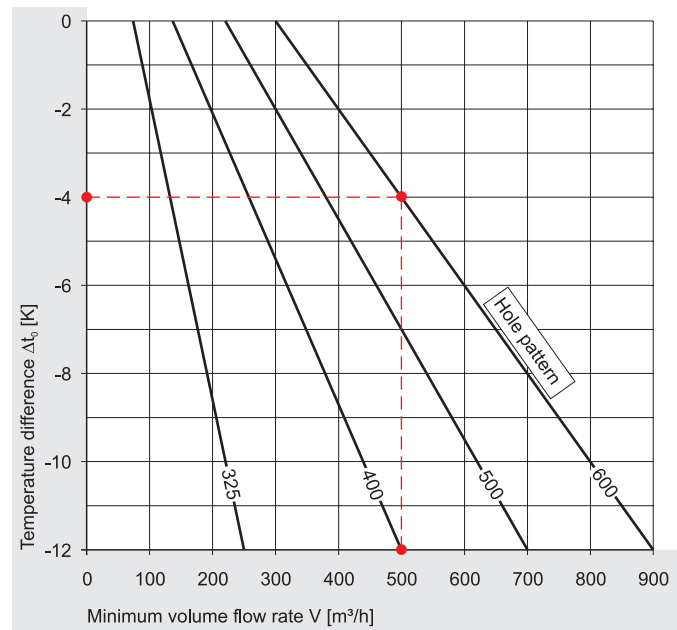
The nomograms present these relationships and the effect of adjoining walls. The flow in the room can be optimized by varying the DSQ swirl diffuser layouts and appropriate size selection. By this means it is also often possible to reduce the number of swirl diffusers required. However, care should be taken to ensure effective purging of the room, also by means of sufficiently high flow velocities in the room!

### Range of application

Plenum boxes, installed flush in ceilings, are required for optimum supply air distribution in rooms with a height of approx. 2.5 to 4 m. In this application, the square DSQ swirl diffusers distribute the supply air radial underneath the ceilings. The air is then distributed into the occupied zone via the walls of the room and the effects of counterflow. In the case of cooling, the required minimum volume flow rates should be maintained at a given temperature difference  $\Delta t_o$  between supply air and room air. This then excludes the possibility of a partial incidence of cold air as stratification and the associated occurrence of draughts in the occupied zone, which may otherwise arise when cold air is brought in a room which has a higher temperature.

In general, minimum volume flow rates sufficient to guarantee minimum purging of the room should always be assured, even in heating applications and under isothermal conditions where  $\Delta t_o = 0$  [K].

In the case of freely suspended installation, thermal deflections occur. Therefore a changed infiltration of the supply air into the occupied zone with changed flow velocities are to be expected. For this reason, comfort criteria can be met only very restricted at this type of installation.



**Example** (⇒ see page 5)

**DSQ - 625 - K1 - 250 - DL**

Room temperature	$t_R$	=	22	[°C]
Supply air temperature	$t_o$	=	18	[°C]
Temperature difference	$\Delta t_o$	=	-4	[K]
Minimum volume flow rate (supply air)	$V$	=	500	[m³/h]

**NOTE**

The specified, temperature-dependent **minimum volume flow rates** must also be taken into consideration when selecting using the nomogram or tables. These can be taken into account automatically with the WILDEBOER - selection software!

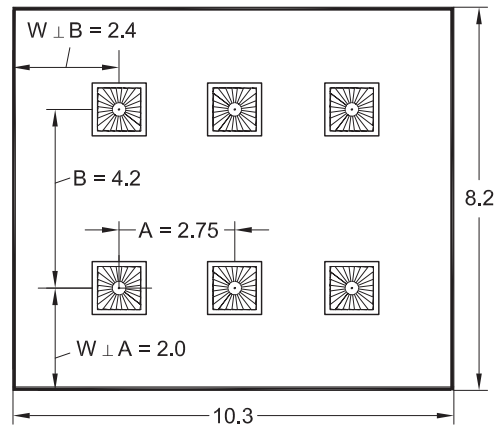
# DSQ Swirl Diffuser

## Example for selection

### Rectangular layout

#### Specified:

Room dimension 1		10.3 [m]
Room dimension 2		8.2 [m]
Room height	H =	3.0 [m]
Ceiling distance	Y =	1.2 [m]
Air change		11.8 [h <sup>-1</sup> ]
Room volume		253 [m <sup>3</sup> ]
Total volume flow rate	V <sub>total</sub> =	3000 [m <sup>3</sup> /h]
Room temperature	t <sub>R</sub> =	22 [°C]
Supply air temperature	t <sub>o</sub> =	18 [°C]



#### Plenum box with standard connecting piece

<b>DSQ - 625 - K1 - 250 - DL<sup>1)</sup></b>		6 pieces
Volume flow rate per diffuser	V	= 500 [m <sup>3</sup> /h]
Cross section	A <sub>DN</sub>	= 0.049 [m <sup>2</sup> ]
Flow velocity in A <sub>DN</sub>	v <sub>DN</sub>	= 2.8 [m/s]
Δp <sub>t</sub> , damper OPEN	Δp <sub>t</sub>	= 7 [Pa]
L <sub>WA</sub> , damper OPEN	L <sub>WA</sub>	= 23 [dB(A)]
Nomogram ⇒ see page 8		
Δp <sub>t</sub> , damper CLOSED	7 [Pa] · 3.8 <sup>2)</sup>	= 27 [Pa]
L <sub>WA</sub> , damper CLOSED	23 [dB(A)] + 12.4 <sup>2)</sup>	= 35 [dB(A)]

<sup>2)</sup> Correction values ⇒ see page 11

#### Octave sound power level L<sub>W-Oct</sub>, damper OPEN

f [Hz]	63	125	250	500	1000	2000	4000	8000
L <sub>WA</sub> [dB(A)]	23	23	23	23	23	23	23	23
ΔL <sub>2.8 [m/s]</sub> [dB]	+12	+6	+3	-2	-6	-17	<-30	<-30
L <sub>W-Oct</sub> [dB]	35	29	26	21	<20	<20	<20	<20

Nomogram ⇒ see page 8

#### Plenum box with other connecting piece size

<b>DSQ - 625 - K1 - 200 - DL<sup>1)</sup></b>		6 pieces
Volume flow rate per diffuser	V	= 500 [m <sup>3</sup> /h]
Cross section	A <sub>DN</sub>	= 0.031 [m <sup>2</sup> ]
Flow velocity in A <sub>DN</sub>	v <sub>DN</sub>	= 4.4 [m/s]
Δp <sub>t</sub> , damper OPEN	7 [Pa] · 2.1 <sup>3)</sup>	= 15 [Pa]
L <sub>WA</sub> , damper OPEN	23 [dB(A)] + 8.9 <sup>3)</sup>	= 32 [dB(A)]
Δp <sub>t</sub> , damper CLOSED	7 [Pa] · 2.1 <sup>3)</sup> · 4.3 <sup>4)</sup>	= 63 [Pa]
L <sub>WA</sub> , damper CLOSED	23 [dB(A)] + 8.9 <sup>3)</sup> + 14.3 <sup>4)</sup>	= 46 [dB(A)]

