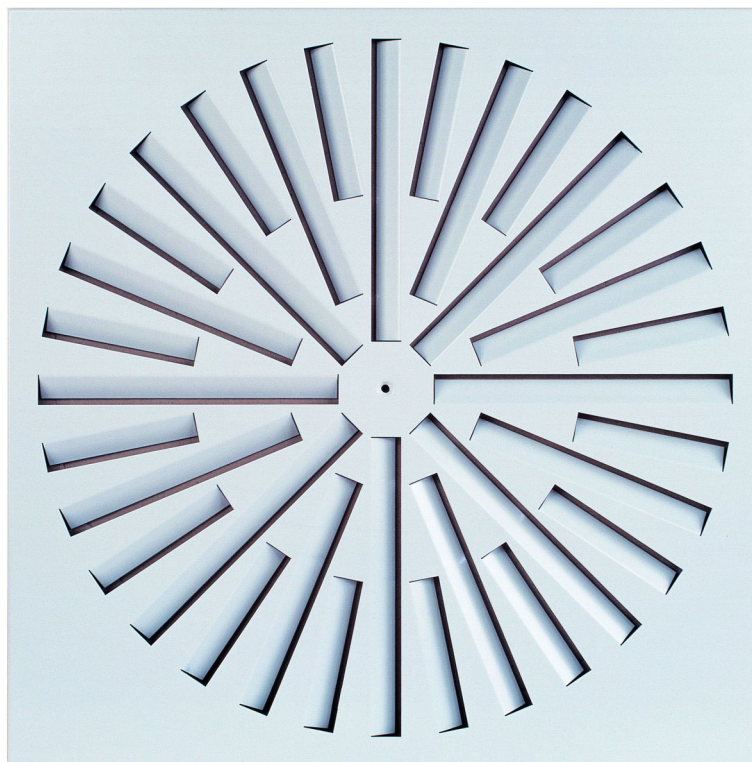




Ceiling swirl diffuser

DO



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Ceiling swirl diffuser DO

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Ceiling swirl diffuser DO

Description

The ceiling swirl diffuser type DO-... has been developed in particular **for comfort rooms with a high air change rate**. It is manufactured with a square faceplate (type DO-Q-...) or round faceplate (type DO-R-...) and **integrated air deflection blades**. The air deflection blades produce a horizontal swirl jet. The diffuser can be used for both **supply and return air installations**. The swirl diffuser is suitable in particular for installations with variable volumetric flow. A **stable jet pattern** is guaranteed by the high exit velocities. Even at a low volumetric flow the jet does not sink abruptly from the ceiling. If the "critical throw" x_{kr} (m) parameter is smaller than the "horizontal throw" x (m) parameter for your model, then the calculation for the maximum end velocity of jet V_{max} (m/s) is based on the "critical throw" x_{kr} and not on the "horizontal throw" x (m) parameter.

A volumetric flow meter can be integrated into the spigot of the plenum box at an extra charge. The measurement error of the volumetric flow meter is $\pm 5\%$ at a connection spigot velocity of 2-5 m/s and a straight flow pattern of at least $1 \times D$. The measurement is carried out with mounted diffuser. By adjusting the throttle damper, the required air volume of each diffuser can be set quickly and correctly. For plenum boxes type SK-R-..., a cable-operated adjustment must be ordered at an extra charge, which allows the damper to be adjusted on the room side even with mounted diffuser.

Attention:

The swirl diffuser type DO-... must only be fitted with a plenum box type SK-R-10-...

The swirl diffuser type DO-... is not suitable for installation in fire protection boxes and particle filter boxes.

Technical data

see under ceiling swirl diffuser type DQJ-...-SR-...
Please observe the correction factors shown below.

Correction factor

for DO-... compared to DQJ-Q-SR-... with air throw pattern "A"

	NW			
	310	400	500	600 / 625
V_{max} (m/s)	x 1.1	x 1.1	x 1.1	x 1.15
x_{kr} (m)	x 0.8	x 0.8	x 0.8	x 0.8
i (-)	x 0.42	x 0.42	x 0.42	x 0.42
TV (-)	x 2.4	x 2.4	x 2.4	x 2.4

Construction

Faceplate

- Sheet steel painted to RAL 9010 (white)
- Sheet steel painted to a different RAL colour (at an extra charge)
- Natural colour anodised aluminium E6/EV1 (only with concealed mounting possible) (not available for DO-R-... model)

Model

- DO-Q-SR-F-... - Square faceplate, round drill pattern, fixed blades
- DO-R-SR-F-... - Round faceplate, round drill pattern, fixed blades
- DO-...-Z - Supply air
- DO-...-A - return air

Accessories

Plenum box (SK-R-10-...)

