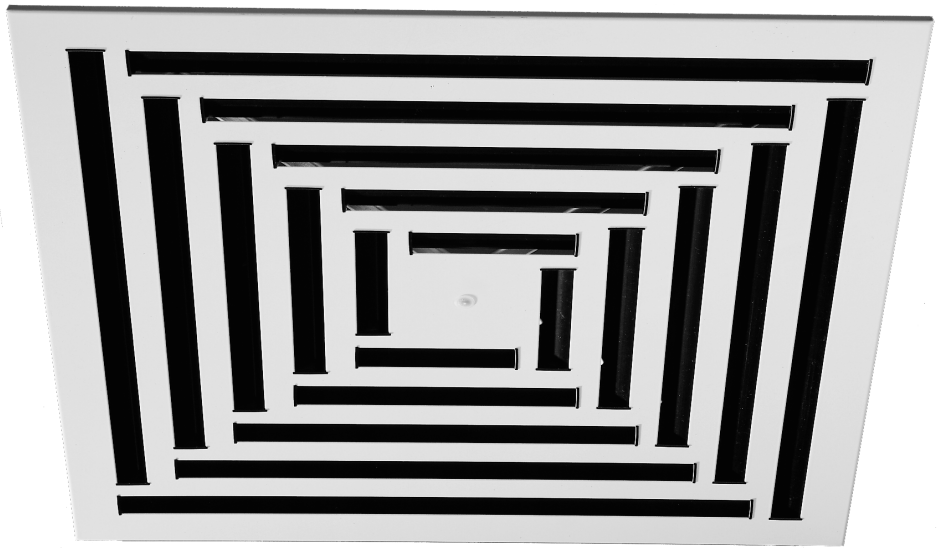
Ceiling diffuser

4DE



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Ceiling diffuser 4DE

Contents

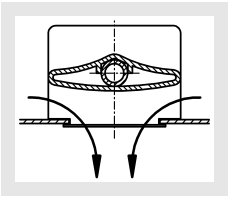
Ceiling diffuser 4DE

Description

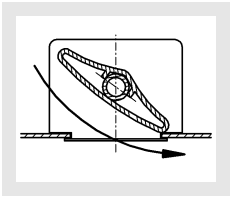
Square ceiling diffuser type 4DE with **manually adjustable air deflection blades**. The blades can be adjusted from below even if the diffuser is installed in order to allow an adaptation of the air throw pattern to changing room use. Both horizontal and vertical air throw patterns can be achieved. The ceiling diffuser type 4DE can be used in **heating or cooling mode**.
The fastening without edges of the air deflection blades in the front plate allows easy cleaning. The air deflection blades made of plastic in support blade profile are aerodynamic and ensure an optimal air throw pattern. By consistently avoiding sharp edges, a **low noise function** is achieved.
The ceiling diffuser type 4DE is manufactured in **supply air and return air models**. In the return air model, the air deflection blades have been omitted. In exchange, the plenum box is painted to the RAL colour 9005 (black) on the inside. If you want a perforated plate visual protection to be mounted to the return air diffuser type 4DE-A, this must already be specified when ordering. A later installation is not possible. A hit-and-miss damper can be fitted to the diffuser instead of a plenum box when the duct is fitted or if the false ceiling has a low height.
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 ± 5 % at a connection spigot velocity of 2-5 m/s and a straight flow pattern of at least 1 x 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.
The damper, equalising grid and volume flow measuring device can easily be removed from the plenum type SK-Q-... model for easy cleaning from the room side.

Variable volumetric flow
The ceiling diffuser type 4DE is also highly suitable for VAV systems. A stable air jet is guaranteed by the high exit velocities thus ensuring no air dumping.

Blade setting options
Blade position 1



Blade position 2



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 available with concealed mounting) (at an extra charge)

Blades
- Plastic, similar to RAL colour 9010 (white) or RAL 9005 (black)
- Aluminium painted to the RAL colour of the faceplate (subsequent adjustment of blades not possible)

Model

4DE-Z-...	- supply air
4DE-A-...	- Return air, without blades

Accessories

Plenum box (SK-Q-...)
- Galvanised sheet steel with integrated perforated straightener (for supply air model only) and fixing lugs

ball-impact guard (-BS)
- only possible with SM mounting and for NW 800 only with VS mounting
- Steel painted to RAL 9010 (white), other RAL colours possible at an extra charge.

Damper (-DK1)
- Galvanised sheet steel, in plenum box (SK-Q-...)
- Damper fastening made of plastic

Damper (-DK2)
- same as -DK1, but with cable-operated adjustment

Rubber lip seal (-GD1)
- at the plenum box connection spigot, made of special rubber

Internal insulation (-Ii)
- thermal insulation at the inside of the plenum box

External insulation (-Ia)
- thermal insulation at the outside of the plenum box

ROB version (-ROB1)
- Removable diffuser plate, damper and volumetric flow meter

Hit-and-miss damper (-SS)
- Electrolytically galvanised sheet steel for air volume regulation

Volumetric flow meter (-VME1)
- Holder made of galvanised sheet steel
- Measuring sensor made of plastic
- Aluminium connections

Ceiling diffuser 4DE

Fastening

Screw mounting (-SM), standard

- with 4 on-site slotted shallow-raised, countersunk-tapping head screws (not possible for NW 800)

Concealed mounting (-VM)

- Pole brace fixing (at an extra charge) only available with plenum box (SK-Q-...) (standard for NW 800)
- fixed to the plenum box with a hexagonal socket head screw DIN EN ISO 4762 M6

Screw mounting with concealed mounting (-VS)

- Screw mounting (-SM) in combination with concealed mounting (-VM)
- only possible for NW 800 in conjunction with ball-impact guard (-BS)

Ceiling diffuser 4DE

Models and dimensions

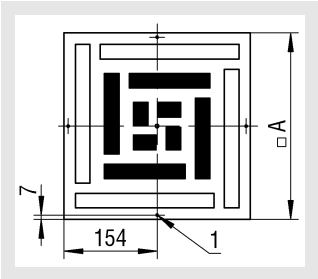
Air throw pattern

Possible blade settings and screw mounting (SM)
Air throw "H" (horizontal)
all blades in position 2
Air throw pattern "H" is preset in factory

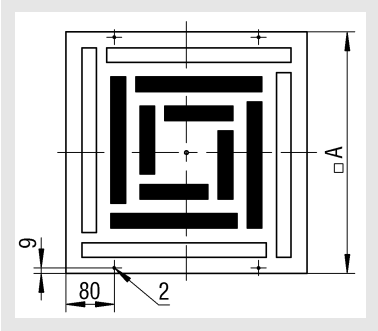
Air throw pattern "V" (vertical)
Different blade settings, blade positions 1 and 2

Blade position 1 **Blade position 2**

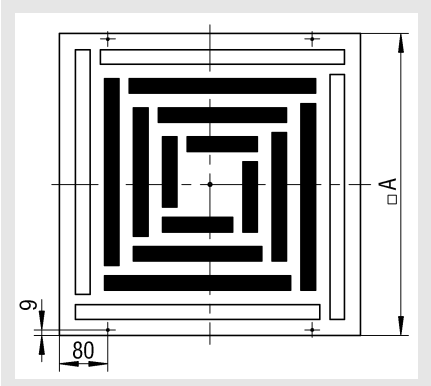
4DE-...-310-...



