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DSA, DSA-PR, DSA-HV and DF-CP-MT Floor swirl diffusers

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Circular floor swirl diffuser DSA



DSA



DSA-PR



DSA-HV

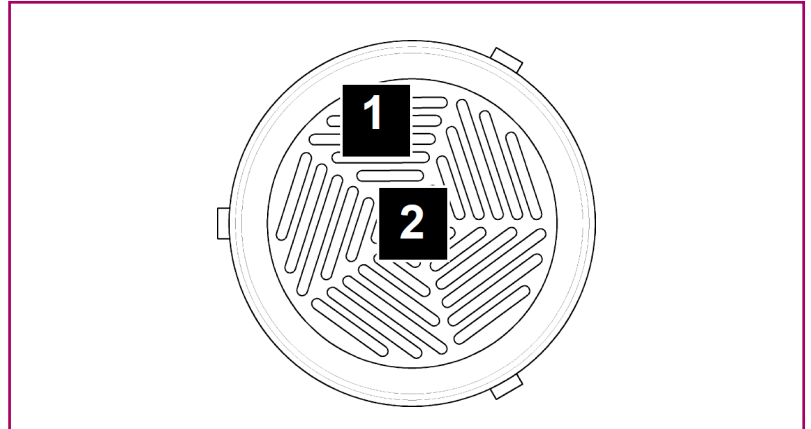


Description

Circular diffuser with swirl air supply, suitable for false floor installation. Diffuser slots are designed to ensure a swirl air supply with high levels of induction, achieving reduced air velocities and a moderate temperature gradient in the occupied zone. The diffuser may be used in rooms with a variable or constant air volume.

Product characteristics

- Floor circular diffuser, and frontal punched plate made in natural aluminum of 6 mm thick. (DSA)
- Floor circular diffuser, with swirl function, and frontal perforated plate made in steel sheet of 3 mm thick. (DSA-PR)
- Sheet steel dirt trap and swirl unit
- Floor circular diffuser, with swirl function, frontal plate and dirt trap made of ABS material. High induction model for large airflows. Finished in black RAL-9005 or in gray RAL-9006. (DSA-HV)
- High levels of induction
- Simple to clean
- Can be used with connection plenum



Types

DSA: High point load shoes.

DSA-PR: High point load shoes.

DSA-HV: Standard footwear.

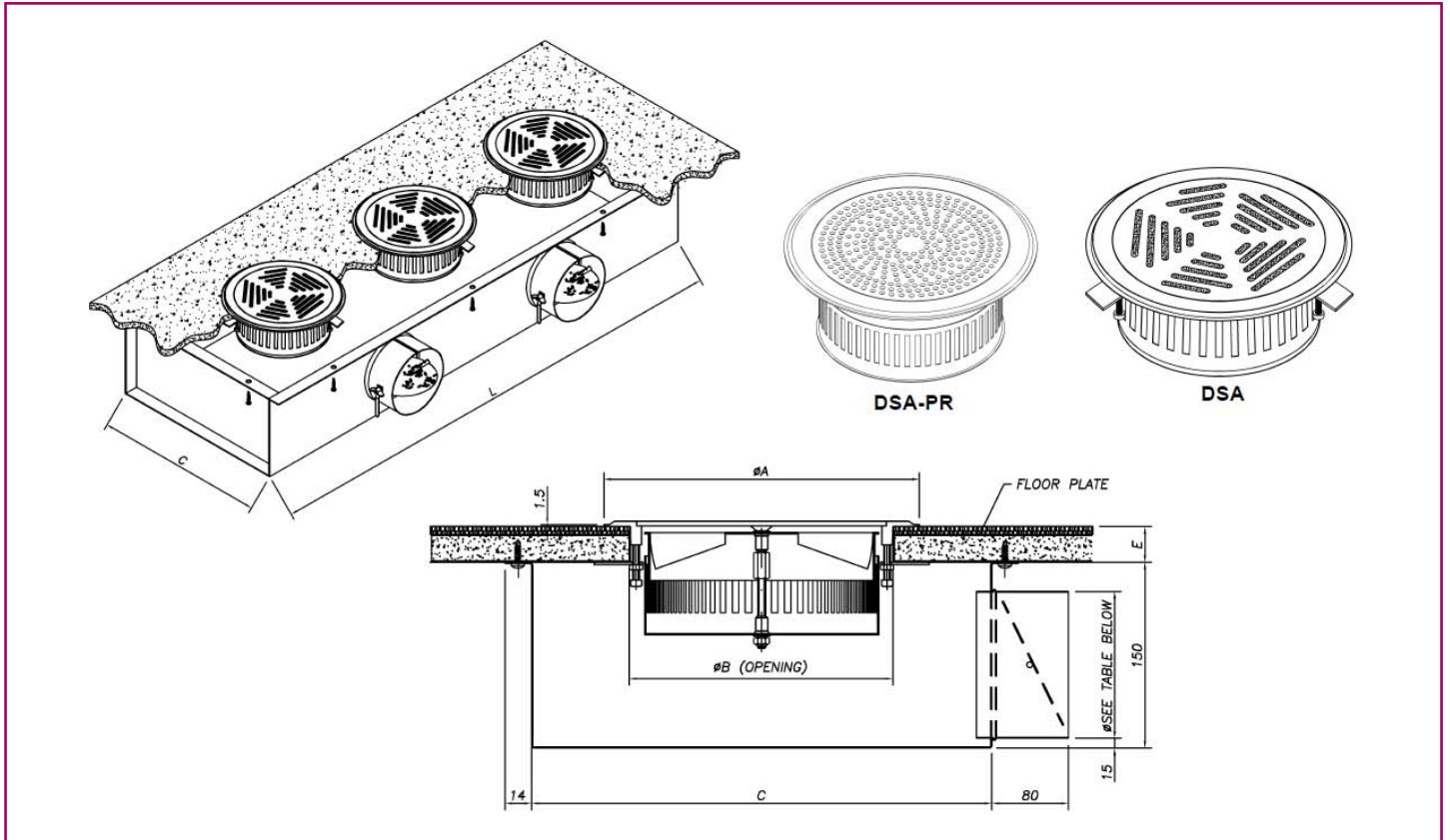
DIFFUSER LOAD CAPACITY

Model	Size	Position 1	Position 2
DSA / DSA-PR	Ø 150	2,9	2,5
	Ø 200	2	2,25
DSA-HV	Ø 200	2,5	2