- only available in conjunction with concealed mounting
- made of galvanised sheet steel with suspension eyes

Damper (-DK1)

- Damper made of galvanised sheet steel
- Damper fastening made of plastic

Damper (-DK2)

- same as -DK1, but with cable-operated adjustment

Rubber lip seal (-GD1)

- Special rubber

Volumetric flow meter (-VME1)

- Holder made of galvanised sheet steel
- Measuring sensor made of plastic
- Aluminium connections

ball-impact guard (-BS)

- only possible for DO-Q-... with SM mounting.
- Steel painted to RAL 9010 (white), other RAL colours possible at an extra charge.

Internal insulation (-li)

- Thermal insulation in the plenum box

External insulation (-la)

- thermal insulation at the outside of the plenum box

Fastening

Concealed mounting (-VM, standard)

- Pole brace fixing, by means of an M6 screw to DIN EN ISO 10642, at the plenum box, only possible with plenum box (SK-R-10-...)

Screw mounting (-SM) (only DO-Q-...)

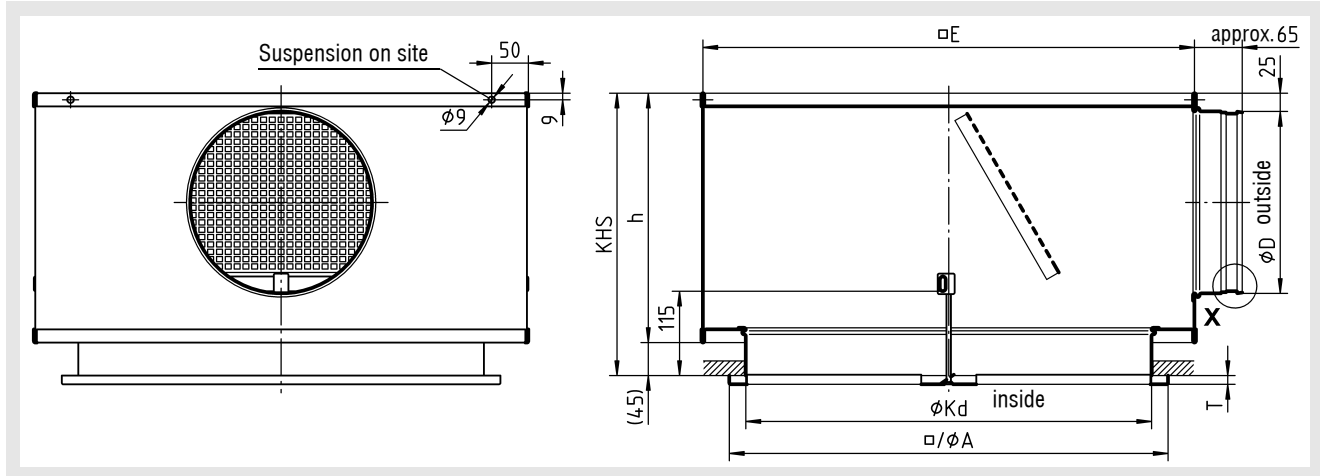
- for model with ball-impact guard only (-BS)
- with 4 raised countersunk head tapping screws (on-site)