<sup>3)</sup> Correction values ⇒ see page 10

<sup>4)</sup> Correction values ⇒ see page 11

#### Octave sound power level L<sub>W-Oct</sub>, damper OPEN

f [Hz]	63	125	250	500	1000	2000	4000	8000
L <sub>WA</sub> [dB(A)]	32	32	32	32	32	32	32	32
ΔL <sub>4.4 [m/s]</sub> [dB]	+9	+4	+3	-2	-5	-13	-26	-27
L <sub>W-Oct</sub> [dB]	41	36	35	30	27	<20	<20	<20

Nomogram ⇒ see page 8

#### Room flow

Distance A	A	= 2.75 [m]
Distance B	B	= 4.20 [m]
Distance W, at right angles to A	W	= 2.00 [m]
Distance W, at right angles to B	W	= 2.40 [m]
Flow velocity in the occupied zone	v <sub>∇</sub>	= 0.16 [m/s]
Nomogram ⇒ see page 6		
Flow velocity on the wall, at right angles to A	v <sub>∇</sub>	= 0.25 [m/s]
Nomogram ⇒ see page 7		
Flow velocity on the wall, at right angles to B	v <sub>∇</sub>	= 0.18 [m/s]
Nomogram ⇒ see page 7		

#### Temperature ratio, induction in the occupied zone

Temperature ratio	Δt/Δt <sub>o</sub>	= 0.12
Induction	i	= 7

Nomogram ⇒ see page 12

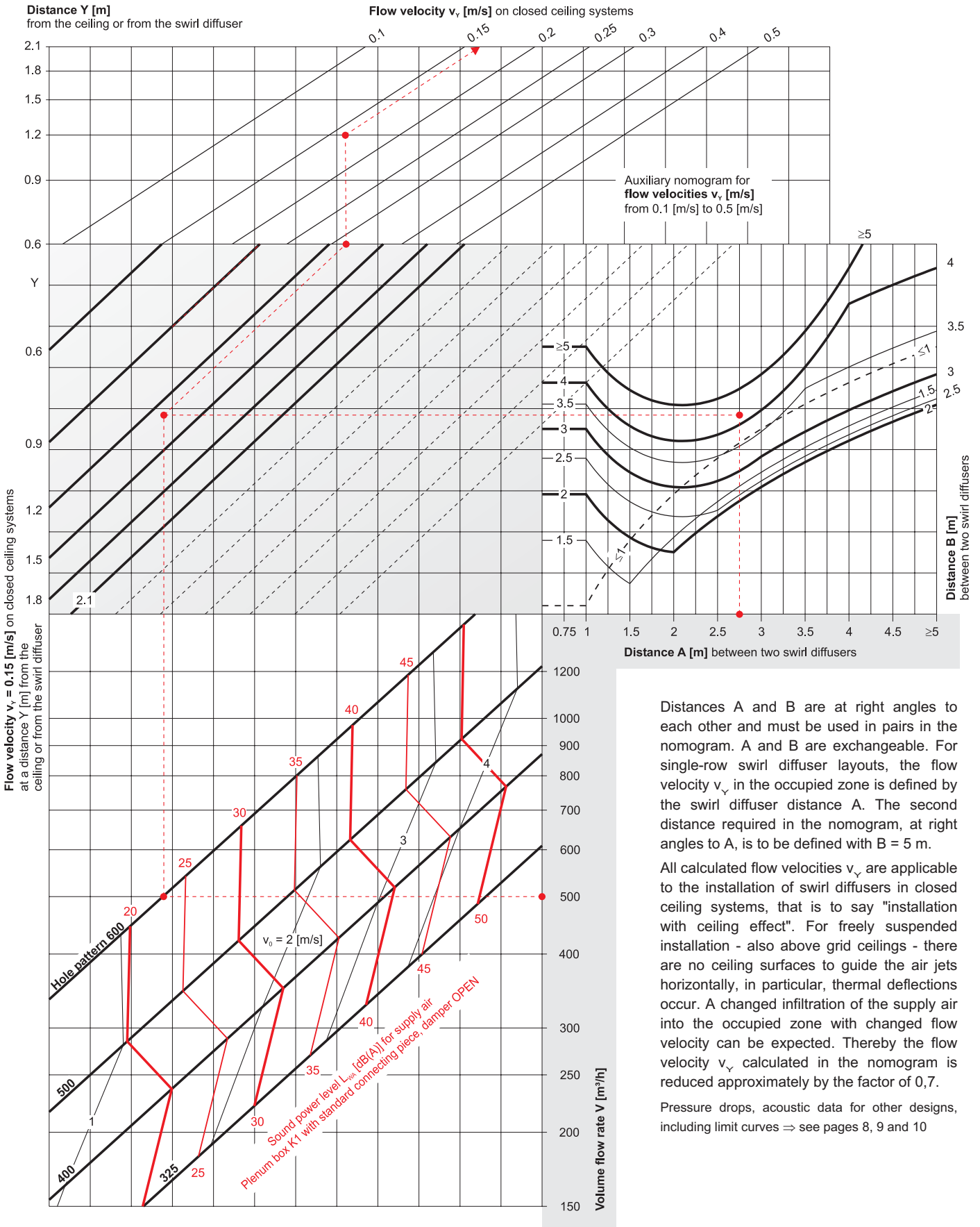
<sup>1)</sup> Order information ⇒ see page 2 or 14

Nomenclature ⇒ see page 12



# DSQ Swirl Diffuser

Room flow (air jets directed on each other)



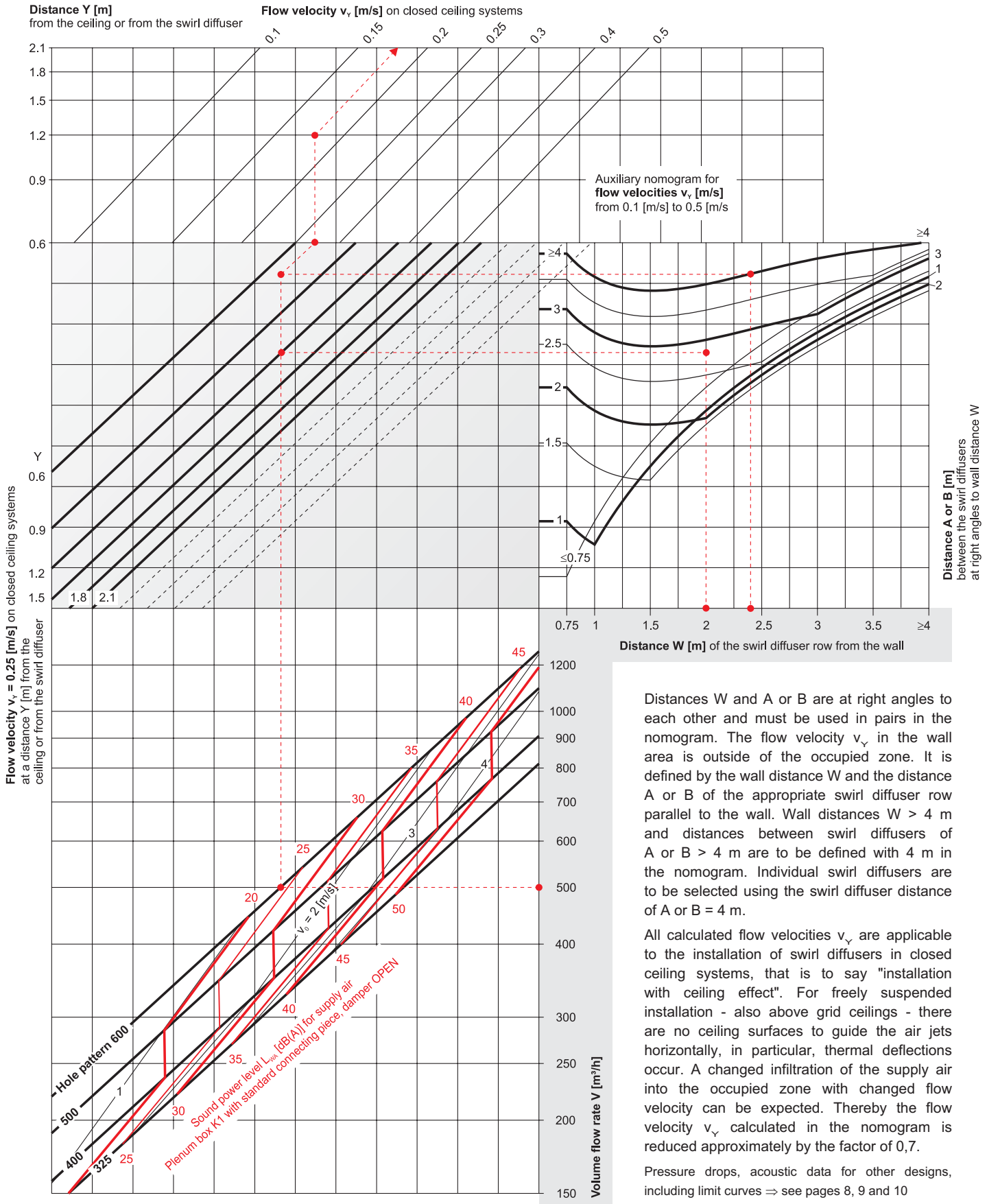
Distances A and B are at right angles to each other and must be used in pairs in the nomogram. A and B are exchangeable. For single-row swirl diffuser layouts, the flow velocity  $v_v$  in the occupied zone is defined by the swirl diffuser distance A. The second distance required in the nomogram, at right angles to A, is to be defined with B = 5 m.