4DE-...-400-...



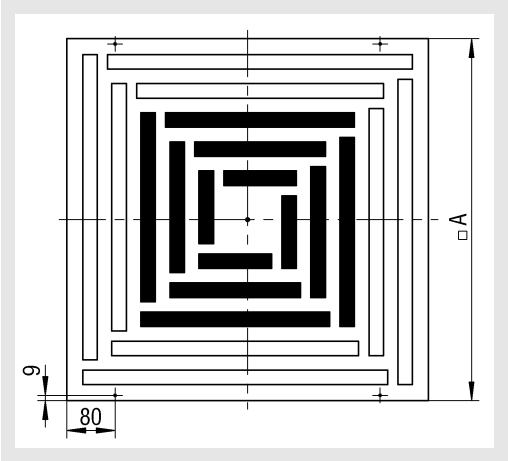
4DE-...-500-...



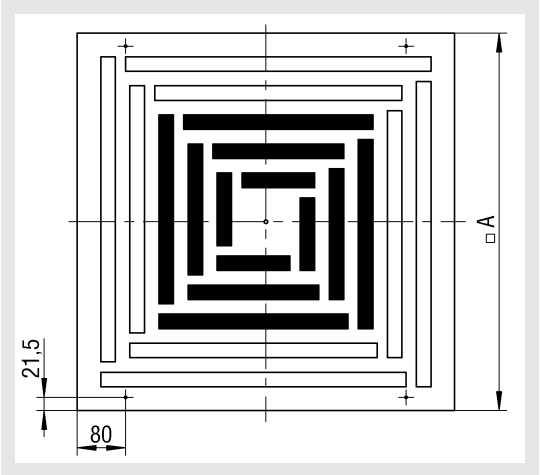
1 = Indentation for slotted shallow-raised countersunk-head tapping screw DIN ISO 7051 pitch 3.9

2 = available from NW 400. Indentation for raised countersunk head tapping screw according to DIN ISO 7051 pitch 4.8.

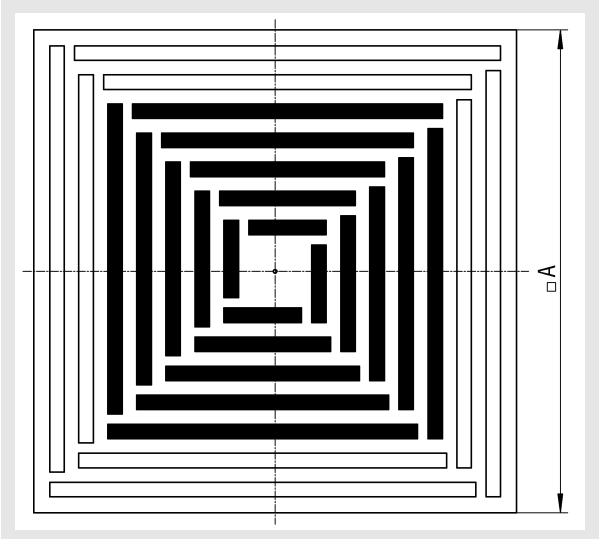
4DE-...-600-...



4DE-...-625-...



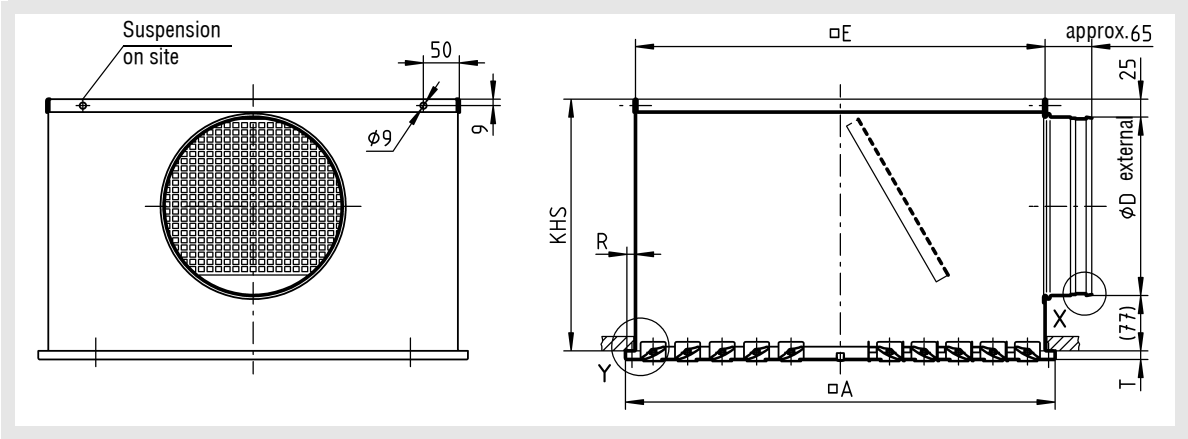
4DE-...-800-... with concealed mounting (VM)



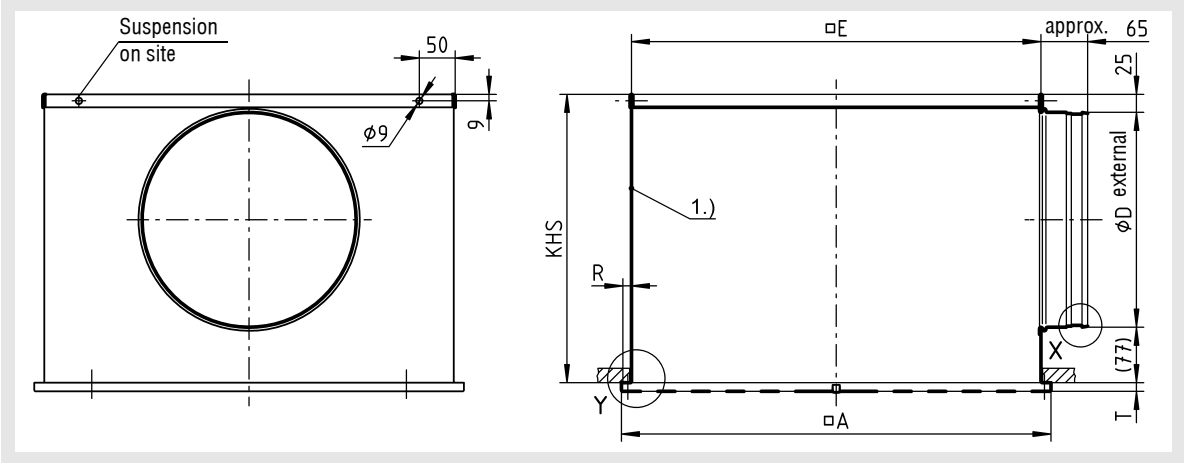
Ceiling diffuser 4DE

Dimensions

4DE-Z with SK-Q-06-Z-… (for supply air)



4DE-A with SK-Q-06-A-… (for return air)



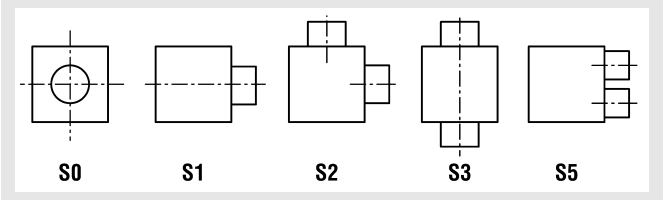
1) = Inside painted to RAL 9005 (black)

Available sizes

NW	□A	□E	R	T	SK-Q-06-Z-…		SK-Q-06-A-…		$øD_{max}$
					KHS	øD	KHS	øD	for …-S5
310	308	290	8	7	260	158	300	198	98
400	398	370	12	12	260	158	300	198	138
500	498	470	12	12	300	198	350	248	198
600	598	570	12	12	350	248	400	298	248
625	623	570	24	12	350	248	400	298	248
800	798	770	12	12	455	353	455	353	353

KHS= standard height of plenum box
Special height of plenum box = øD + 102mm, but at least 200mm
Note: For SK-Q-06-Z-...-DK1 / -DK2-...-S0, the height of plenum box changes to KHS=280 mm for NW310 and NW400 (see p. 7).