Ceiling swirl diffuser DO

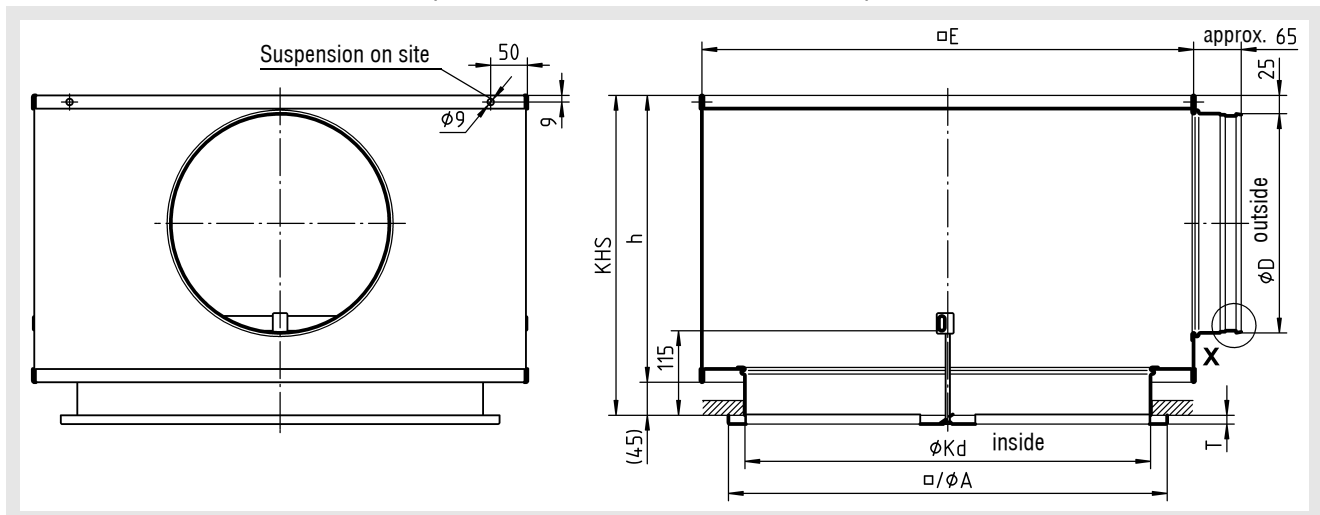
Models and dimensions

Dimension

DO-Q-... / DO-R-... with SK-R-10-Z-... (for supply air, with concealed mounting)



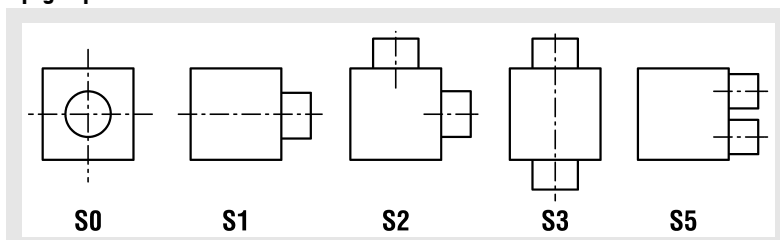
DO-Q-... / DO-R-... with SK-R-10-A-... (for return air, with concealed mounting)



Available sizes

NW	DO-Q-...		DO-R-...		SK-R-10-Z-...					SK-R-10-A-...					øD _{max} for ...-S5
	□ A	T	øA	T	□ E	øKd	KHS	h	øD	□ E	øKd	KHS	h	øD	
310	308	7	310	7	405	283	295	250	158	405	283	335	290	198	158
400	398	12	400		445	353	295	250	158	445	353	335	290	198	178
500	498		500		545	453	335	290	198	545	453	385	340	248	198
600	598		600		670	553	385	340	248	670	553	435	390	298	298
625	623		625		670	553	385	340	248	670	553	435	390	298	298

Spigot position

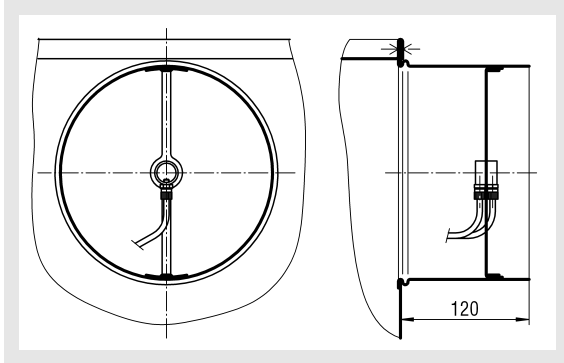


KHS= standard height of plenum box
 Special height of plenum box = $\phi D + 137$ mm, but at least 235 mm
 Note: For SK-R-10-Z-...-DK1/-DK2-...-S0, the height of plenum box changes to $h=280$ mm for NW310 and NW400 and to $h=300$ mm for NW500 (see p. 5)

Ceiling swirl diffuser DO

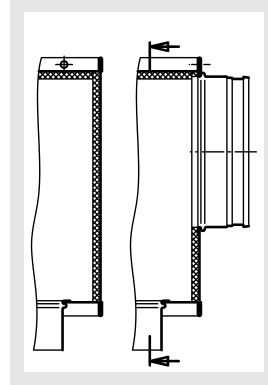
Dimensions of accessories

Volumetric flow meter (-VME1)

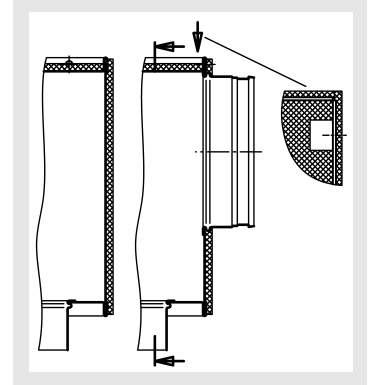


Insulation for SK-R-...

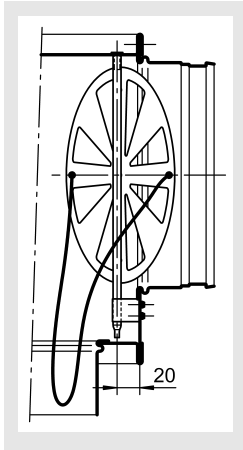
internal (-li)



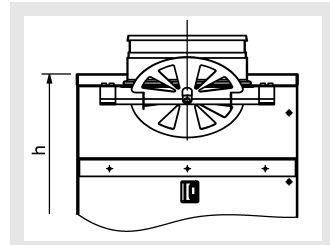
outside(-la)



Damper (-DK1) with Cable-operated adjustment (-DK2)



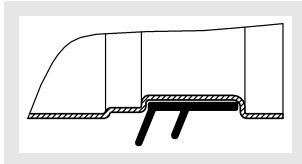
Height of plenum box with spigot from above (-S0)



For the model with spigot from above (-S0) in combination with damper (-DK1 / -DK2), the height of plenum box h changes for the following NW as follows.