All calculated flow velocities  $v_v$  are applicable to the installation of swirl diffusers in closed ceiling systems, that is to say "installation with ceiling effect". For freely suspended installation - also above grid ceilings - there are no ceiling surfaces to guide the air jets horizontally, in particular, thermal deflections occur. A changed infiltration of the supply air into the occupied zone with changed flow velocity can be expected. Thereby the flow velocity  $v_v$  calculated in the nomogram is reduced approximately by the factor of 0,7.

Pressure drops, acoustic data for other designs, including limit curves → see pages 8, 9 and 10

# DSQ Swirl Diffuser

Room flow (air jets directed to the wall)



Distances W and A or B are at right angles to each other and must be used in pairs in the nomogram. The flow velocity  $v_v$  in the wall area is outside of the occupied zone. It is defined by the wall distance W and the distance A or B of the appropriate swirl diffuser row parallel to the wall. Wall distances  $W > 4$  m and distances between swirl diffusers of A or B  $> 4$  m are to be defined with 4 m in the nomogram. Individual swirl diffusers are to be selected using the swirl diffuser distance of A or B = 4 m.

All calculated flow velocities  $v_v$  are applicable to the installation of swirl diffusers in closed ceiling systems, that is to say "installation with ceiling effect". For freely suspended installation - also above grid ceilings - there are no ceiling surfaces to guide the air jets horizontally, in particular, thermal deflections occur. A changed infiltration of the supply air into the occupied zone with changed flow velocity can be expected. Thereby the flow velocity  $v_v$  calculated in the nomogram is reduced approximately by the factor of 0,7.

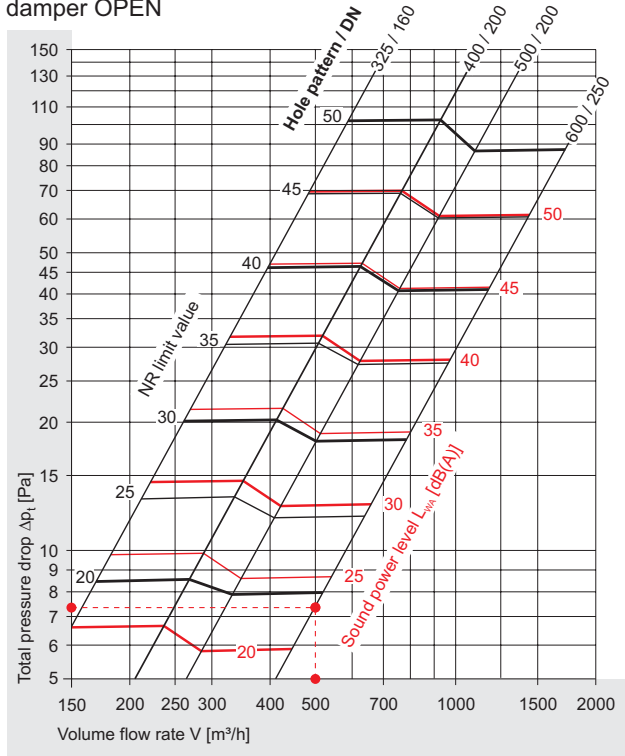
Pressure drops, acoustic data for other designs, including limit curves => see pages 8, 9 and 10

# DSQ Swirl Diffuser

Pressure drop, sound power level, NR rating, relative sound power levels

## Supply air: DSQ with plenum box K1-DL

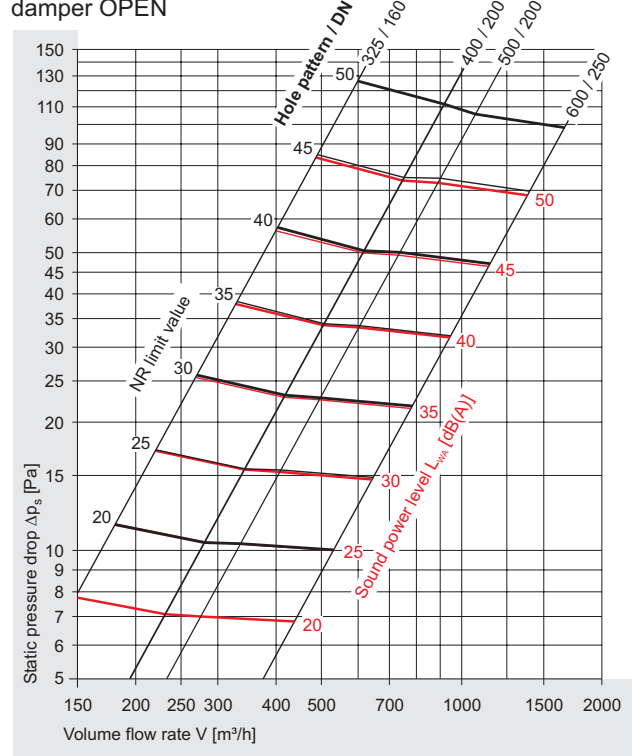
with air deflector plate and damper OPEN