Spigot position

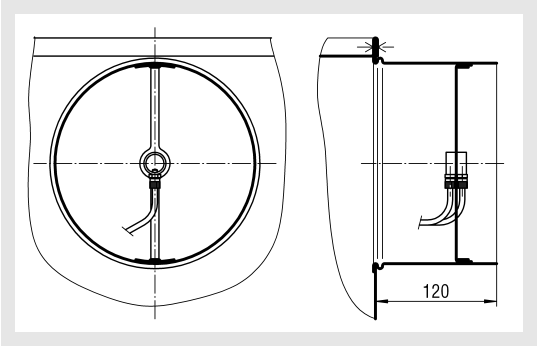


Ceiling diffuser 4DE

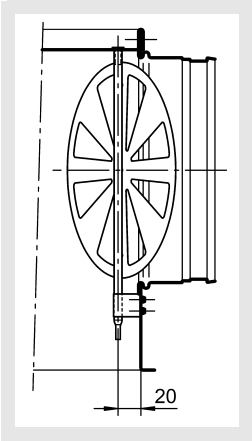
Accessories - dimensions

(at an extra charge):

Volumetric flow meter (-VME1)



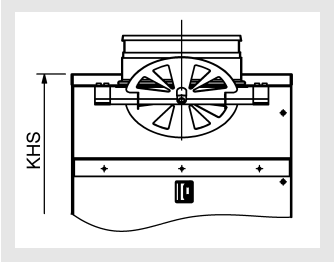
Damper (-DK1/-DK2)



DK1 = without cable-operated adjustment

DK2 = with cable-operated adjustment

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

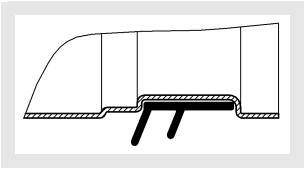


For the model with spigot from above (-S0) in combination with damper (-DK1 / -DK2), the height of plenum box KHS changes for the following NW as follows.

NW	SK-Q-06-Z-...	
	KHS	øD
310	280	158
400	280	158

Rubber lip seal (-GD1)

Detail X

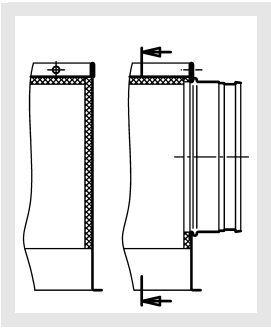


ROB version (-ROB1)

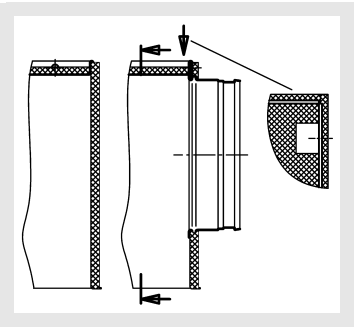
Removable diffuser plate, damper and volumetric flow meter.

Insulation for SK-Q-...

internal (-Ii)

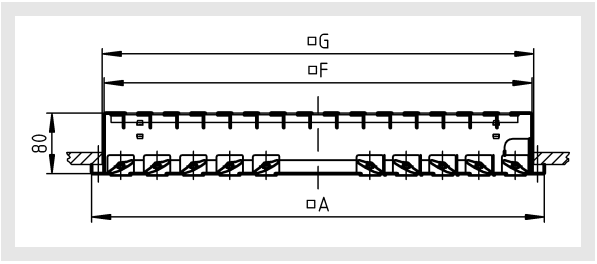


external (-Ia)

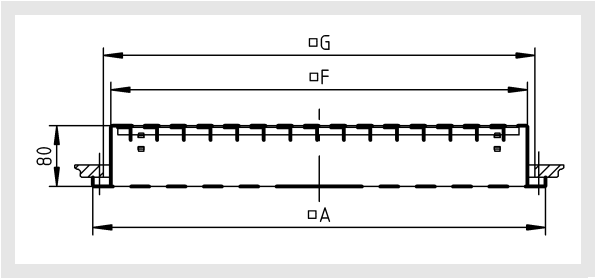


Hit-and-miss damper (-SS)

4DE-Z-...-SS-... (supply air)



4DE-A-...-SS-... (return air)



A hit-and-miss damper is only available for an aluminium faceplate together with SM mounting.

Available sizes

NW	□A	□ F		□G
		-Z-...-SS-...	-A-...-SS-...	
310	308	280	280	295
400	398	360	350	370
500	498	460	450	470
600	598	560	550	570
625	623	560	550	570
800	798	755	750	770

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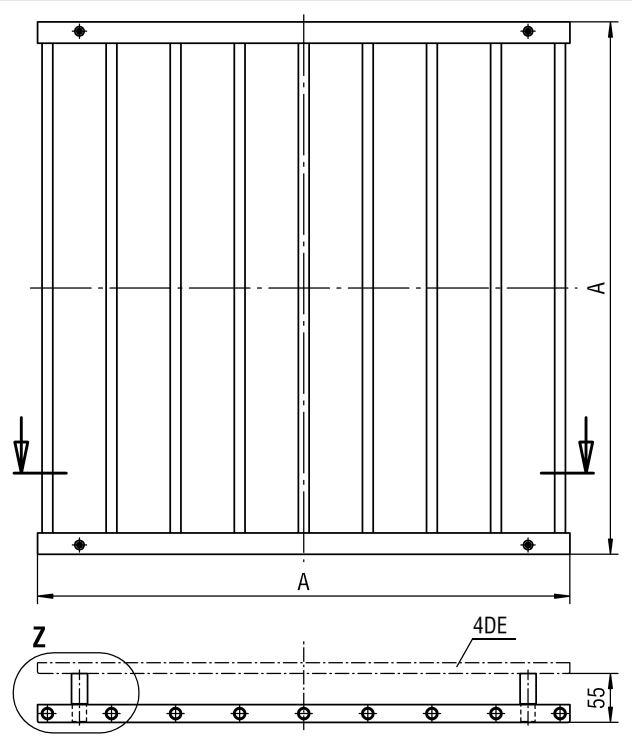
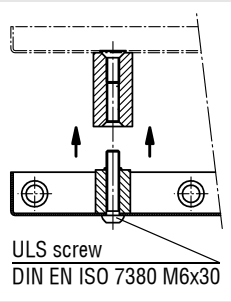
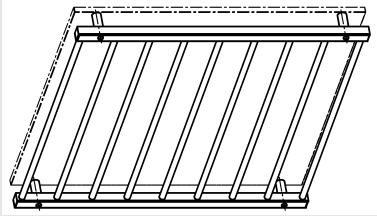
ball-impact guard (-BS)
(only possible with SM mounting and for NW 800 only with VS mounting)