NW	SK-R-10-Z-...		
	KHS	h	øD
310	325	280	158
400	325	280	158
500	345	300	198

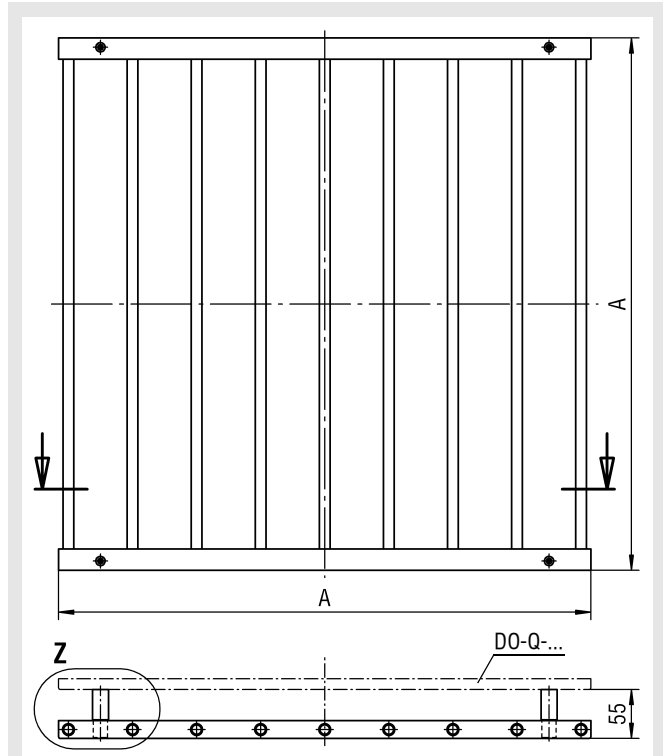
Rubber lip seal (-GD1) detail X



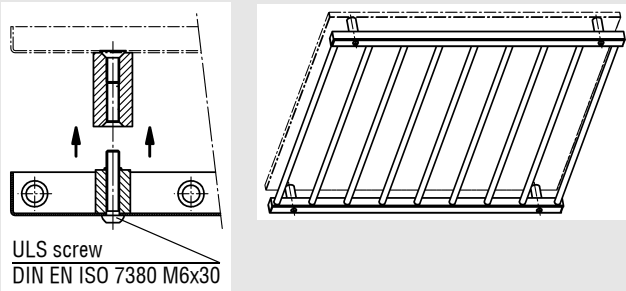
Ceiling swirl diffuser DO

ball-impact guard (-BS)

(only possible for DO-Q-... with SM mounting)



Detail Z



Available sizes

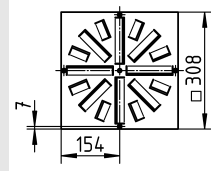
NW	□ A
310	308
400	398
500	498
600	598
625	623

Fastening methods

Screw mounting (-SM) (only DO-Q-...)

for model with ball-impact guard only

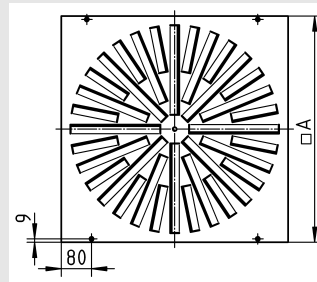
NW 310



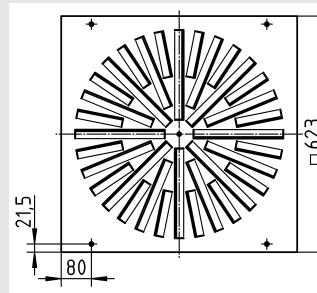
with indentation for slotted shallow-raised counter-sunk-head tapping screw (on site)