Load in kN

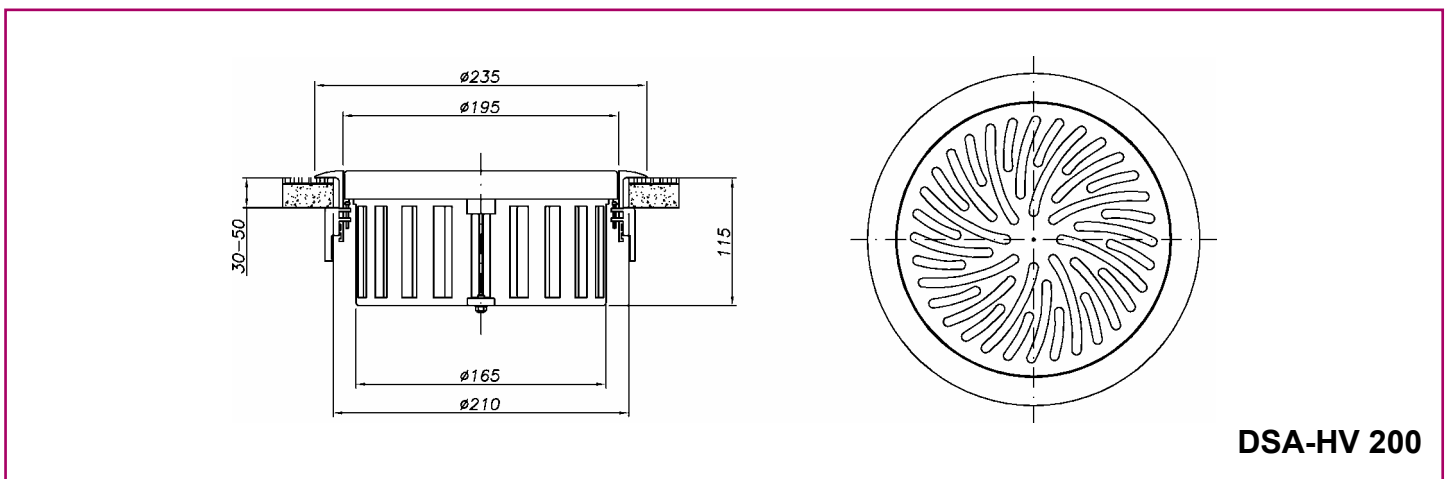
According to the requirements of European test standard EN 13264:2001, over 30 x 30 mm² area.

Models and dimensions DSA



Size	Ø A	Ø B	C	L				E	
				1 DIFFUSER	2 DIFFUSERS	3 DIFFUSERS	4 DIFFUSERS	MAXIMUM	MINIMUM
150	190	150	225	500 1 SPIGOT Ø 100	1000 2 SPIGOTS Ø 100	1500 2 SPIGOTS Ø 125	2000 2 SPIGOTS Ø 125	32	14
200	240	200	275						

- Dimensions for models DSA, DSA-PR



DSA-HV 200

Selection table. DSA diffuser

Technical data in regard to sound power and pressure drop refer to a DSA diffuser without plenum. Technical data for the DSA plenum box diffuser can be obtained by adding 4 dB(A) to the sound power level data in the table for the diffuser without a plenum box and increasing the pressure loss by 18%. The remaining data remains unchanged.

Circular floor diffuser DSA								
Q		Size	150			200		
		A _k (m ²)	0,00495			0,00945		
(m ³ /h)	(l/s)	ΔT (°C)	-4	-6	-8	-4	-6	-8
30	8,3	h _{0,25} (m)	0,8	0,7	0,6			
		V _k (m/s)		1,7				
		ΔP _{est} (Pa)		6				
		L _w - [dB(A)]		<20				
35	9,7	h _{0,25} (m)	0,9	0,8	0,7			
		V _k (m/s)		2,0				
		ΔP _{est} (Pa)		8				
		L _w - [dB(A)]		22				
40	11,1	h _{0,25} (m)	1,1	0,9	0,8			
		V _k (m/s)		2,2				
		ΔP _{est} (Pa)		11				
		L _w - [dB(A)]		25				
45	12,5	h _{0,25} (m)	1,2	1,0	0,9			
		V _k (m/s)		2,5				
		ΔP _{est} (Pa)		13				
		L _w - [dB(A)]		28				
50	13,9	h _{0,25} (m)	1,3	1,2	1,0	0,7	0,6	0,5
		V _k (m/s)		2,8			1,5	
		ΔP _{est} (Pa)		17			3	
		L _w - [dB(A)]		31			<20	
60	16,7	h _{0,25} (m)	1,6	1,4	1,2	0,8	0,7	0,6
		V _k (m/s)		3,4			1,8	
		ΔP _{est} (Pa)		24			5	
		L _w - [dB(A)]		35			20	
70	19,4	h _{0,25} (m)	1,9	1,6	1,4	0,9	0,8	0,7
		V _k (m/s)		3,9			2,1	
		ΔP _{est} (Pa)		33			7	
		L _w - [dB(A)]		39			24	