Minimum volume flow rates must also be taken into account!  
 ⇒ see page 4

## Exhaust air: DSQ with plenum box K1-D

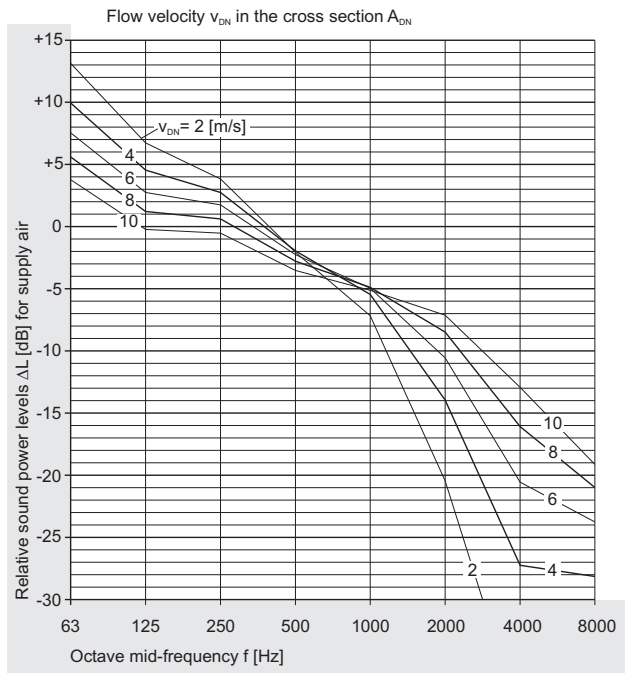
without air deflector plate and damper OPEN



Corrections for other connecting piece sizes and for damper CLOSED  
 ⇒ see pages 10 and 11

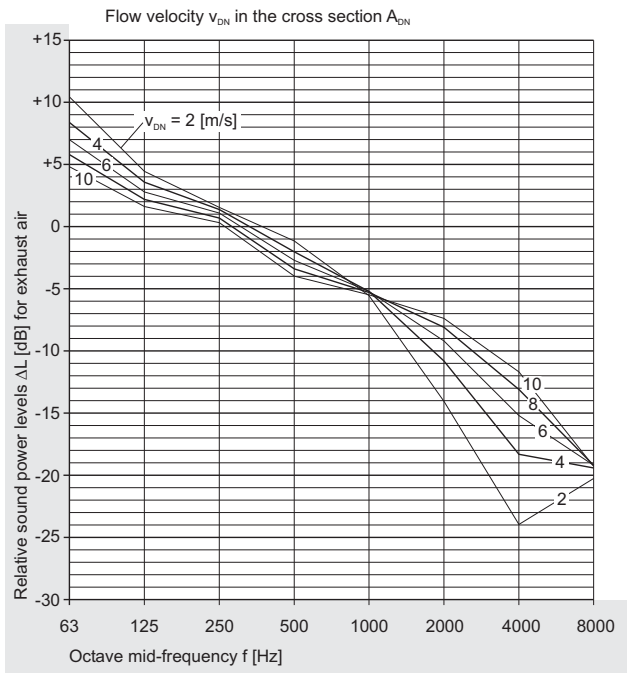
## Supply air: DSQ with plenum box K1-DL

with air deflector plate and damper OPEN



## Exhaust air: DSQ with plenum box K1-D

without air deflector plate and damper OPEN



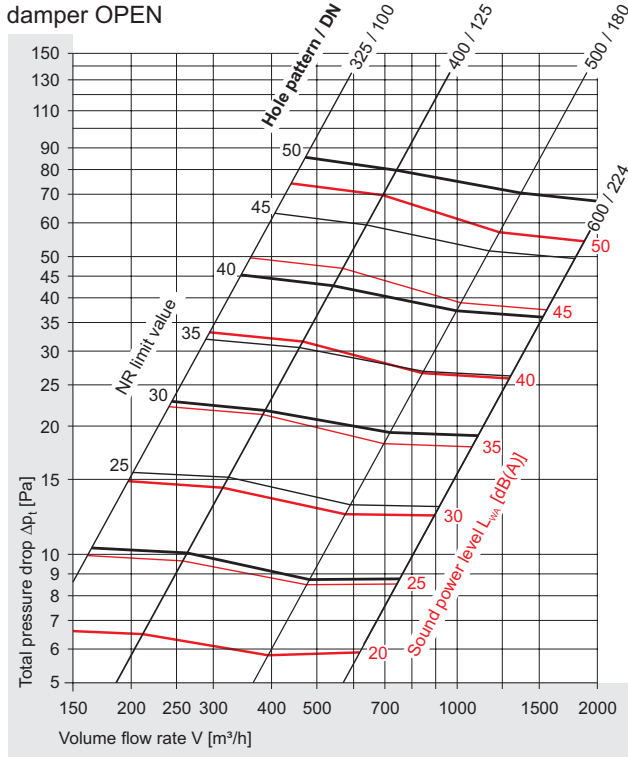


# DSQ Swirl Diffuser

Pressure drop, sound power level, NR rating

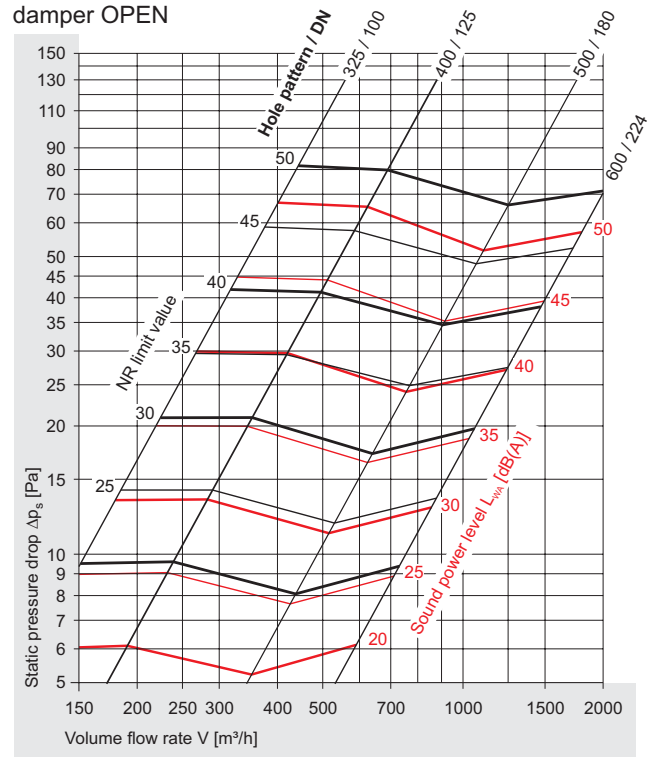
## Supply air: DSQ with plenum box K2-DL

with air deflector plate and damper OPEN



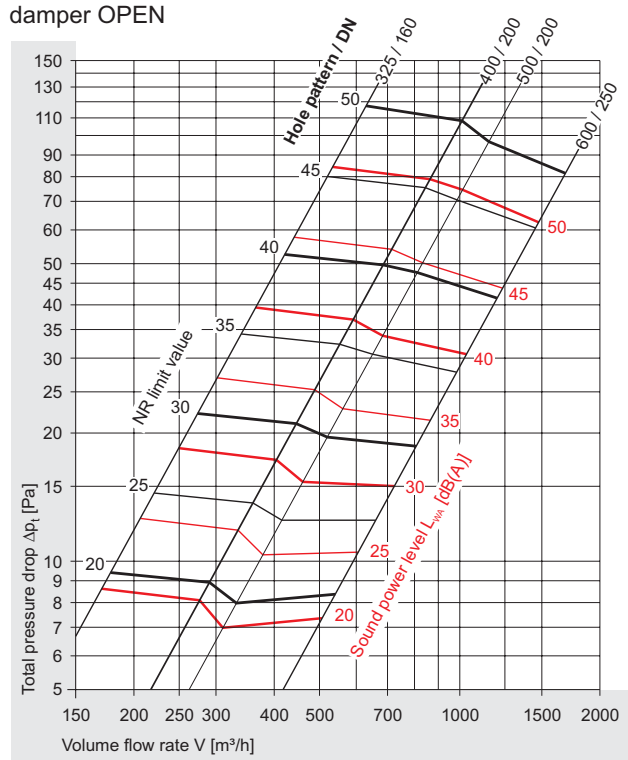
## Exhaust air: DSQ with plenum box K2-D