- NW 310:
DIN ISO 7051 pitch 3.9
- NW 400-625:
DIN ISO 7051 pitch 4.8

NW 400-600



NW 625



Ceiling swirl diffuser DO

Technical data

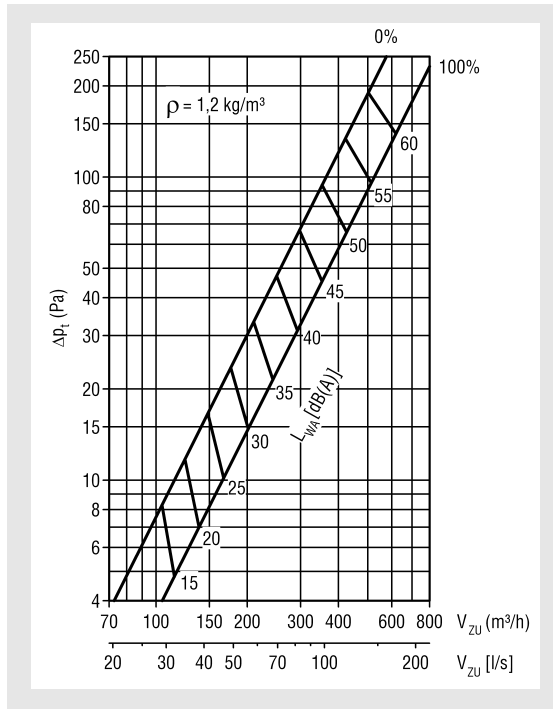
Pressure loss and noise level

DO-Q-SR-F-Z-...

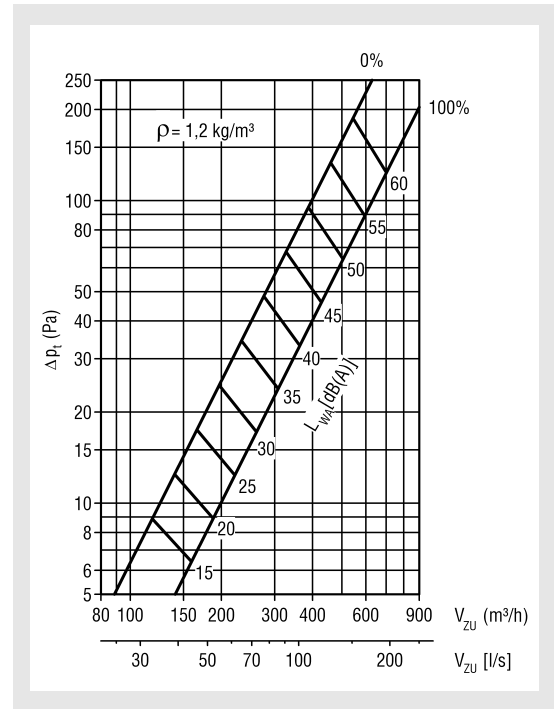
for supply air, with plenum box

0% = CLOSED / 100% = OPEN

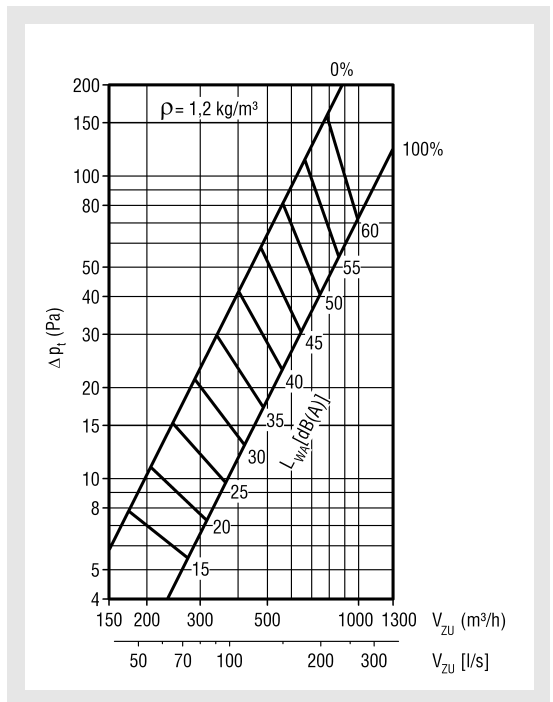
DO-Q-SR-F-Z-310-...



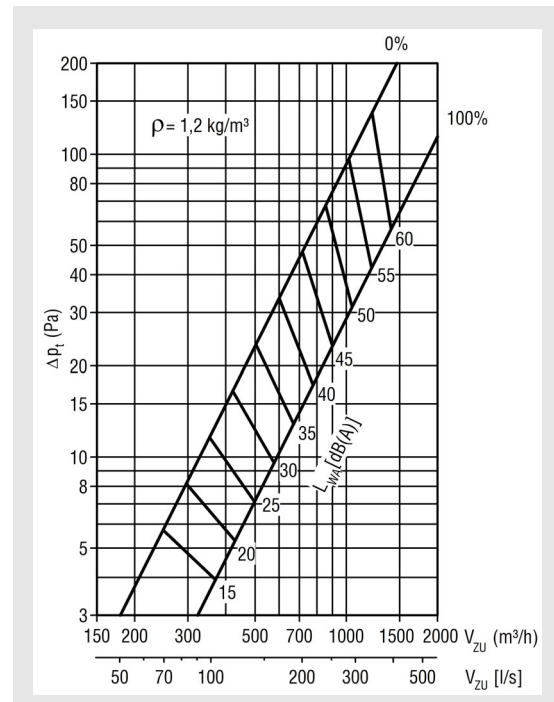
DO-Q-SR-F-Z-400-...