Detail Z



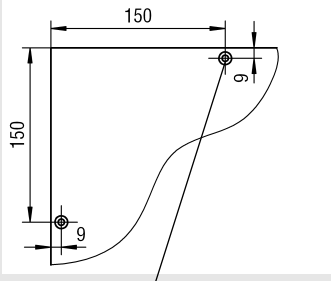


Available sizes

NW	□ A
310	308
400	398
500	498
600	598
625	623
800*	798

* NW 800:
with VS mounting

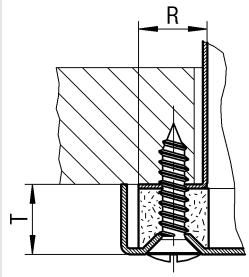
Dimensions VS mounting (for NW 800 only)
SM mounting for NW 310-625, see p. 5.



Indentation for slotted shallow-raised countersunk-head tapping screw DIN ISO 7051 pitch 4.8 (on site)

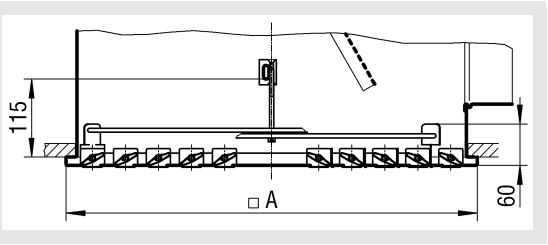
Fastening methods

Screw mounting (-SM)
Detail Y

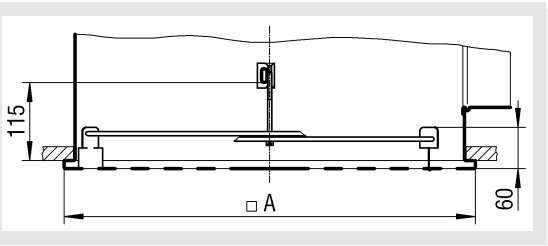


For screw mounting, the ceiling diffuser is fixed to the plenum box with 4 on-site countersunk screws (not possible for NW 800)

concealed mounting (-VM, at extra cost)
4DE-Z-...



4DE-A-...



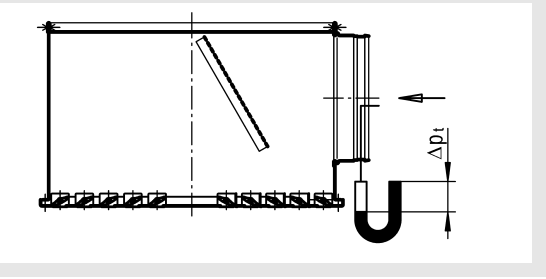
For concealed mounting the ceiling diffuser is fixed to the plenum box with a traverse and a hexagonal socket head screw DIN EN ISO 4762 M6
Attention: The max. torque of the fastening screw is 0.4 Nm

Ceiling diffuser 4DE

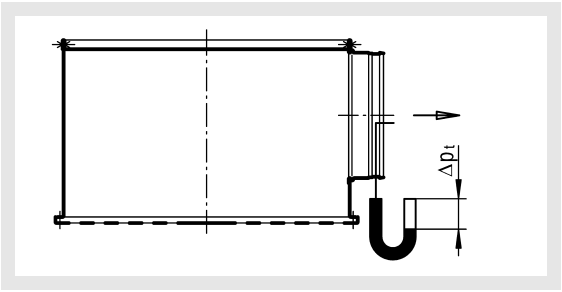
Technical data

Pressure loss and noise level

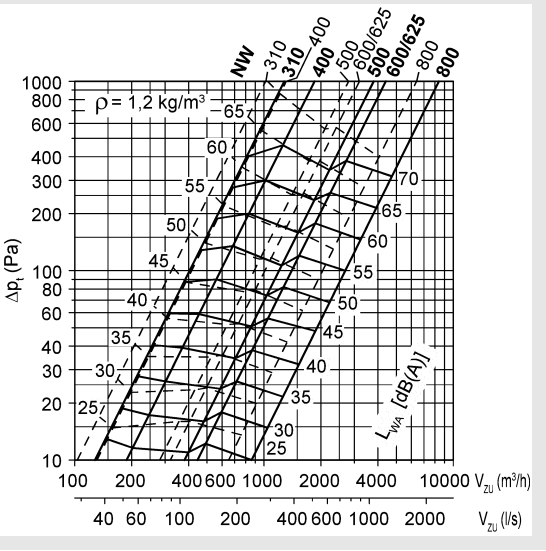
4DE-Z-... (supply air), with plenum box

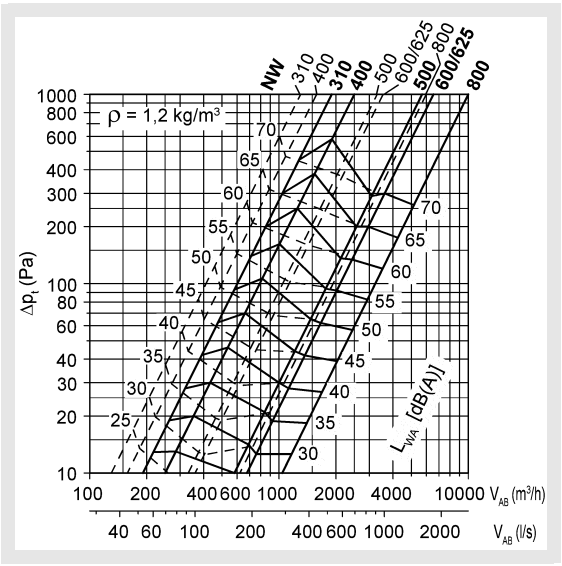


4DE-A-... (return air), with plenum box

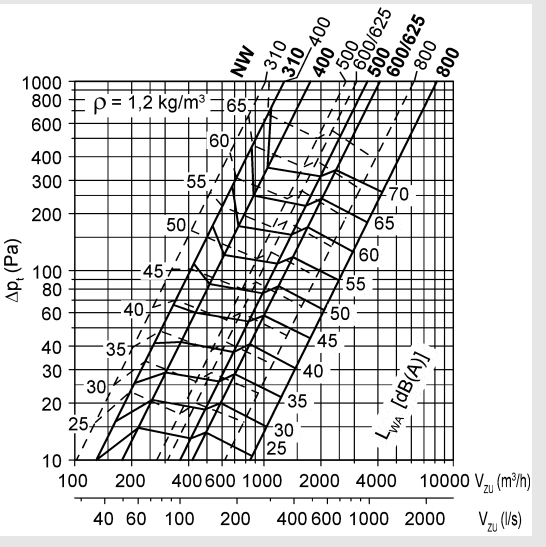


Air throw "H" (horizontal)