without air deflector plate and damper OPEN



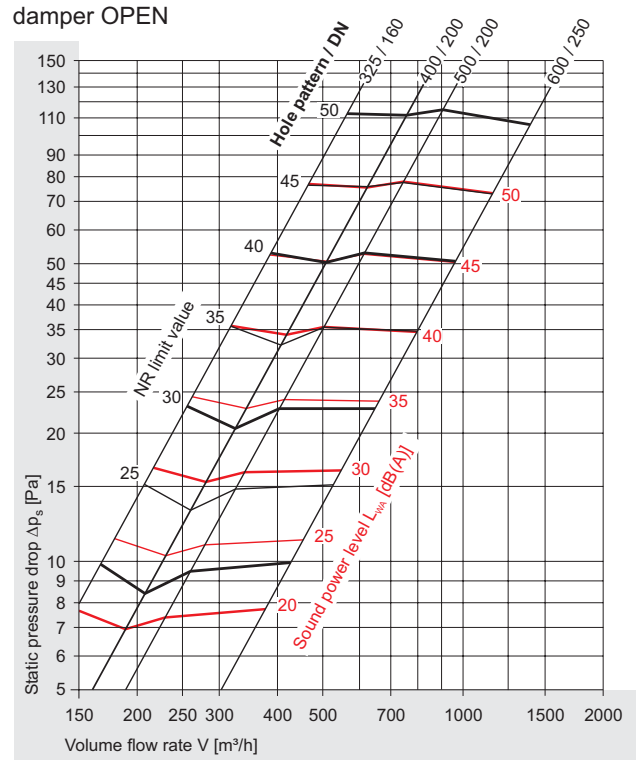
## Supply air: DSQ with plenum box K3-DL

with air deflector plate and damper OPEN



## Exhaust air: DSQ with plenum box K3-D

without air deflector plate and damper OPEN



Minimum volume flow rates must also be taken into account!  
 → see page 4

Corrections for other connecting piece sizes and for damper CLOSED ⇒ see pages 10 and 11.  
 Relative sound power levels  $\Delta L$  for plenum boxes K2 and K3 ⇒ see WILDEBOER - selection software.

# DSQ Swirl Diffuser

Correction values: plenum boxes with non-standard connecting piece sizes, damper OPEN

Connecting piece size		DN	100	125	150	160	180	200	224	250	280	300	315	
Supply air Plenum box K1-DL with air deflector plate	Plenum box size 325	$\Delta p$	x	3.9	1.9	1.1	1.0	0.8	0.7	-	-	-	-	-
		$L_{WA}$	+	11.3	5.9	1.5	0.0	-2.8	-5.3	-	-	-	-	-
	400	$\Delta p$	x	-	3.6	2.0	1.7	1.3	1.0	0.8	-	-	-	-
		$L_{WA}$	+	-	12.9	7.9	6.1	2.9	0.0	-3.1	-	-	-	-
	500	$\Delta p$	x	-	-	2.8	2.2	1.4	1.0	0.7	0.5	0.4	-	-
		$L_{WA}$	+	-	-	9.5	7.4	3.5	0.0	-3.7	-7.3	-10.9	-	-
	600 <sup>1)</sup>	$\Delta p$	x	-	-	6.1	4.7	3.1	2.1	1.4	1.0	0.7	0.6	0.5
		$L_{WA}$	+	-	-	20.6	17.9	13.2	8.9	4.4	0.0	-4.5	-7.2	-9.1
Exhaust air Plenum box K1-D without air deflector plate	Plenum box size 325	$\Delta p$	x	3.5	1.8	1.1	1.0	0.8	0.7	-	-	-	-	-
		$L_{WA}$	+	13.0	6.6	1.7	0.0	-2.9	-5.4	-	-	-	-	-
	400	$\Delta p$	x	-	4.1	2.3	1.8	1.3	1.0	0.8	-	-	-	-
		$L_{WA}$	+	-	14.9	8.8	6.7	3.1	0.0	-3.1	-	-	-	-
	500	$\Delta p$	x	-	-	2.7	2.1	1.4	1.0	0.7	0.5	0.4	-	-
		$L_{WA}$	+	-	-	10.9	8.3	3.8	0.0	-3.9	-7.5	-11.0	-	-
	600 <sup>1)</sup>	$\Delta p$	x	-	-	6.2	4.9	3.2	2.2	1.4	1.0	0.7	0.6	0.5
		$L_{WA}$	+	-	-	20.7	17.9	12.8	8.5	4.1	0.0	-3.9	-6.2	-7.7
Supply air Plenum box K2-DL with air deflector plate	Plenum box size 325	$\Delta p$	x	1.0	-	-	-	-	-	-	-	-	-	-
		$L_{WA}$	+	0.0	-	-	-	-	-	-	-	-	-	-
	400	$\Delta p$	x	2.0	1.0	-	-	-	-	-	-	-	-	-
		$L_{WA}$	+	10.4	0.0	-	-	-	-	-	-	-	-	-
	500	$\Delta p$	x	-	3.0	1.6	1.3	1.0	-	-	-	-	-	-
		$L_{WA}$	+	-	13.6	6.4	4.0	0.0	-	-	-	-	-	-
	600 <sup>1)</sup>	$\Delta p$	x	-	6.7	3.4	2.7	1.8	1.3	1.0	-	-	-	-
		$L_{WA}$	+	-	26.1	16.8	13.8	8.5	4.2	0.0	-	-	-	-
Exhaust air Plenum box K2-D without air deflector plate	Plenum box size 325	$\Delta p$	x	1.0	-	-	-	-	-	-	-	-	-	-
		$L_{WA}$	+	0.0	-	-	-	-	-	-	-	-	-	-
	400	$\Delta p$	x	2.0	1.0	-	-	-	-	-	-	-	-	-
		$L_{WA}$	+	10.1	0.0	-	-	-	-	-	-	-	-	-
	500	$\Delta p$	x	-	3.2	1.7	1.4	1.0	-	-	-	-	-	-
		$L_{WA}$	+	-	14.5	6.8	4.3	0.0	-	-	-	-	-	-
	600 <sup>1)</sup>	$\Delta p$	x	-	6.7	3.5	2.8	1.9	1.4	1.0	-	-	-	-
		$L_{WA}$	+	-	25.7	16.6	13.6	8.5	4.2	0.0	-	-	-	-

The correction values are average values for the entire volume flow range, otherwise see WILDEBOER - selection software.

<sup>1)</sup> Plenum box size 600 is for swirl diffusers with nominal sizes 600 and 625 (hole pattern 600).