DO-Q-SR-F-Z-500-...



DO-Q-SR-F-Z-600/625-...



Relative sound power spectrum - correction factor:

Ceiling swirl diffuser DO

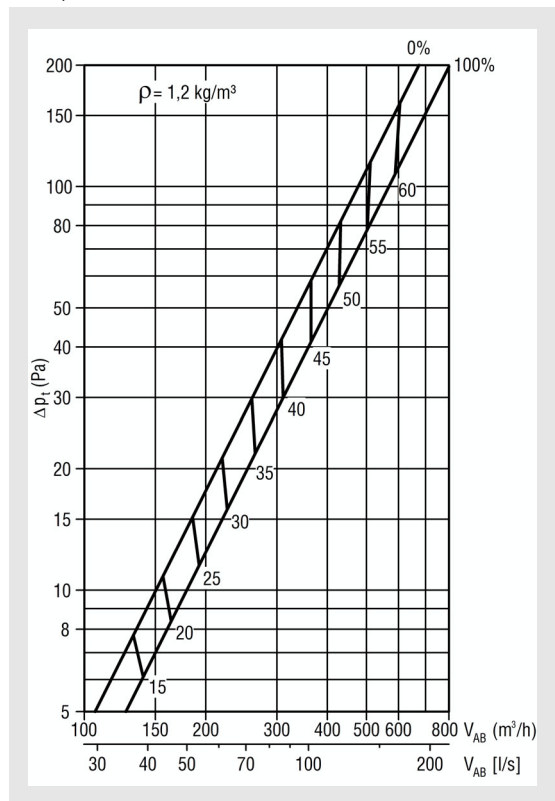
DO-Q-SR-F-Z															
		Damper OPEN							Damper CLOSED						
Frequency	Hz	125	250	500	1000	2000	4000	8000	125	250	500	1000	2000	4000	8000
KF	-	7,8	3,7	-3,2	-7,9	-14,6	-19,0	-22,7	7,3	3,4	-3,2	-7,1	-12,5	-16,3	-20,6

$$L_W = L_{WA} + KF$$

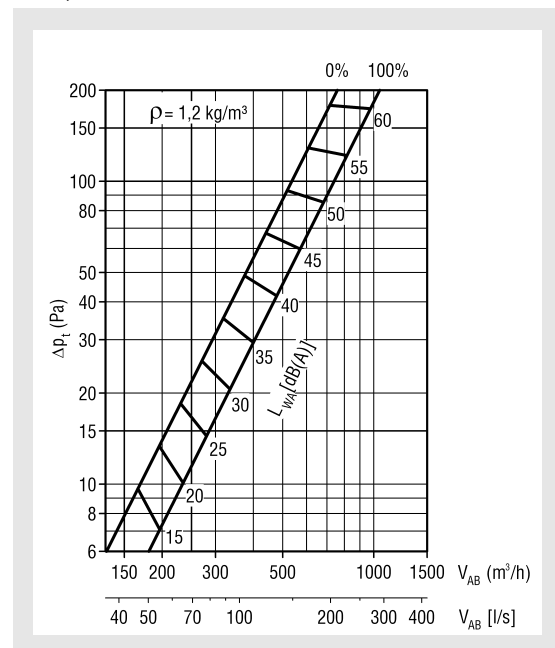
DO-Q-SR-F-A-...
for return air, with plenum box

0% = CLOSED / 100% = OPEN

DO-Q-SR-F-A-310-...

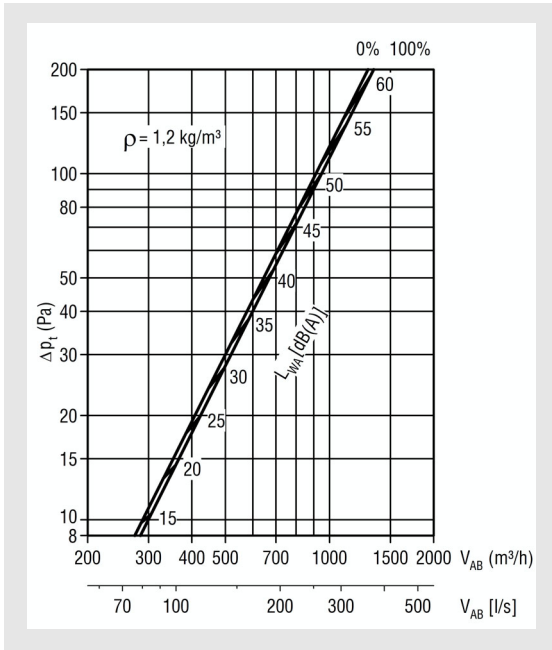


DO-Q-SR-F-A-400-...