Air throw pattern "V" (vertical)

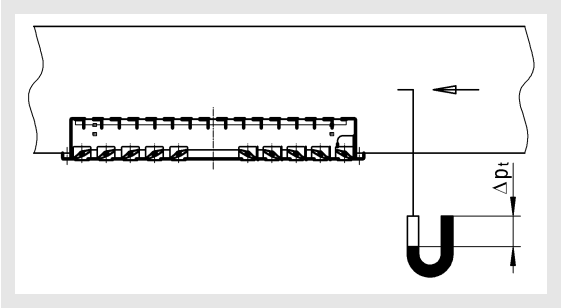


Damper position OPEN ———

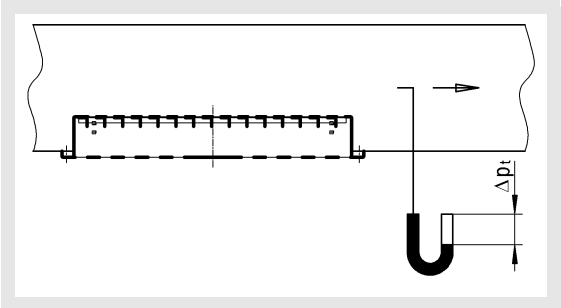
Damper position CLOSED ---------

Ceiling diffuser 4DE

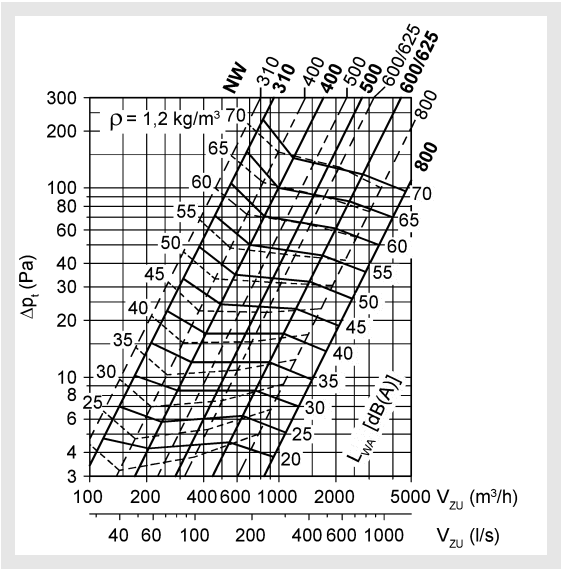
4DE-Z-...-SS-... with hit-and-miss damper

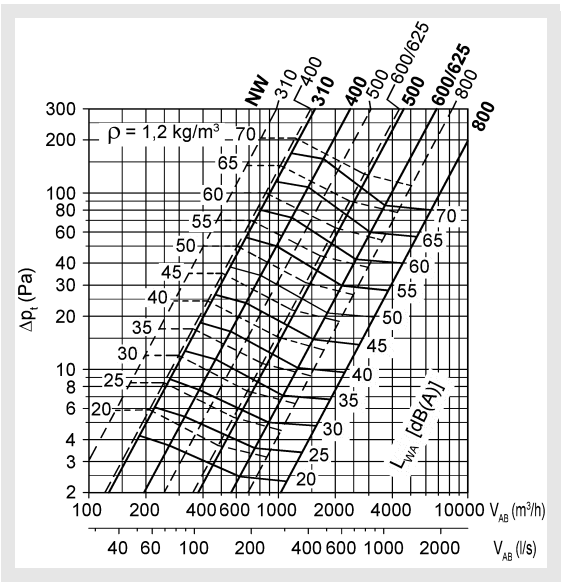


4DE-A-...-SS-... with hit-and-miss damper

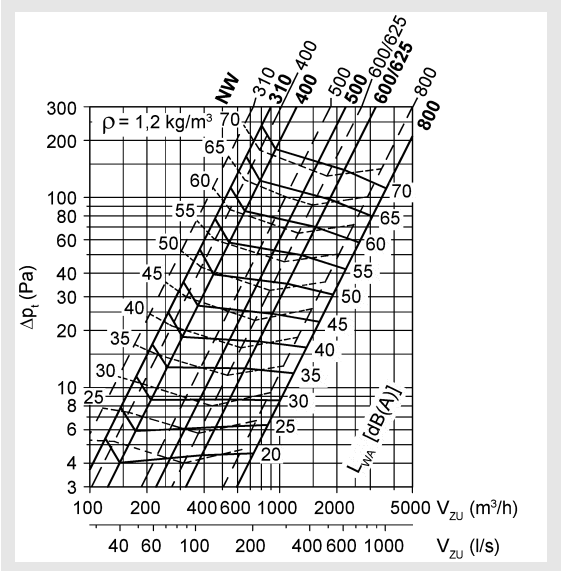


Air throw "H" (horizontal)





Air throw pattern "V" (vertical)