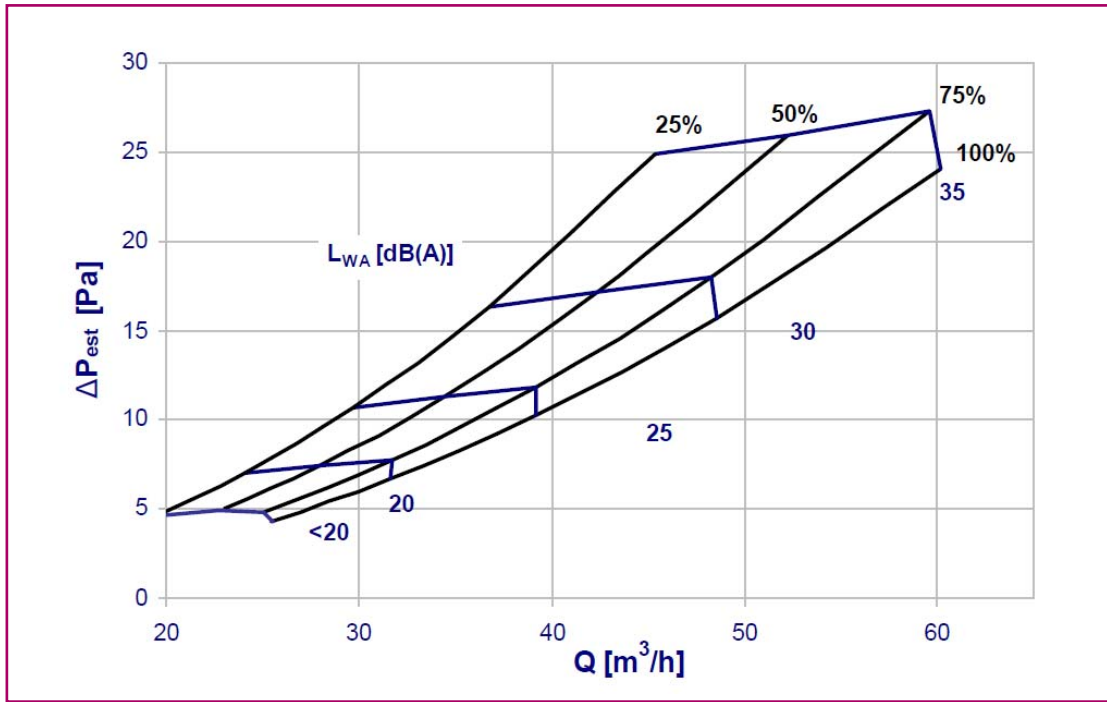
Circular floor diffuser DSA								
Q		Size	150			200		
		A _k (m ²)	0,00495			0,00945		
(m ³ /h)	(l/s)	ΔT (°C)	-4	-6	-8	-4	-6	-8
85	23,6	h _{0,25} (m)	2,3	2,0	1,7	1,1	1,0	0,9
		V _k (m/s)		4,8			2,5	
		ΔP _{est} (Pa)		48			10	
		L _w - [dB(A)]		43			29	
100	27,8	h _{0,25} (m)	2,7	2,3	2,0	1,3	1,2	1,0
		V _k (m/s)		5,6			2,9	
		ΔP _{est} (Pa)		67			14	
		L _w - [dB(A)]		47			33	
115	31,9	h _{0,25} (m)				1,5	1,3	1,2
		V _k (m/s)					3,4	
		ΔP _{est} (Pa)					18	
		L _w - [dB(A)]					36	
130	36,1	h _{0,25} (m)				1,7	1,5	1,3
		V _k (m/s)					3,8	
		ΔP _{est} (Pa)					23	
		L _w - [dB(A)]					39	
150	41,7	h _{0,25} (m)				2,0	1,7	1,5
		V _k (m/s)					4,4	
		ΔP _{est} (Pa)					31	
		L _w - [dB(A)]					43	
170	47,2	h _{0,25} (m)				2,3	2,0	1,7
		V _k (m/s)					5,0	
		ΔP _{est} (Pa)					40	
		L _w - [dB(A)]					46	

- Q (m³/h)** Air flow rate
- AK (m²)** Effective supply area
- ΔT (°C)** Temperature ΔT
- h_{0,25} (m)** Vertical throw for an air velocity of 0,25 m/s
- V_k (m/s)** Effective supply velocity
- ΔP_{est} (Pa)** Pressure drop
- L_w [dB(A)]** Sound power

Selection graphs. DSA diffuser

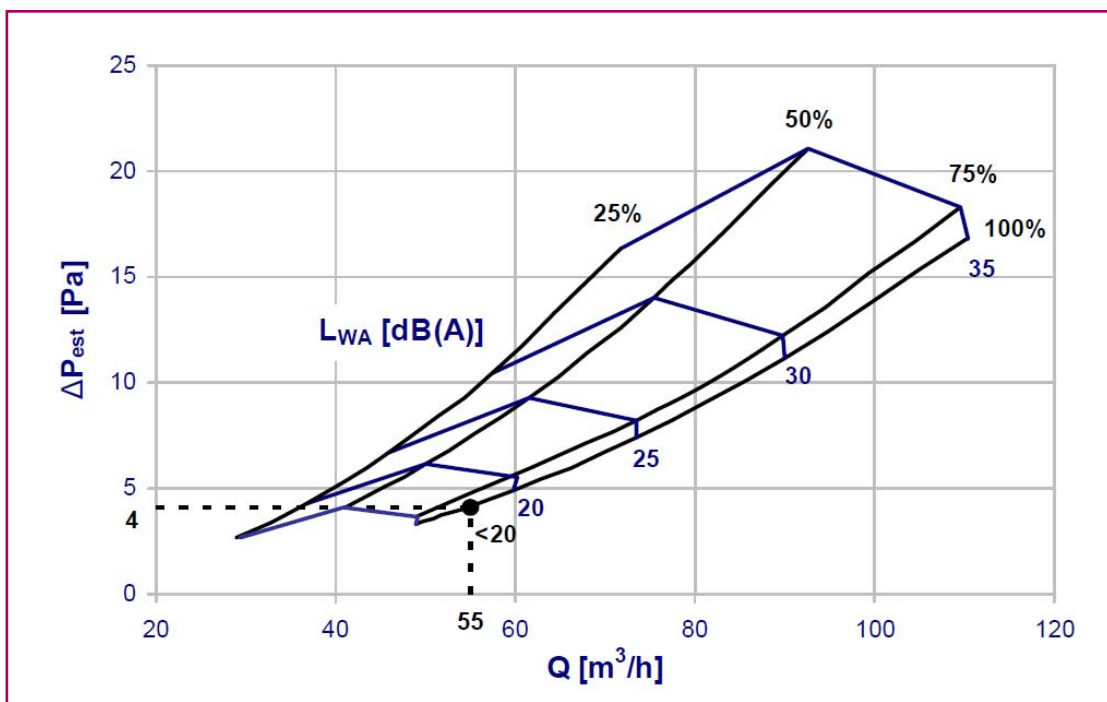
Sound power
% (Dirt trap opening percentage)

DSA 150 WITHOUT PLENUM
Graph 1



Sound power
% (Dirt trap opening percentage)