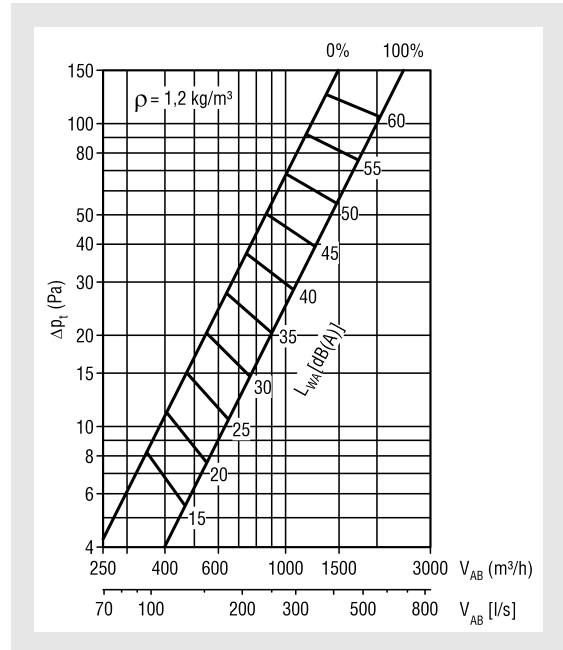


Ceiling swirl diffuser DO

DO-Q-SR-F-A-500-...



DO-Q-SR-F-A-600/625-...



Relative sound power spectrum - correction factor:

		DO-Q-SR-F-A													
		Damper OPEN							Damper CLOSED						
Frequency	Hz	125	250	500	1000	2000	4000	8000	125	250	500	1000	2000	4000	8000
KF	-	7,3	2,4	-3,8	-6,4	-11,3	-16,2	-21,4	10,2	2,3	-4,9	-8,3	-10,7	-14,3	-20,1

$$L_W = L_{WA} + KF$$

Ceiling swirl diffuser DO

Legend

v_{\max}	(m/s)	= Maximum end velocity
x_{kr}	(m)	= Critical throw
i	(-)	= Induction ratio ($i = V_x / V_{ZU}$)
TV	(-)	= Temperature ratio ($TV = \Delta T_x / \Delta T_0$)
NW	(mm)	= Nominal value
V_x	(m ³ /h)	= Total air jet volume at point x
V_x	[l/s]	= total air jet volume at point x
V_{ZU}	(m ³ /h)	= Supply air volume
V_{ZU}	[l/s]	= Supply air volume
V_{AB}	(m ³ /h)	= Return air volume
V_{AB}	[l/s]	= Return air volume
Δp_t	(Pa)	= Pressure loss
ρ	(kg/m ³)	= Density
ΔT_x	(K)	= Temperature difference at point x
ΔT_0	(K)	= Temperature difference between supply air temperature and room temperature ($\Delta T_0 = t_{ZU} - t_R$)
t_{ZU}	(°C)	= Supply air temperature
t_R	(°C)	= Room temperature
L_{WA}	[dB(A)]	= A-weighted sound power level
L_W	(dB)	= relative sound power level
KF	(-)	= Correction factor

Ceiling swirl diffuser DO

Order code DO

01	02	03	04	05
Type	Model	Blade pattern	Blade type	Air throw
Example				
DO	-Q	-SR	-F	-Z

06	07	08	09	10
Nominal size	Material	Paint	Mounting	Ball-impact guard
-500	-SB	-9010	-VM	-B0

Sample

DO-Q-SR-F-Z-500-SB-9010-VM-B0

Ceiling swirl diffuser type DO | square faceplate | round blade pattern | fixed blades | supply air | NW500 | faceplate made of sheet steel | faceplate painted to RAL9010 | concealed mounting | without ball-impact guard

Order details

01 - Type

DO = ceiling swirl diffuser

02 – Model

Q = Square faceplate

R = round faceplate

03 - Blade pattern

SR = round blade pattern

04 - Blade type

F = fixed blades

05 - Air throw

Z = Supply air

A = return air

06 – Nominal size

310 = NW310

400 = NW400

500 = NW500

600 = NW600

625 = NW625

07 - Material

SB = Sheet steel (standard)

AL = Aluminium (only available with VM)

08 - Paint

9010 = RAL colour white (standard)

xxxx = RAL colour can be freely selected

ELOX = natural colour anodised (only possible for aluminium)

09 - Mounting

VM = concealed mounting (standard), only possible with plenum box

SM = screw mounting (only DO-Q-... and only in connection with ball-impact guard)

10 – Ball-impact guard

B0 = without ball-impact guard (standard)

BS = with ball-impact guard, painted to the same colour as the faceplate (only for DO-Q-... with SM mounting)