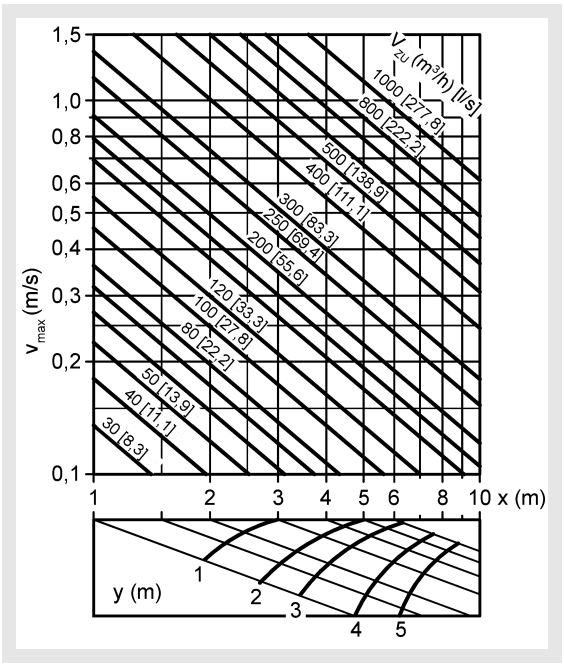
Hit-and-miss damper 100% OPEN ——————

Hit-and-miss damper 50% OPEN ---------

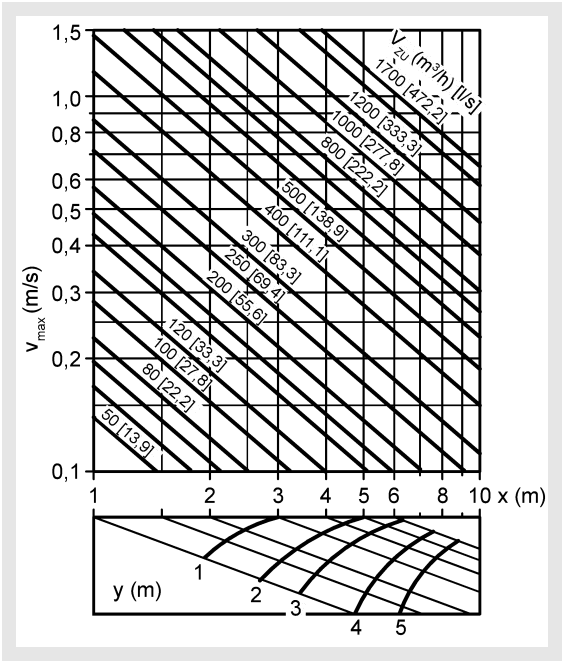
Ceiling diffuser 4DE

Maximum end velocity of jet

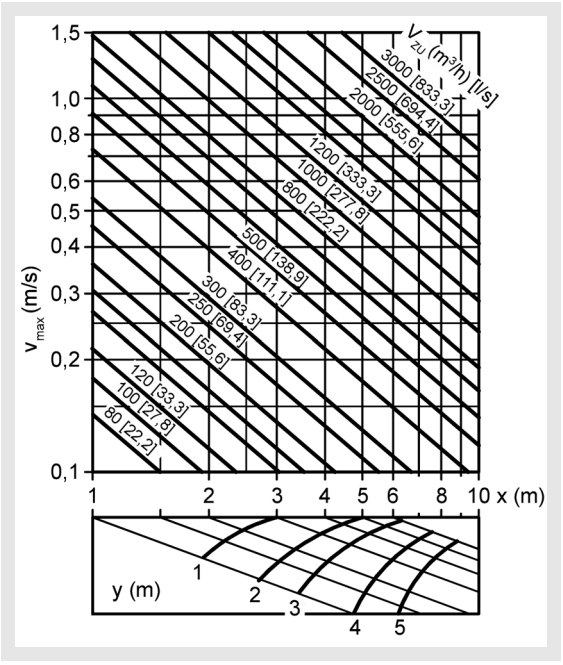
4DE-Z-310-…



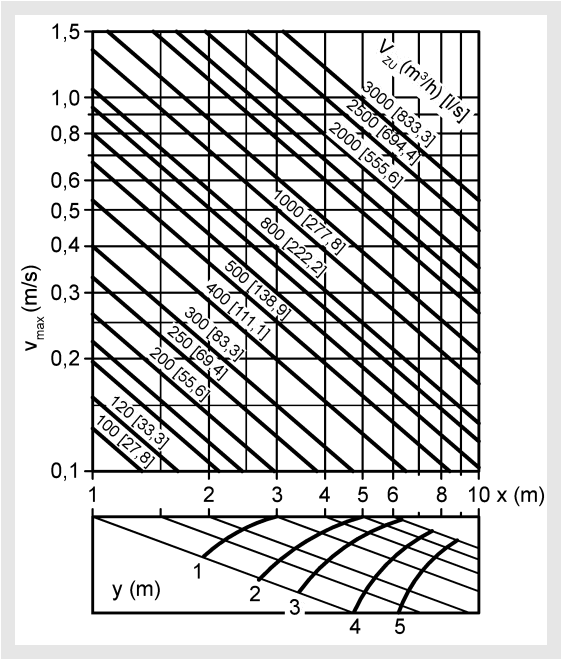
4DE-Z-400-…



4DE-Z-500-…

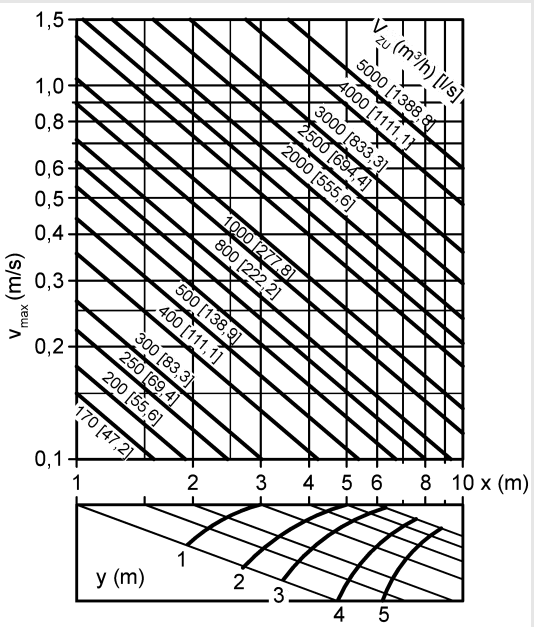


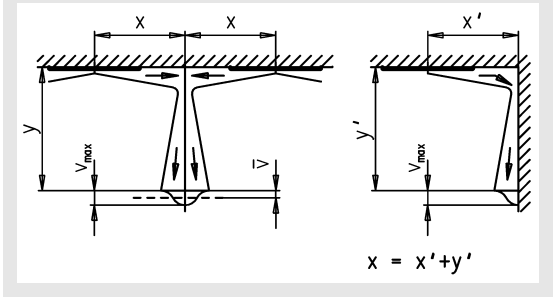
4DE-Z-600-…



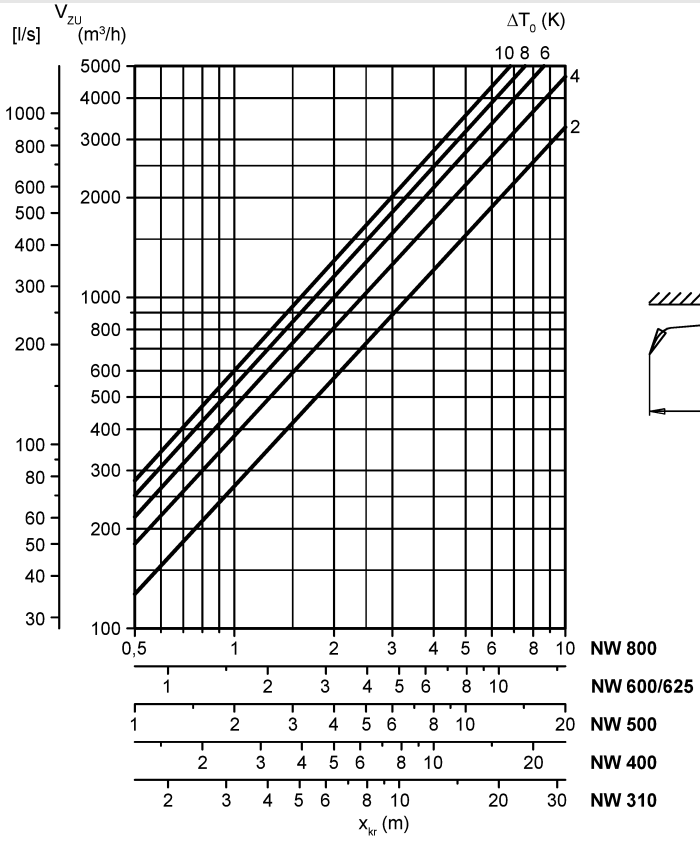
Ceiling diffuser 4DE

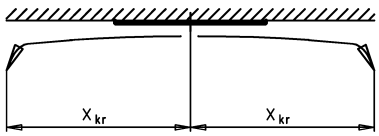
4DE-Z-800-...