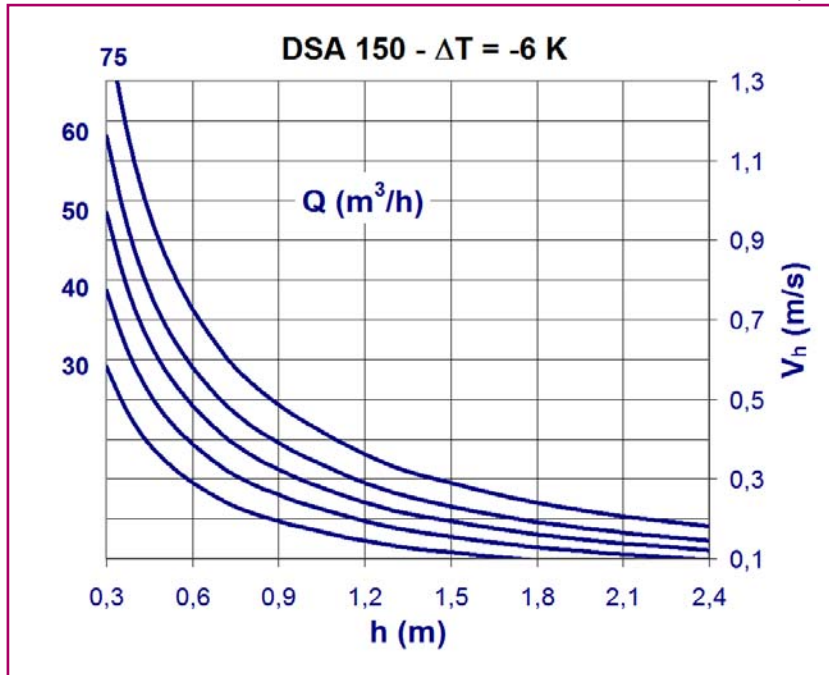
DSA 200 WITHOUT PLENUM
Graph 2



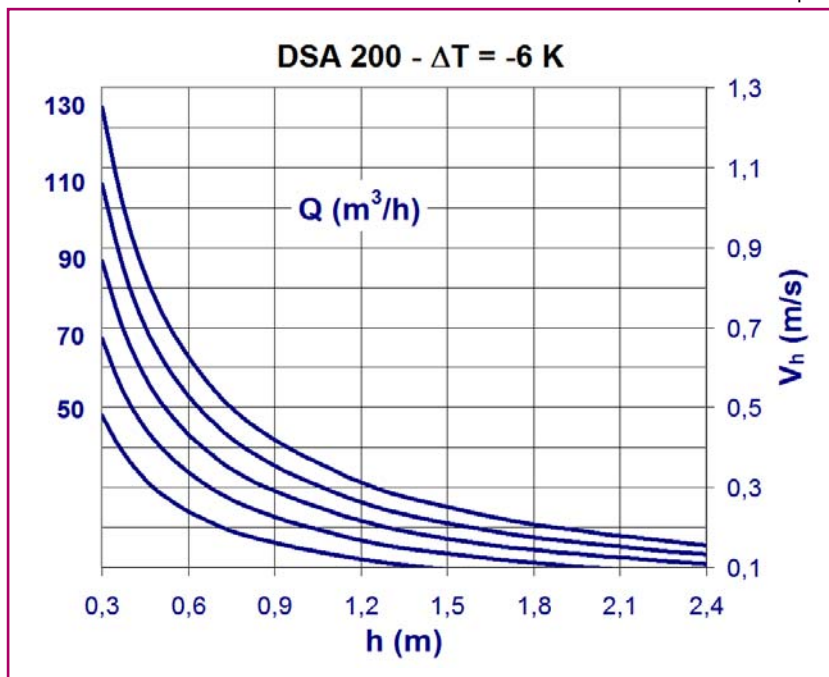
Selection graphs. DSA diffuser

Graphs showing the duct air velocity at different heights account for a possible difference between supply air temperature and room temperature of - 6 K; for a different differential, we must apply the coefficients shown in the table below, using the corresponding formula.