# DSQ Swirl Diffuser

Correction values: plenum boxes with damper CLOSED

Connecting piece size		DN	100	125	150	160	180	200	224	250	280	300	315	
Supply air Plenum box K1-DL with air deflector plate	Plenum box size	325	$\Delta p$ x 4.3	3.8	3.2	3.0	2.4	1.8	-	-	-	-	-	
		$L_{WA}$ + 18.9	12.9	8.4	7.1	5.2	4.3	-	-	-	-	-		
	400	$\Delta p$ x -	4.5	4.1	3.9	3.6	3.1	2.5	-	-	-	-	-	
		$L_{WA}$ + -	16.1	14.0	13.1	11.3	9.4	7.0	-	-	-	-		
	500	$\Delta p$ x -	-	4.6	4.5	4.3	4.0	3.7	3.2	2.7	-	-	-	
		$L_{WA}$ + -	-	16.7	15.7	14.0	12.4	10.8	9.4	8.2	-	-		
	600 <sup>1)</sup>	$\Delta p$ x -	-	4.4	4.4	4.4	4.3	4.1	3.8	3.4	3.0	2.6	-	
		$L_{WA}$ + -	-	16.3	15.9	15.1	14.3	13.4	12.4	11.3	10.6	10.0		
	Exhaust air Plenum box K1-D without air deflector plate	Plenum box size	325	$\Delta p$ x 3.5	2.9	2.4	2.3	2.0	1.8	-	-	-	-	-
			$L_{WA}$ + 15.6	12.4	9.9	9.2	8.0	7.3	-	-	-	-	-	
		400	$\Delta p$ x -	3.0	3.0	3.0	2.8	2.6	2.2	-	-	-	-	-
			$L_{WA}$ + -	11.7	12.2	12.2	11.9	11.0	9.5	-	-	-	-	
500		$\Delta p$ x -	-	3.3	3.3	3.1	3.0	2.8	2.7	2.5	-	-	-	
		$L_{WA}$ + -	-	11.6	11.8	12.1	11.8	11.2	10.0	-	-	-		
600 <sup>1)</sup>		$\Delta p$ x -	-	3.4	3.4	3.4	3.4	3.3	3.2	3.0	2.8	2.7	-	
		$L_{WA}$ + -	-	14.6	14.2	13.6	13.1	12.6	12.3	12.2	12.2	12.2		
Supply air Plenum box K2-DL with air deflector plate		Plenum box size	325	$\Delta p$ x 3.9	-	-	-	-	-	-	-	-	-	-
			$L_{WA}$ + 14.1	-	-	-	-	-	-	-	-	-	-	
		400	$\Delta p$ x 3.6	5.1	-	-	-	-	-	-	-	-	-	-
			$L_{WA}$ + 13.6	16.5	-	-	-	-	-	-	-	-	-	
	500	$\Delta p$ x -	5.5	4.5	4.1	3.3	-	-	-	-	-	-	-	
		$L_{WA}$ + -	17.8	14.8	13.5	11.1	-	-	-	-	-	-		
	600 <sup>1)</sup>	$\Delta p$ x -	5.3	4.5	4.3	3.7	3.3	2.9	-	-	-	-	-	
		$L_{WA}$ + -	16.2	14.3	13.7	12.6	11.8	11.1	-	-	-	-		
	Exhaust air Plenum box K2-D without air deflector plate	Plenum box size	325	$\Delta p$ x 3.6	-	-	-	-	-	-	-	-	-	-
			$L_{WA}$ + 13.5	-	-	-	-	-	-	-	-	-	-	
		400	$\Delta p$ x 3.7	3.8	-	-	-	-	-	-	-	-	-	-
			$L_{WA}$ + 12.9	14.9	-	-	-	-	-	-	-	-	-	
500		$\Delta p$ x -	4.0	3.5	3.2	2.8	-	-	-	-	-	-	-	
		$L_{WA}$ + -	13.9	12.0	11.2	9.6	-	-	-	-	-	-		
600 <sup>1)</sup>		$\Delta p$ x -	4.4	3.3	3.0	2.5	2.3	2.4	-	-	-	-	-	
		$L_{WA}$ + -	14.9	12.6	11.9	11.0	10.7	11.0	-	-	-	-		
Supply air Plenum box K3-DL with air deflector plate		Plenum box size	325	$\Delta p$ x -	-	-	3.7	-	-	-	-	-	-	-
			$L_{WA}$ + -	-	-	14.1	-	-	-	-	-	-	-	
		400	$\Delta p$ x -	-	-	-	-	3.4	-	-	-	-	-	-
			$L_{WA}$ + -	-	-	-	-	14.2	-	-	-	-	-	
	500	$\Delta p$ x -	-	-	-	-	4.5	-	-	-	-	-	-	
		$L_{WA}$ + -	-	-	-	-	17.0	-	-	-	-	-		
	600 <sup>1)</sup>	$\Delta p$ x -	-	-	-	-	-	-	4.0	-	-	-	-	
		$L_{WA}$ + -	-	-	-	-	-	-	16.5	-	-	-		
	Exhaust air Plenum box K3-D without air deflector plate	Plenum box size	325	$\Delta p$ x -	-	-	2.8	-	-	-	-	-	-	-
			$L_{WA}$ + -	-	-	12.9	-	-	-	-	-	-	-	
		400	$\Delta p$ x -	-	-	-	-	2.4	-	-	-	-	-	-
			$L_{WA}$ + -	-	-	-	-	9.2	-	-	-	-	-	
500		$\Delta p$ x -	-	-	-	-	2.8	-	-	-	-	-	-	
		$L_{WA}$ + -	-	-	-	-	9.8	-	-	-	-	-		
600 <sup>1)</sup>		$\Delta p$ x -	-	-	-	-	-	-	3.1	-	-	-	-	
		$L_{WA}$ + -	-	-	-	-	-	-	12.8	-	-	-		

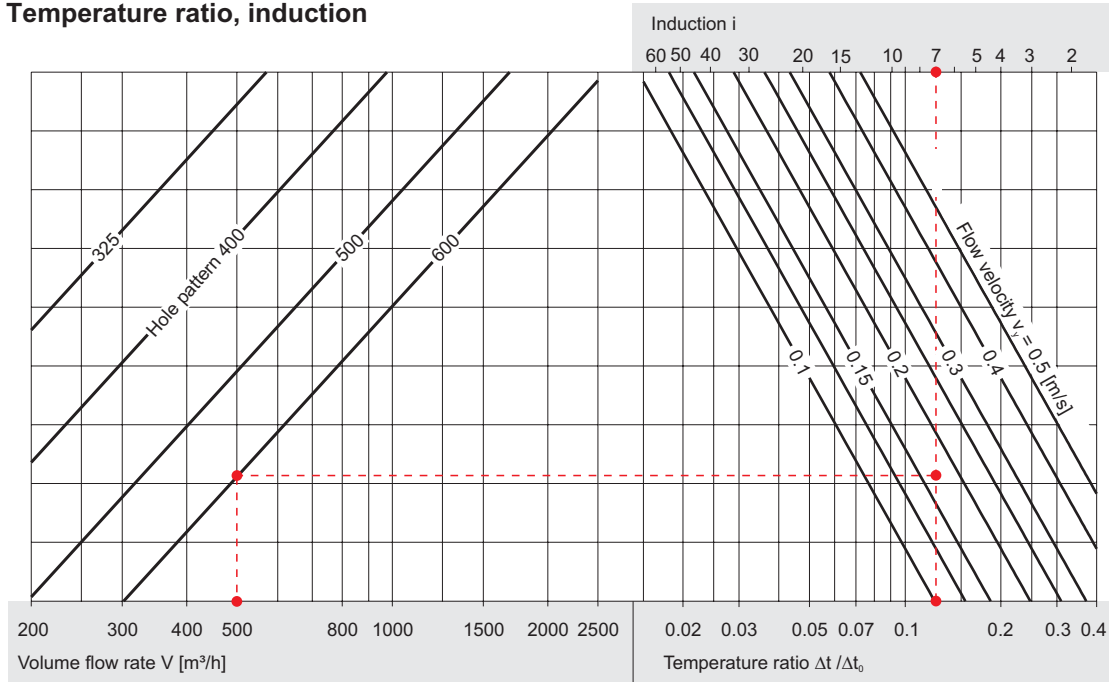
The correction values are average values for the entire volume flow range, otherwise see WILDEBOER - selection software.