Critical throw



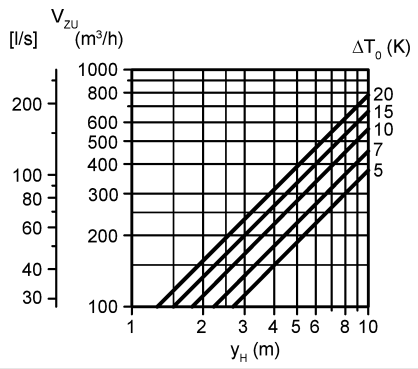


Ceiling diffuser 4DE

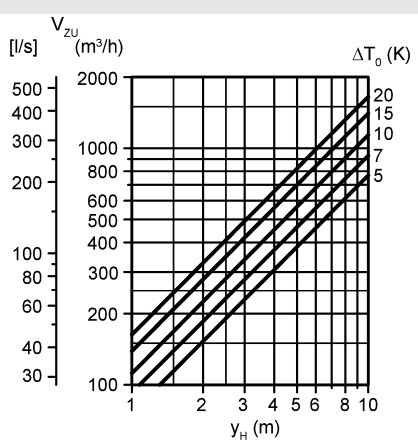
Maximum penetration

In heating mode

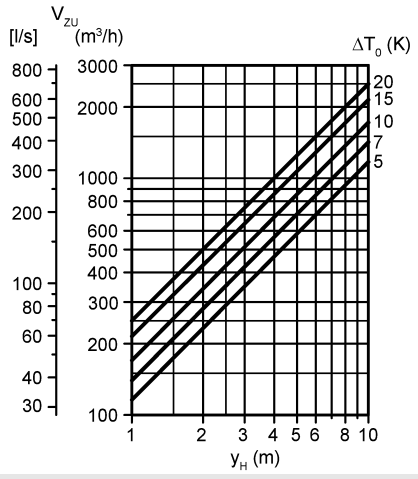
4DE-Z-310-…



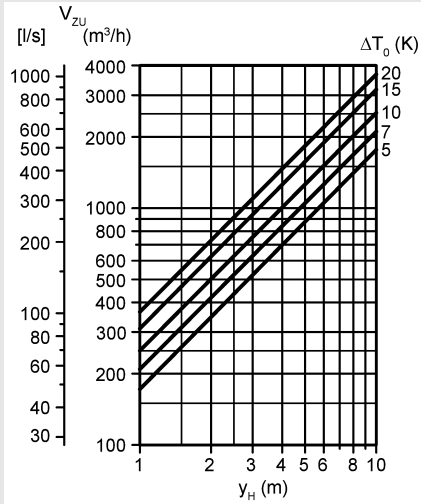
4DE-Z-400-…



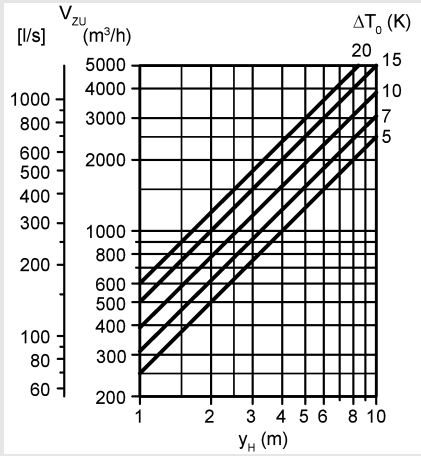
4DE-Z-500-…

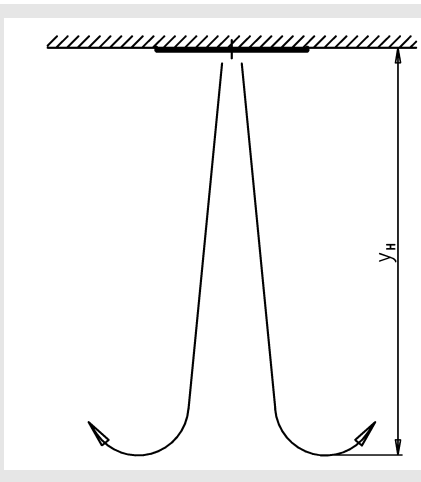


4DE-Z-600-…



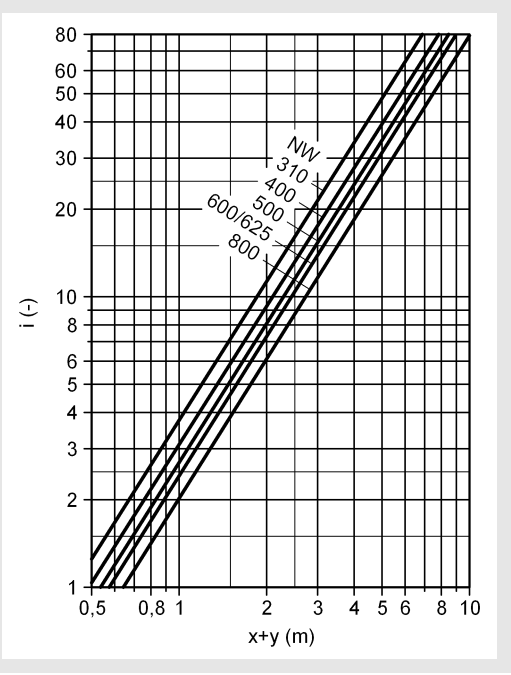
4DE-Z-800-…



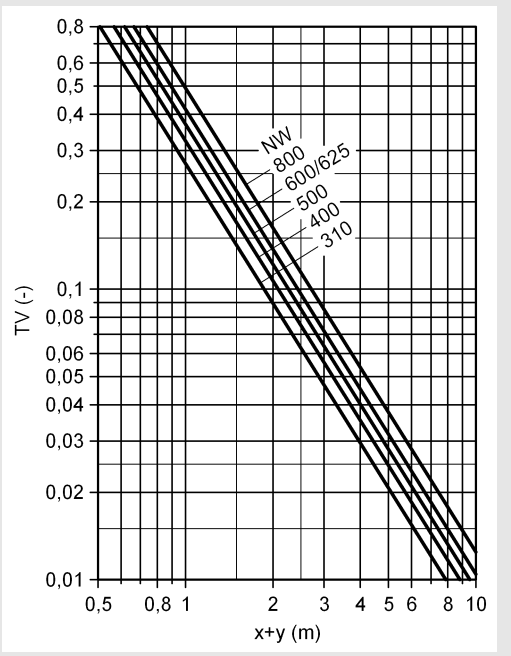


Ceiling diffuser 4DE

Induction ratios



Temperature ratios



Legend

V_{ZU}	(m³/h)	=	Supply air volume
V_{ZU}	[l/s]	=	Supply air volume
V_{AB}	(m³/h)	=	Return air volume
V_{AB}	[l/s]	=	Return air volume
Δp_t	(Pa)	=	Pressure loss
L_{WA}	[dB(A)]	=	A-weighted sound power level
ρ	(kg/m³)	=	Density
v_{max}	(m/s)	=	Maximum end velocity of jet
v	(m/s)	=	Average end velocity of jet ($v = v_{max} \times 0.5$)
x	(m)	=	horizontal throw
y	(m)	=	vertical throw
x+y	(m)	=	Horizontal + vertical throw
x_{kr}	(m)	=	Critical throw
ΔT_0	(K)	=	Temperature difference between supply air temperature and room temperature ($\Delta T_0 = t_{ZU} - t_R$)
t_{zu}	(K)	=	Supply air temperature
t_R	(K)	=	Room temperature
y_H	(m)	=	Maximum penetration in heating mode
i	(-)	=	Induction ratio ($i = V_X / V_{ZU}$)
TV	(-)	=	Temperature ratio ($TV = \Delta T_X / \Delta T_0$)
NW	(mm)	=	Nominal width
ΔT_X	(K)	=	Temperature difference at point x
V_X	(m³/h)	=	Total air jet volume at point x
V_X	[l/s]	=	Total air jet volume at point x