Graph 3



Graph 4



Coefficient correction table

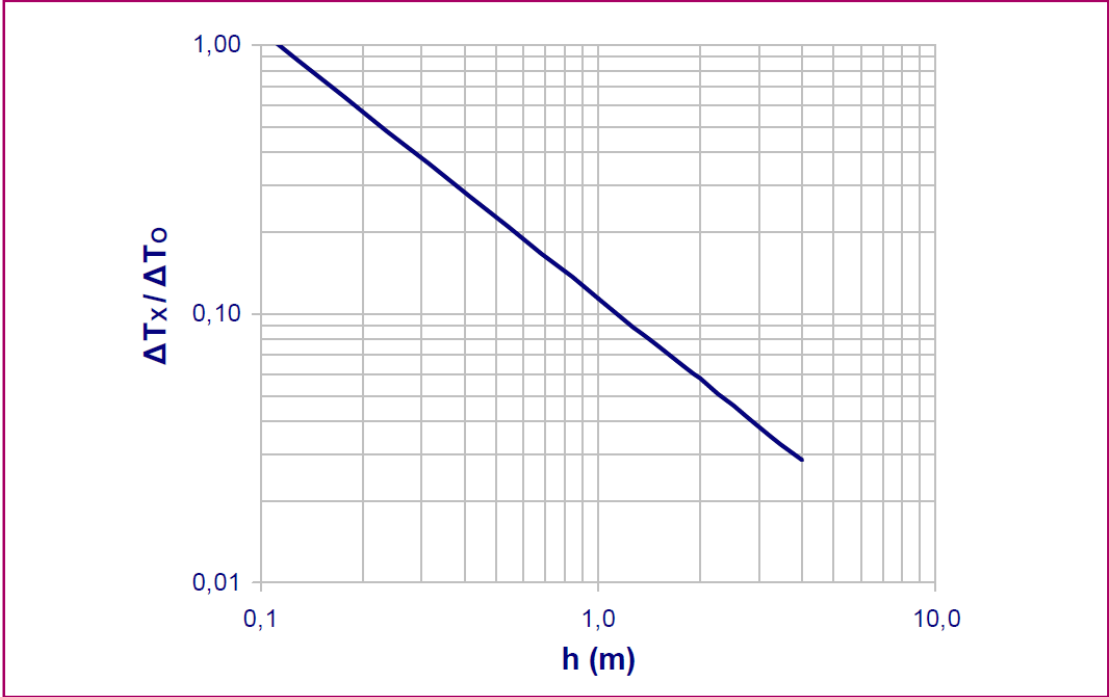
ΔT (K)	-4	-6	-8	-10
C	1,15	1	0,87	0,76

$$V_h = V_{h \text{ graph}} \times C$$

Selection graphs. DSA diffuser

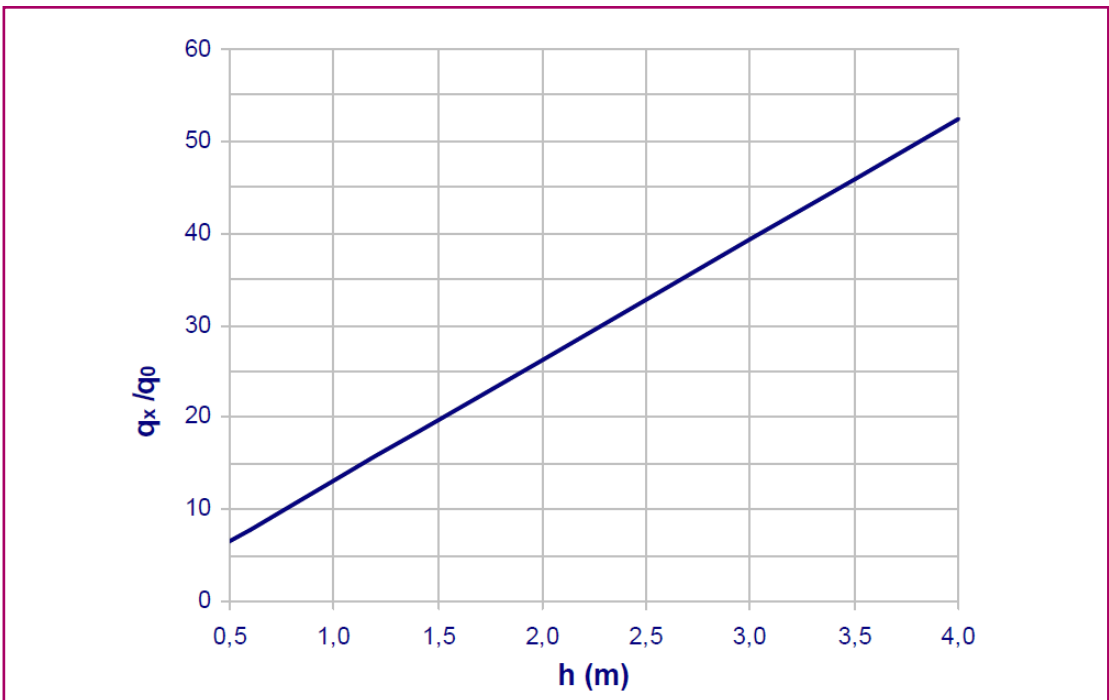
Temperature quotient

Graph 5



Induction rate

Graph 6



Selection table. DSA-HV diffuser

Technical data in regard to sound power and pressure drop refer to a DSA-HV diffuser without plenum. Technical data for the DSA-HV plenum box diffuser can be obtained by adding 4 dB(A) to the sound power level data in the table for the diffuser without a plenum box and increasing the pressure loss by 18%. The remaining data remains unchanged.

Circular floor diffuser DSA-HV					
Q		Size	200		
		A _k (m ²)	0,0168		
(m ³ /h)	(l/s)	ΔT (°C)	-4	-6	-8
100	27,8	h _{0,25} (m)	0,9	0,7	0,6
		V _k (m/s)	1,7		
		ΔP _{est} (Pa)	7		
		L _w - [dB(A)]	<20		
120	33,3	h _{0,25} (m)	0,9	0,8	0,7
		V _k (m/s)	2,0		
		ΔP _{est} (Pa)	10		
		L _w - [dB(A)]	22		
140	38,9	h _{0,25} (m)	1,1	1,0	0,8
		V _k (m/s)	2,3		
		ΔP _{est} (Pa)	14		
		L _w - [dB(A)]	26		
160	44,4	h _{0,25} (m)	1,2	1,1	1,0
		V _k (m/s)	2,6		
		ΔP _{est} (Pa)	18		
		L _w - [dB(A)]	30		
180	50,0	h _{0,25} (m)	1,4	1,2	1,1
		V _k (m/s)	3,0		
		ΔP _{est} (Pa)	23		
		L _w - [dB(A)]	32		
200	55,6	h _{0,25} (m)	1,5	1,4	1,2
		V _k (m/s)	3,3		
		ΔP _{est} (Pa)	29		
		L _w - [dB(A)]	35		

Q (m³/h)	Air flow rate
AK (m²)	Effective supply area
ΔT (°C)	Temperature ΔT
h_{0,25} (m)	Vertical throw for an air velocity of 0,25 m/s
V_k (m/s)	Effective supply velocity
ΔP_{est} (Pa)	Pressure drop
L_w [dB(A)]	Sound power

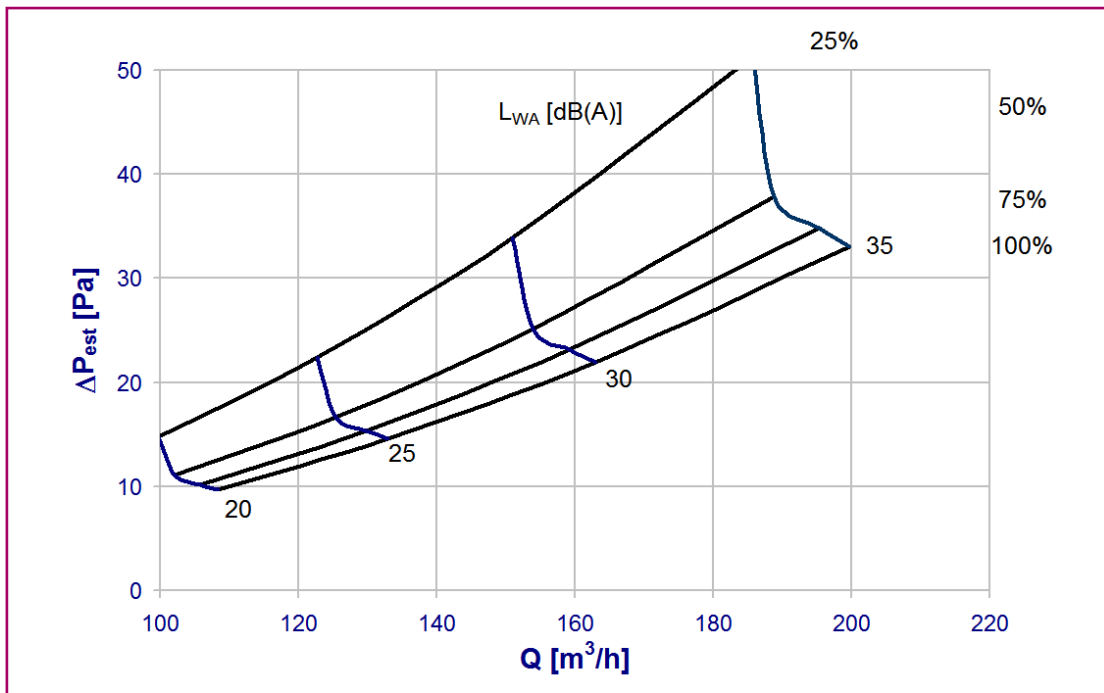
Selection graphs. DSA-HV diffuser

Graphs showing the duct air velocity at different heights account for a possible difference between supply air temperature and room temperature of - 6 K; for a different differential, we must apply the coefficients shown in the table below, using the corresponding formula. Graphs of Temperature quotient and induction rate are similar to DSA model detailed in page 9.