<sup>1)</sup> Plenum box size 600 is for swirl diffusers with nominal sizes 600 and 625 (hole pattern 600).

# DSQ Swirl Diffuser

Temperature ratio, induction, nomenclature

## Temperature ratio, induction



Example (⇒ see page 5)

### DSQ - 625 - K1 - 250 - DL

Supply air volume flow rate	$V$	=	500	[m³/h]
Flow velocity	$v_v$	=	0.16	[m/s]
Room temperature	$t_R$	=	22	[°C]
Supply air temperature	$t_o$	=	18	[°C]
Temperature ratio	$\Delta t / \Delta t_o$	=	0.12	
Temperature	$t_y$	=	$0.12 \cdot (18 - 22) + 22$	= 21.5 [°C]
Induction	$i$	=	7	
Secondary volume flow rate	$V_s$	=	$7 \cdot 500$	= 3500 [m³/h]

## Nomenclature

$A_{free}$ [m²]	= Free cross-section of the swirl diffuser	$t_R$ [°C]	= Room temperature
DN [mm]	= Connecting piece size	$\Delta t_o$ [K]	= Temperature difference; $\Delta t_o = t_o - t_R$
$A_{DN}$ [m²]	= Cross-section $A_{DN} = (DN [m])^2 \cdot \pi / 4$	$\Delta t / \Delta t_o$	= Temperature ratio
$V$ [m³/h]	= Volume flow rate	$i$	= Induction
$V_{total}$ [m³/h]	= Total volume flow rate	$V_s$ [m³/h]	= Secondary volume flow rate; $V_s = i \cdot V$
$v_o$ [m/s]	= Flow velocity in $A_{free}$ $v_o = V / (3600 \cdot A_{free})$	$\Delta p_t$ [Pa]	= Total pressure drop
$v_{DN}$ [m/s]	= Flow velocity in $A_{DN}$ $v_{DN} = V / (3600 \cdot A_{DN})$	$\Delta p_s$ [Pa]	= Static pressure drop
$v_v$ [m/s]	= Flow velocity after the flow path	$L_p$ [dB]	= Sound pressure level
$A, B$ [m]	= Distance between two diffusers	$L_{pA}$ [dB(A)]	= A-weighted sound pressure level
$W$ [m]	= Distance from diffuser to wall	$L_w$ [dB]	= Sound power level
$Y$ [m]	= Distance from the ceiling	$L_{wA}$ [dB(A)]	= A-weighted sound power level
$H$ [m]	= Room height	$L_{w-Oct}$ [dB]	= Octave sound power level $L_{w-Oct} = L_{wA} + \Delta L$
$t_y$ [°C]	= Temperature after the flow path $t_y = (\Delta t / \Delta t_o) \cdot (t_o - t_R) + t_R$	$\Delta L$ [dB]	= Relative sound power level to $L_{wA}$
$t_o$ [°C]	= Supply air temperature	$\Delta L_R$ [dB]	= Acoustic room attenuation
		$f$ [Hz]	= Octave mid-frequency
		NR	= Sound power related NR limit value
		NC	= Sound power related NC limit value

# DSQ Swirl Diffuser

Quick selection, limit curves, room acoustics

## Volume flow rate [m³/h] / Pressure drop [Pa]

Connecting piece size DN Plenum box size			Sound power level [dB(A)]						
			20	25	30	35	40	45	50
Supply air DSQ	325	100	100 / 12	120 / 17	140 / 23	170 / 34	210 / 51	260 / 78	310 / 111
		<b>160</b>	150 / 7	180 / 10	220 / 14	270 / 21	330 / 32	400 / 47	490 / 71
	400	200	180 / 7	220 / 10	270 / 15	330 / 23	400 / 34	490 / 51	600 / 76
		<b>200</b>	240 / 7	290 / 10	350 / 15	430 / 22	520 / 32	630 / 47	770 / 70
	500	125	140 / 8	170 / 12	210 / 19	260 / 29	310 / 41	380 / 62	460 / 91
		<b>200</b>	240 / 7	290 / 10	350 / 15	430 / 22	520 / 32	630 / 47	770 / 70
	600 <sup>1)</sup>	225	270 / 7	320 / 10	400 / 16	480 / 22	580 / 33	710 / 49	860 / 72
		<b>200</b>	280 / 6	350 / 9	420 / 13	510 / 19	620 / 28	760 / 41	920 / 61
	with air deflector plate damper OPEN	150	200 / 8	240 / 11	290 / 17	350 / 24	430 / 37	520 / 54	640 / 81
		<b>250</b>	440 / 6	530 / 9	650 / 13	790 / 20	960 / 29	1160 / 42	1410 / 63
Minimum volume flow rates must also be taken into account! ⇒ see page 4	280	200 / 7	240 / 10	290 / 15	360 / 23	440 / 35	530 / 50	650 / 76	
	<b>315</b>	450 / 6	540 / 9	660 / 13	800 / 19	970 / 28	1180 / 41	1440 / 61	
Exhaust air DSQ	325	100	90 / 10	110 / 15	130 / 21	160 / 31	200 / 49	240 / 71	290 / 103
		<b>160</b>	150 / 8	180 / 11	220 / 17	270 / 26	330 / 38	400 / 56	490 / 85
	400	200	190 / 9	230 / 13	270 / 18	330 / 27	410 / 41	490 / 59	600 / 88
		<b>200</b>	230 / 7	280 / 10	340 / 15	420 / 23	510 / 34	610 / 49	750 / 75
	500	125	130 / 9	150 / 12	190 / 19	230 / 28	280 / 42	350 / 66	420 / 95
		<b>200</b>	260 / 7	320 / 11	390 / 16	470 / 23	570 / 33	690 / 49	840 / 72
	600 <sup>1)</sup>	225	260 / 7	320 / 11	390 / 16	470 / 23	570 / 33	690 / 49	840 / 72
		<b>200</b>	180 / 8	220 / 12	260 / 17	320 / 25	390 / 37	480 / 57	590 / 86
	without air deflector plate damper OPEN	150	280 / 7	330 / 10	410 / 16	490 / 22	600 / 33	730 / 49	890 / 73
		<b>250</b>	430 / 7	520 / 10	630 / 14	760 / 21	920 / 30	1120 / 45	1350 / 65
with air deflector plate damper OPEN	280	190 / 8	230 / 12	290 / 19	350 / 27	430 / 41	520 / 60	630 / 88	
	<b>315</b>	440 / 8	530 / 12	640 / 17	780 / 25	940 / 37	1130 / 53	1360 / 77	
Minimum volume flow rates must also be taken into account! ⇒ see page 4	315	600 / 7	720 / 9	870 / 14	1050 / 20	1270 / 29	1530 / 42	1840 / 61	

Standard connecting pieces of the plenum boxes K1 are in bold type.

<sup>1)</sup> Plenum box size 600 is for swirl diffusers with nominal sizes 600 and 625 (hole pattern 600).