Ceiling diffuser 4DE

Order details 4DE

01	02	03	04	05	06	07
Type	Air throw	Nominal size	Material	Paint	Blade colour	Air throw pattern
Example						
4DE	-Z	-500	-SB	-9010	-L9005	-H

08	09	10
Mounting	Hit-and-miss damper	Ball-impact guard
-VM	-SN	-BO

Sample
4DE-Z-500-SB-9010-L9005-H-VM-SN-BO

Ceiling diffuser type 4DE I supply air I NW500 I faceplate made of sheet steel I faceplate painted to RAL9010 I blade colour similar to RAL9005 black I air throw pattern H (horizontal) I concealed mounting I without hit-and-miss damper I without ball-impact guard

Order details

01 - Type

4DE = Ceiling diffuser

02 - Air throw

Z = supply air
A = return air

03 – Nominal size

310 = NW310
400 = NW400
500 = NW500
600 = NW600
625 = NW625
800 = NW800

04 - Material

SB = Sheet steel (standard)
AL = Aluminium (only available with VM)

05 - Paint

0000 = without paint (galvanised sheet steel, aluminium raw material)
9010 = RAL colour white (standard)
xxxx = RAL colour can be freely selected
ELOX = Natural colour anodised (only for AL)

06 - Bladescolour

L9005 = Blades made of plastic similar to RAL 9005 (black)
L9006 = Blades made of plastic similar to RAL9006 (grey)
L9010 = Blades made of plastic similar to RAL9010 (white)
Axxxx = Blades made of aluminium, RAL colour can be freely selected
00000 = without blades

07 - Air throw pattern

H = All blades in position 2 (standard)
V = Blades in position 1, set ex works
C = without blades

08 - Mounting

VM = Concealed mounting (available only in conjunction with SK-Q-..., standard for NW800)
SM = Screw mounting (standard, not possible for NW800)
VS = Screw mounting with concealed mounting (NW800, only model with ball-impact guard)

09 - Hit-and-miss damper

SN = Without hit-and-miss damper (standard)
SS = With hit-and-miss damper (only possible without a plenum box)

10 – Ball-impact guard

BO = without ball-impact guard (standard)
BS = With ball-impact guard, painted same as faceplate

Ceiling diffuser 4DE

Order details SK

01	02	03	04	05	06	07	08	09
Plenum box	Model	Air diffuser	Type of air	Nominal size	Fastening	Material	Damper	Rubber lip seal
Example								
SK	-Q	-06	-Z	-500	-VM	-SV	-DK1	-GD1

10	11	12	13	14	15
Volumetric flow meter	ROB version	Insulation	Height of plenum box	Spigot diameter	Spigot position
-VME1	-ROB0	-I0	-KHS	-SDS	-S1

Sample
SK-Q-06-Z-500-VM-SV-DK1-GD1-VME1-ROB0-I0-KHS-SDS-S1

Plenum box, square design I for square air diffusers I air diffuser 4DE I supply air I NW500 I with concealed mounting I galvanised sheet steel I with damper 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

Q = for square air diffusers

03 - Air diffuser (must be ordered separately)

06 = suitable for 4DE-...

04 - Type of air

Z = supply air
A = return air

05 – Nominal size

310 = NW310
400 = NW400
500 = NW500
600 = NW600
625 = NW625
800 = NW800

06 - Fastening

VM = Concealed mounting
SM = screw mounting
VS = screw mounting with concealed mounting (only model with ball-impact guard)

07 - Material

SV = Galvanised sheet steel (standard)

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 version

ROB0 = Without ROB version (standard)
ROB1 = With ROB version

12 - Insulation

I0 = without insulation (standard)
Ii = with box insulation inside
Ia = With box insulation outside

Ceiling diffuser 4DE

13 - Height of plenum box

KHS = Height of plenum box standard

xxx = height of plenum box in mm (height$_{min}$= spigot diameter + 102 mm, but at least 200 mm) (For models SK-Q-06-Z-310 / -400-...-DK1/-DK2-...-S0, observe special height of plenum box (see p. 7))

14 - Spigot diameter

SDS = Spigot diameter standard

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 diffuser 4DE

Specification texts

Ceiling diffuser **type 4DE-Z** for supply air, in square design. Particularly suitable for installation in comfort rooms with high number of air changes, for clean rooms (in connection with particle filter boxes) and for VAV installations with variable volumetric flows (between 40-100%). Cooling and heating modes are possible (from -14 K to +14 K). Consisting of a high-quality powder-coated sheet steel faceplate painted to a RAL colour (RAL 9010, white, standard), with central pivoting, aerodynamic and radial fitted air deflection blades, which are individually adjustable without any tools from the diffuser side without dismounting the diffuser, in support blade profile made of plastic similar to RAL colour 9010 (white), RAL 9005 (black) or aluminium, painted individually or to the same RAL colour as the faceplate (subsequent adjustment of blades not possible). Free cross-section, resistance and sound power level constant in all blade positions. Fastened with visible screw mounting (SM). Fastening of NW 800 with concealed mounting (-VM).
Product: SCHAKO **type 4DE-Z-...**

- for return air, without air deflection blades

Product: SCHAKO **type 4DE-A-...**

- Faceplate made of natural anodised aluminium (E6/EV1)

- with concealed mounting (-VM), made of aerodynamic aluminium profile suspended at 4 points (up to size 400) and at 6 points, respectively, only available in conjunction with plenum box.

- with screw mounting with concealed mounting (-VS), for mounting with ball-impact guard (-BS) (only for NW 800).

Accessories:

- Plenum box (SK-Q-06-...) made of galvanised sheet steel, with fixing lugs.
  - Supply air model with integrated perforated straightener (-Z).
  - Return air model inside painted to RAL 9005 (black) (-A).
  - with damper (-DK1/-DK2) in plenum box, adjustable from below, for simple air volume regulation without dismounting the faceplate.
    - with damper without cable-operated adjustment (-DK1)
    - with damper with cable-operated adjustment (-DK2)
  - with volumetric flow meter (-VME1).
  - with ROB model (-ROB1), removable diffuser plate, damper and volumetric flow meter.
  - Rubber lip seal (-GD1) at the plenum box connection spigot, made of special rubber.
  - with thermal insulation
    - internal (-Ii)
    - external (-Ia)
  - height of plenum box can be freely selected, xxx in mm, (minimum height = spigot diameter + 102 mm) (For models SK-Q-06-Z-310 / -400-...-DK1/-DK2-...-S0, observe special height of plenum box, which is at least 200 mm (see p. 7))
  - 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

- with hit-and-miss damper (-SS) made of galvanised sheet steel for air volume regulation

- Ball-impact guard (-BS), made of steel with high-quality powder coating in RAL 9010 (white), other RAL colours possible at an extra charge (only possible with screw mounting (-SM) and for NW 800 only with VS mounting).