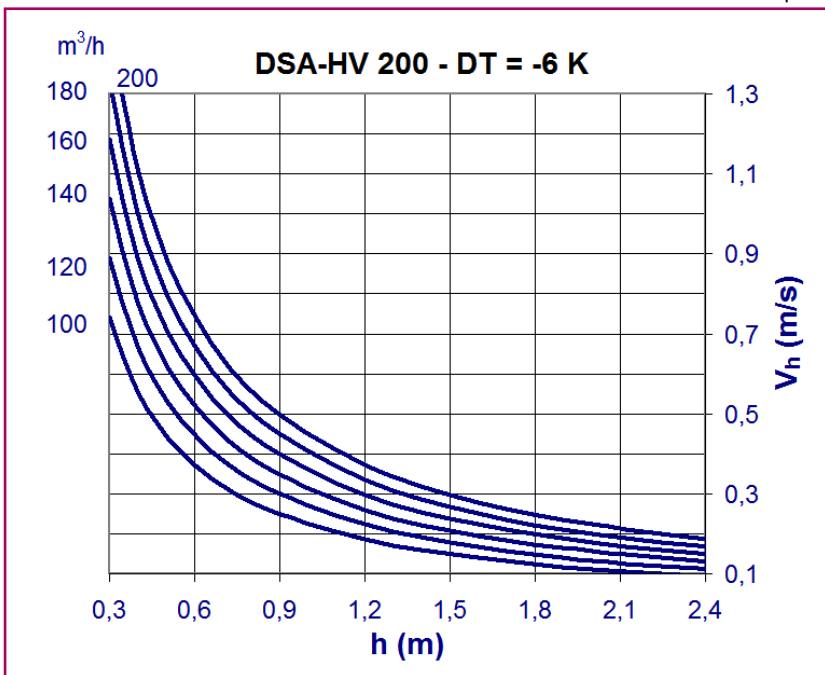
Sound power
% (Dirt trap opening percentage)

DSA-HV 200 WITHOUT PLENUM

Graph 7



Graph 8



ΔT (K)	-4	-6	-8	-10
C	1,15	1	0,87	0,76

Selection table. DSA-PR diffuser

Technical data in regard to sound power and pressure drop refer to a DSA-PR diffuser without plenum. Technical data for the DSA-PR plenum box diffuser can be obtained by adding 4 dB(A) to the sound power level data in the table for the diffuser without a plenum box and increasing the pressure loss by 18%. The remaining data remains unchanged.

CIRCULAR FLOOR DIFFUSER DSA-PR								
Q		Size	150			200		
		A _k (m ²)	0,00495			0,00945		
(m ³ /h)	(l/s)	ΔT (°C)	-4	-6	-8	-4	-6	-8
30	8,3	h _{0,25} (m)	1,1	0,9	0,8			
		V _k (m/s)		2,6				
		ΔP _{est} (Pa)		14				
		L _w - [dB(A)]		24				
35	9,7	h _{0,25} (m)	1,3	1,0	0,9			
		V _k (m/s)		3,0				
		ΔP _{est} (Pa)		20				
		L _w - [dB(A)]		27				
40	11,1	h _{0,25} (m)	1,5	1,2	1,1	0,7	0,6	0,5
		V _k (m/s)		3,5			1,8	
		ΔP _{est} (Pa)		25			5	
		L _w - [dB(A)]		30			<20	
45	12,5	h _{0,25} (m)	1,6	1,3	1,2	0,8	0,7	0,6
		V _k (m/s)		3,9			2,0	
		ΔP _{est} (Pa)		32			6	
		L _w - [dB(A)]		33			<20	
50	13,9	h _{0,25} (m)	1,8	1,5	1,4	0,9	0,8	0,7
		V _k (m/s)		4,3			2,2	
		ΔP _{est} (Pa)		40			8	
		L _w - [dB(A)]		36			21	
60	16,7	h _{0,25} (m)	2,2	1,8	1,6	1,1	1,0	0,8
		V _k (m/s)		5,2			2,7	
		ΔP _{est} (Pa)		57			12	
		L _w - [dB(A)]		40			25	
70	19,4	h _{0,25} (m)	2,6	2,1	1,9	1,3	1,1	0,9
		V _k (m/s)		6,1			3,1	
		ΔP _{est} (Pa)		78			16	
		L _w - [dB(A)]		44			29	

CIRCULAR FLOOR DIFFUSER DSA-PR								
Q		Size	150			200		
		A _k (m ²)	0,00495			0,00945		
(m ³ /h)	(l/s)	ΔT (°C)	-4	-6	-8	-4	-6	-8
80	22,2	h _{0,25} (m)	2,9	2,4	2,2	1,5	1,3	1,1
		V _k (m/s)		6,9			3,6	
		ΔP _{est} (Pa)		102			21	
		L _w - [dB(A)]		47			32	
90	25,0	h _{0,25} (m)				1,7	1,5	1,2
		V _k (m/s)					4,0	
		ΔP _{est} (Pa)					26	
		L _w - [dB(A)]					35	
100	27,8	h _{0,25} (m)				1,8	1,6	1,3
		V _k (m/s)					4,5	
		ΔP _{est} (Pa)					32	
		L _w - [dB(A)]					38	
125	34,7	h _{0,25} (m)				2,3	2,0	1,7
		V _k (m/s)					5,6	
		ΔP _{est} (Pa)					50	
		L _w - [dB(A)]					43	
150	41,7	h _{0,25} (m)				2,8	2,4	2,0
		V _k (m/s)					6,7	
		ΔP _{est} (Pa)					72	
		L _w - [dB(A)]					48	

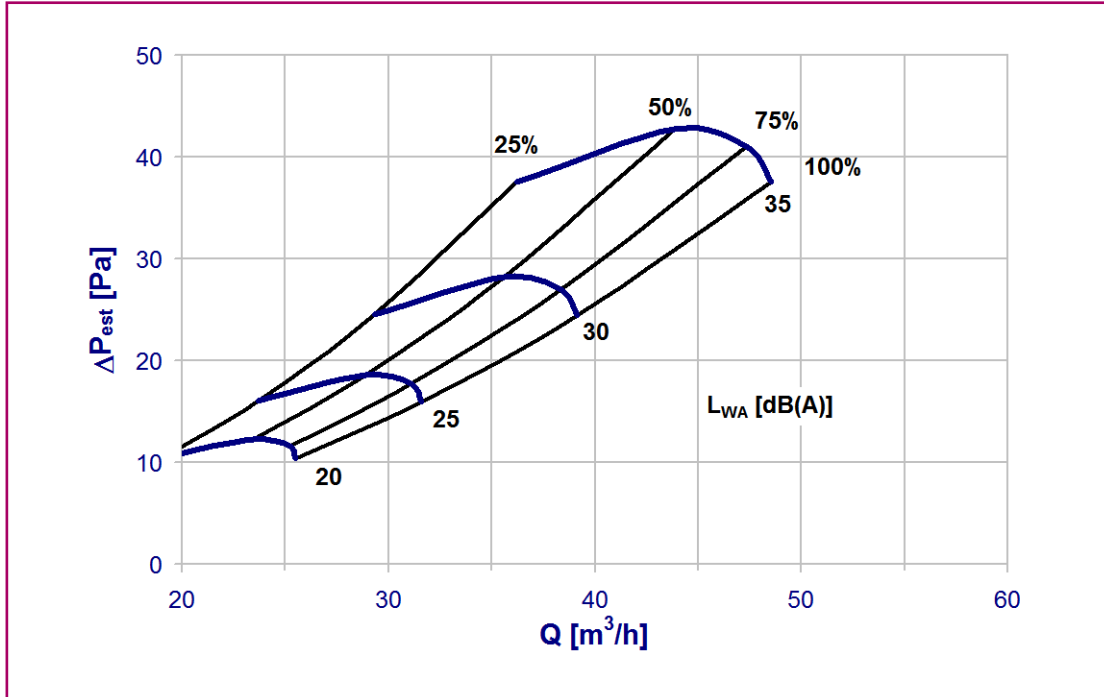
Q (m³/h)	Air flow rate
AK (m²)	Effective supply area
ΔT (°C)	Temperature ΔT
h_{0,25} (m)	Vertical throw for an air velocity of 0,25 m/s
V_k (m/s)	Effective supply velocity
ΔP_{est} (Pa)	Pressure drop
L_w [dB(A)]	Sound power