## Acoustic limit values NR, NC

The NR limit values in accordance with ISO 1996 given in the nomograms are calculated from octave sound power levels and are therefore not related to sound pressure levels. The room attenuation  $\Delta L_R$  is not considered; this depends on the room acoustics in each individual case. NC limit values, like NR limit values, are to be referenced to sound pressure level.  $NC = NR - 4$  may be used as an approximation in air conditioning and ventilation applications.

## Room attenuation $\Delta L_R$

Individual sound power levels are given in the nomograms. The sum of all sound pressure levels should be used for an acoustic assessment. This differs from the sum of the individual sound power levels by the room attenuation:

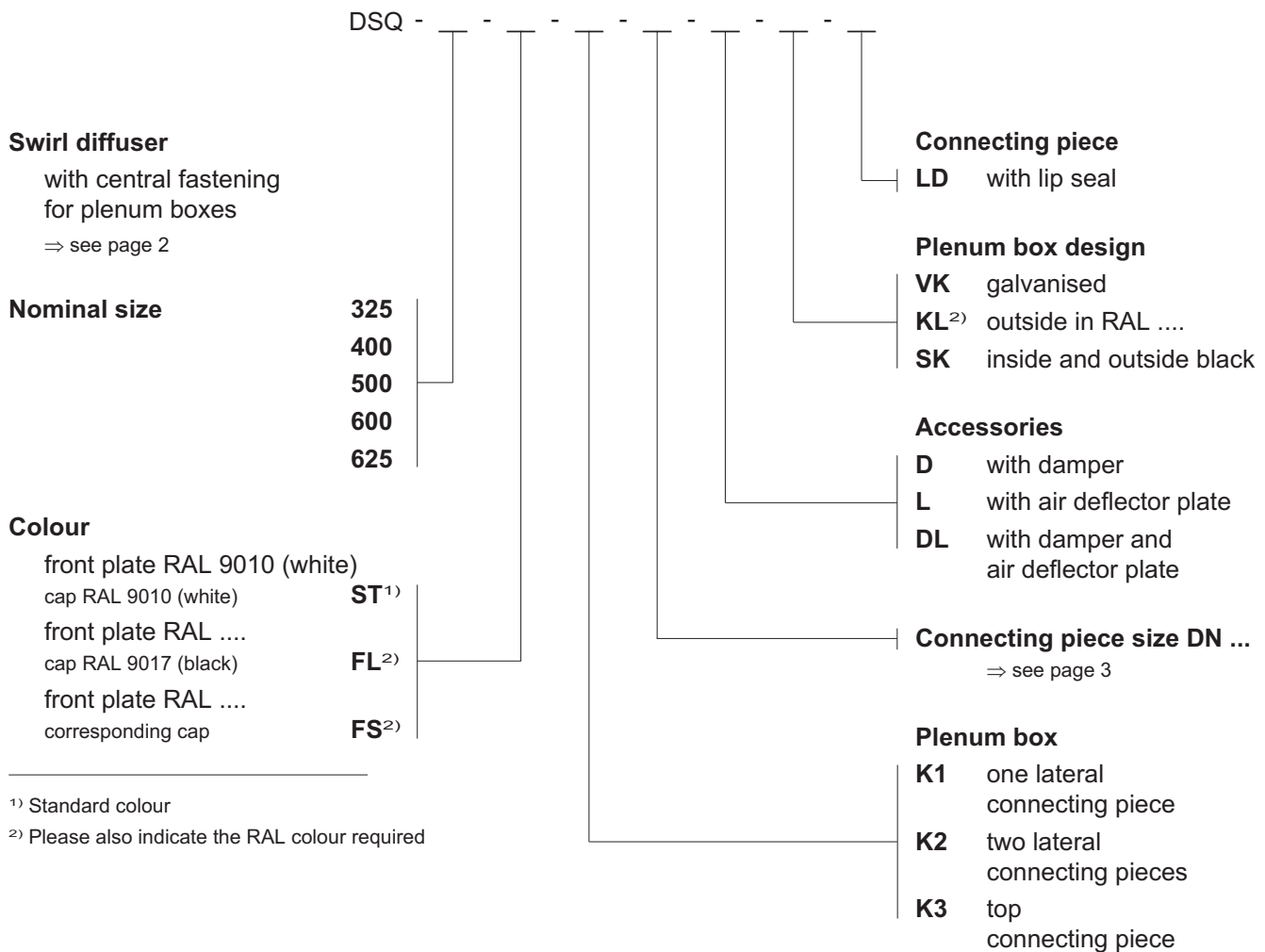
$$L_p, L_{pA} = L_w, L_{wA} + \Delta L_R$$

$\Delta L_R = -8$  [dB] can be used for estimating in air conditioning and ventilation systems.



# DSQ Swirl Diffuser

## Order information



<sup>1)</sup> Standard colour

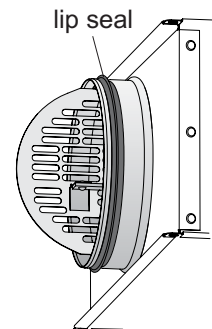
<sup>2)</sup> Please also indicate the RAL colour required

**Example:** DSQ - 625 - ST - K1 - 250 - DL - VK - LD

### NOTE regarding colours

- RAL - colours available as standard are basically in accordance with the RAL - CLASSIC colour collection.
- For technical reasons, deviations in colour can never completely be avoided. This relates to colour tones in particular RAL 9006 (white aluminium) and RAL 9007 (grey aluminium) In special cases it is therefore always advisable to carry out specific colour matching and to include the surrounding colour tones, for example suspended ceilings!

### Connecting piece with lip seal



# DSQ Swirl Diffuser

## Specification text

DSQ swirl diffuser for supply air and exhaust air. For constant and variable volume flow rates. With flat, smooth surfaces with no disruptive bended edges for high volume flow rates at low flow noises. With induction by means of radial, axially symmetrical air distribution for the reduction of flow velocities and temperature differences in heating applications and room cooling by up to -12 K. Square front plate made of galvanised sheet steel with fixed, large-area radially arranged air deflection blades extend into the corners of the swirl diffuser and concealed central fastening. With robust, colour-resistant, anti-static polyester coating, smooth gloss in colour RAL 9010 (white) or in RAL special colour.

Plenum box with central fastening, made of galvanised sheet steel with suspension holes with

- special air deflector plates, particularly for supply air for optimum air distribution with low flow noises
- inside and outside with black powder coating
- outside in RAL special colour
- one lateral connecting piece
- two lateral connecting pieces
- top connecting piece
- lip seal(s)
- damper for setting volume flow rate without dismantling of swirl diffuser

**Installation in closed ceiling systems, grid ceilings and freely suspended.**

..... pieces

<b>Volume flow rate:</b>	.....	<b>m<sup>3</sup>/h</b>	
<b>Pressure drop:</b>	.....	<b>Pa</b>	
<b>Sound power level:</b>	.....	<b>dB (A)</b>	
<b>Manufacturer:</b>	<b>WILDEBOER®</b>		
<b>Type:</b>	<b>DSQ</b>		
<b>Nominal size:</b>	.....		
<b>Connecting piece size DN:</b>	.....	<b>mm</b>	
<b>Colour swirl diffuser:</b>	RAL.....		
<b>Colour plenum box:</b>	RAL.....		
<b>Complete with fasteners</b>		<b>supply:</b>	.....
		<b>install:</b>	.....

Delete text in non-bold type as required!

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