Ceiling swirl diffuser DO

Order code SK

01	02	03	04	05	06	07
Plenum box	Model	Air diffuser	Type of air	Nominal size	Fastening	Material
Example						
SK	-R	-10	-Z	-500	-VM	-SV

08	09	10	11	12	13	14	15
Damper	Rubber lip seal	Volumetric flow meter	ROB Model	Insulation	Height of box	Spigot diameter	Spigot position
-DK2	-GD1	-VME1	-ROB0	-I0	-KHS	-SDS	-S1

Sample

SK-R-10-Z-500-VM-SV-DK2-GD1-VME1-ROB0-I0-KHS-SDS-S1

Plenum box, square design I for round air diffusers with round diffuser support I air diffuser DO-... I supply air I NW500 I with concealed mounting I galvanised sheet steel I with damper with cable I with rubber lip seal I with volumetric flow meter I without ROB model I without box insulation I standard height of plenum box I standard spigot diameter I 1 lateral spigot

Order details

01 - Plenum box

SK = Plenum box, square design

02 – Model

R = for round air diffusers with round diffuser support

03 - Air diffuser (must be ordered separately)

10 = suitable for DO-...

04 - Type of air

Z = Supply air

A = return air

05 – Nominal size

310 = NW310

400 = NW400

500 = NW500

600 = NW600

625 = NW625

06 - Fastening

VM = Concealed mounting (standard)

SM = Screw mounting (only for the model with ball-impact guard)

07 - Material

SV = Galvanised sheet steel (standard)

V2 = with stainless steel (V2A)

08 - Damper

DK0 = without damper (standard)

DK1 = with damper

DK2 = with damper + cable

09 - Rubber lip seal

GD0 = without rubber lip seal (standard)

GD1 = with rubber lip seal

10 – Volumetric flow meter

VME0 = without volumetric flow meter (standard)

VME1 = With volumetric flow meter

11 – ROB model

ROB0 = Without ROB version (standard)

12 - Insulation

I0 = without insulation (standard)

Ii = With box insulation inside

Ia = With box insulation outside

Ceiling swirl diffuser DO

13 – Height of box

KHS = Height of plenum box standard

xxx = height of plenum box in mm (height_{min}= spigot diameter + 137 mm, but at least 235 mm) (For models SK-R-10-Z-310/-400/-500-...-DK1/-DK2-...-S0, observe special height of plenum box (see p. 5))

14 – Spigot diameter

SDS = Standard spigot diameter

xxx = Spigot diameter in mm

15 – Spigot position

S0 = Spigot from above

S1 = 1 lateral spigot on the box (standard)

S2 = 2 spigots offset by 90°

S3 = 2 spigots offset by 180°

S5 = 2 spigots arranged next to each other

Ceiling swirl diffuser DO

Specification text

Ceiling swirl diffuser type DO-Q-... for square supply and return air models. Especially suitable for use in comfort rooms with a high air change rate and for VAV installations with variable volumetric flows (between 40 and 100%). Consisting of square sheet steel faceplate painted with a high-quality powder coating to a RAL colour (RAL 9010 (white), standard), with integrated fixed air deflection blades to produce a horizontal throw pattern, with concealed mounting (VM). For use up to -14 K. Sophisticated design allows easy cleaning to VDI 6022.

Product: SCHAKO **type DO-Q-...**

- with round faceplate
Product: SCHAKO **type DO-R-...**
- Front plate made of natural colour anodised aluminium (E6/EV1) (possible only with concealed mounting) (not available for DO-R-... model).
- with screw mounting (-SM) (only DO-Q-...), only for model with ball-impact guard.

Accessories:

- Plenum box (SK-R-10-...) made of galvanised sheet steel, with fixing lugs.
 - Supply air model with integrated perforated straightener.
 - with damper (-DK1) in plenum box, adjustable from below, for simple air volume regulation without dismantling the faceplate.
 - adjustable from below with cable (-DK2)
 - with volumetric flow meter (-VME1)
 - with rubber lip seal (-GD1), at the connection spigot made of special rubber.
 - with thermal insulation
 - internal (-li)
 - external (-la)
 - height of plenum box can be freely selected, xxx in mm, (minimum height = spigot diameter + +137 mm, but at least 235 mm) (For models SK-R-10-Z-310/-400/-500-...-DK1/-DK2-...-S0, observe special height of plenum box (see p. 5))
 - Spigot diameter can be freely selected, xxx in mm
 - Spigot position:
 - S0= spigot from above
 - S1= 1 lateral spigot on the box (standard)
 - S2= 2 spigots offset by 90°
 - S3= 2 spigots offset by 180°
 - S5= 2 spigots arranged next to each other
- Ball-impact guard (-BS), made of steel with high-quality powder coating to RAL 9010 (white), other RAL colours possible at an extra charge (available for DO-Q-... with SM mounting only).