Selection graphs. DSA-PR diffuser

Sound power
% (Dirt trap opening percentage)

DSA-PR 150 WITHOUT PLENUM

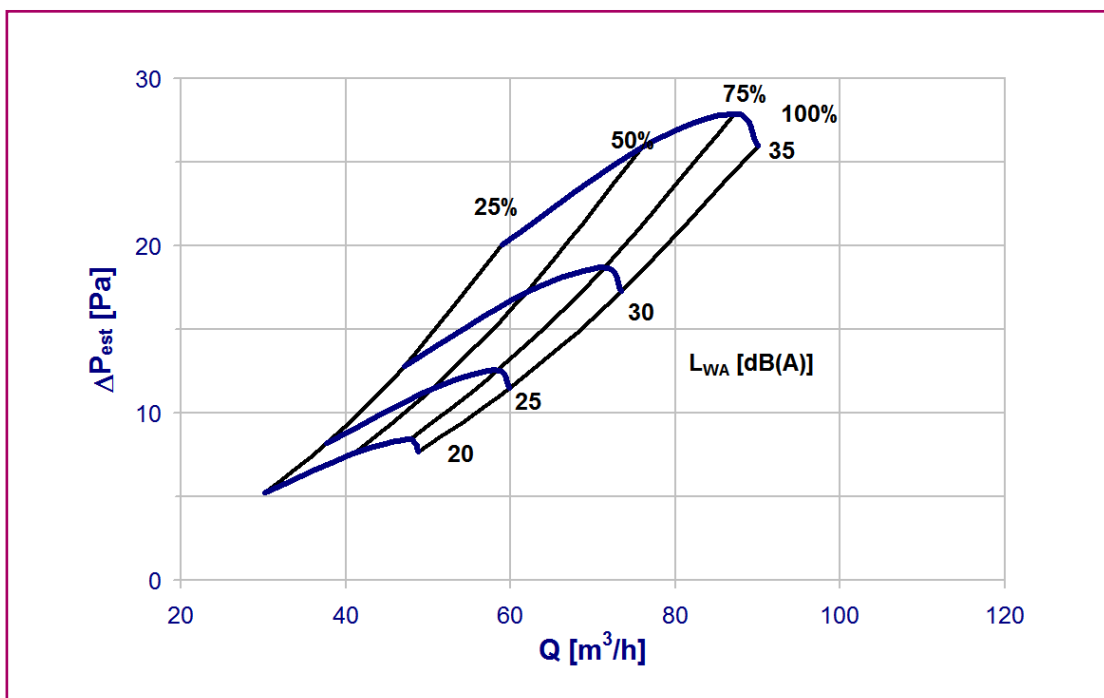
Graph 9



Sound power
% (Dirt trap opening percentage)

DSA-PR 200 WITHOUT PLENUM

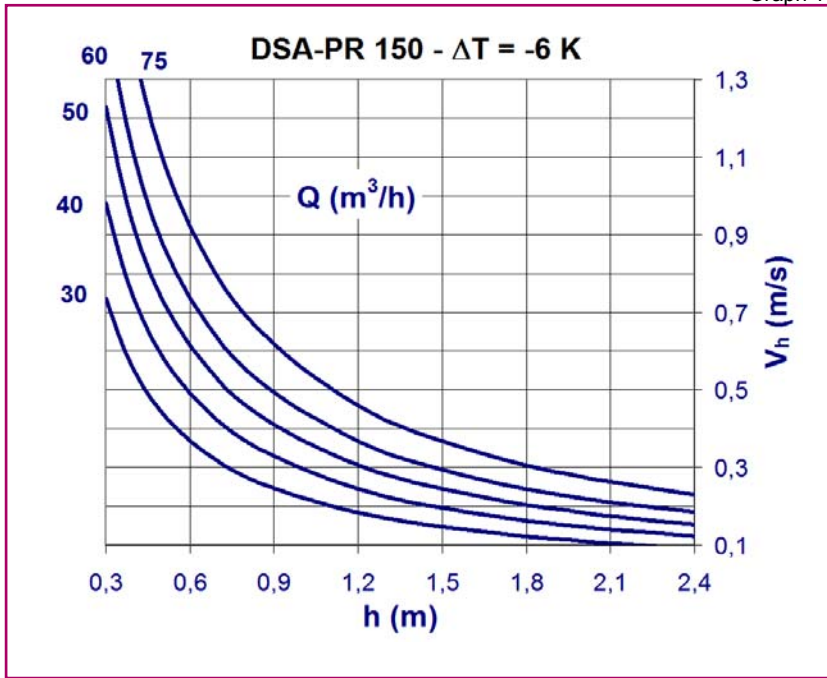
Graph 10



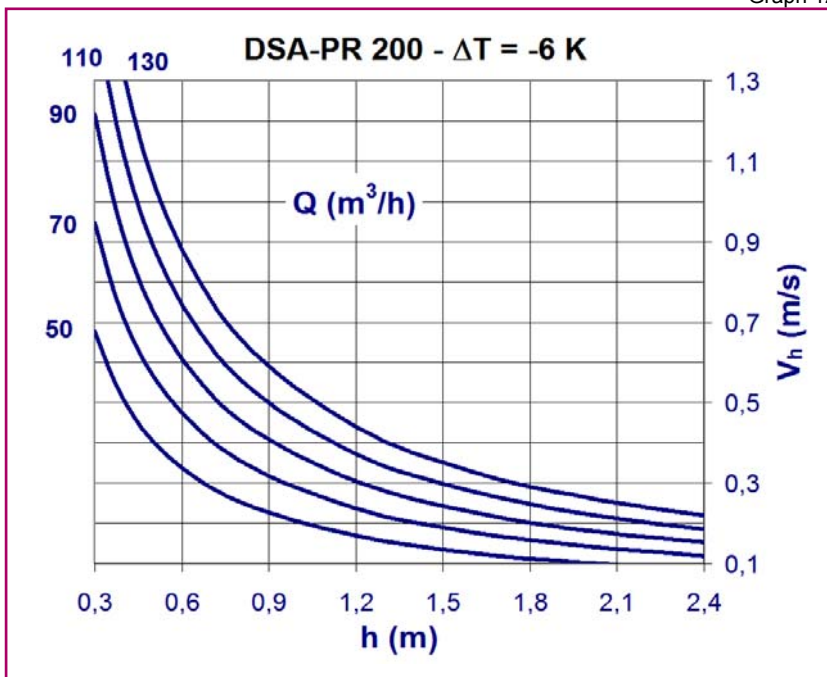
Selection graphs. DSA-PR diffuser

Graphs showing the duct air velocity at different heights account for a possible difference between supply air temperature and room temperature of - 6 K; for a different differential, we must apply the coefficients shown in the table below, using the corresponding formula.

Graph 11



Graph 12



Coefficient correction table

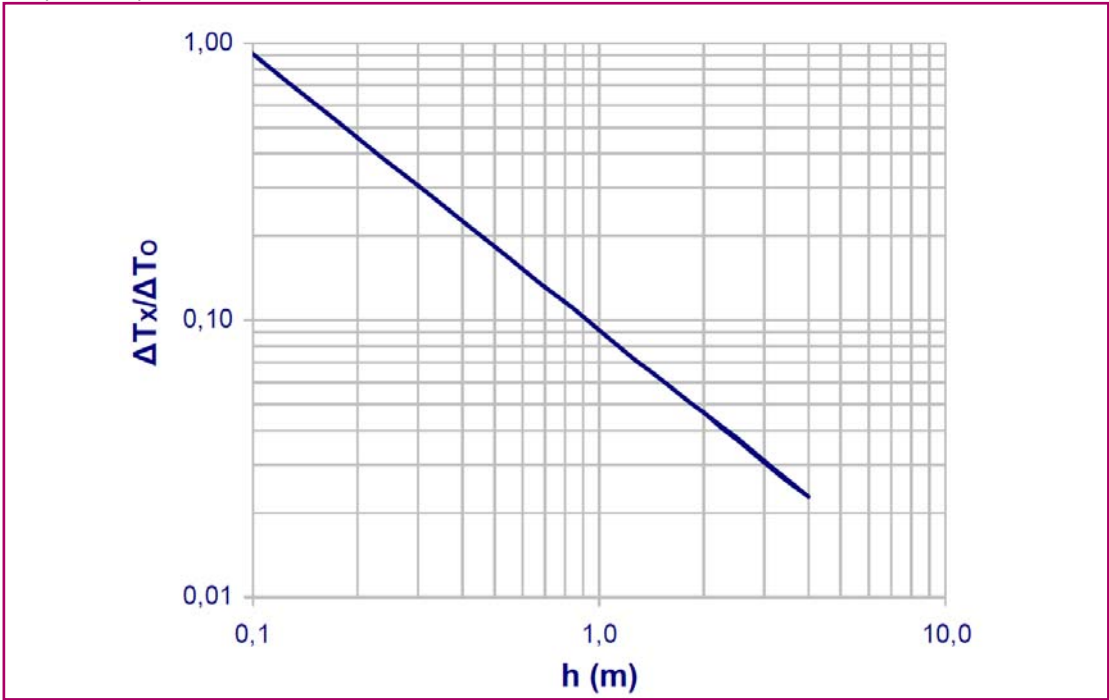
ΔT (K)	-4	-6	-8	-10
C	1,15	1	0,87	0,76

$$V_h = V_{h \text{ graph}} \times C$$

Selection graphs. DSA-PR diffuser

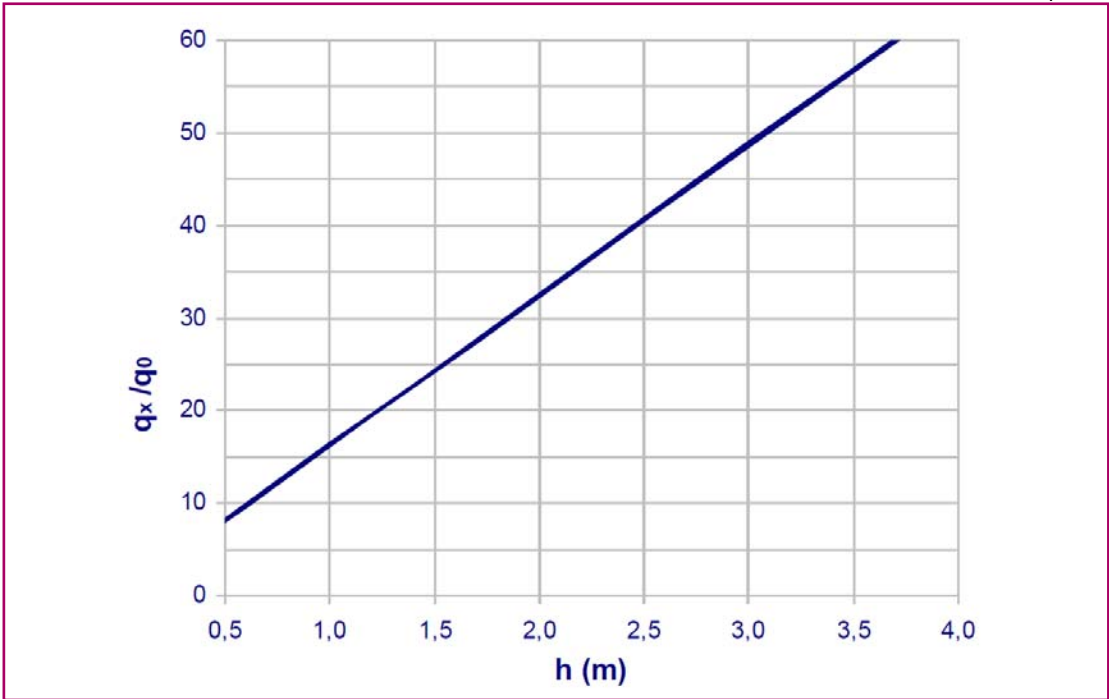
Temperature quotient

Graph 13



Induction rate

Graph 14



Selection example. DSA diffuser

In selecting the element for this type of diffusion, i.e. floor-level diffusion with temperature jumps no greater than ± 6 °C, it is recommended not to exceed effective air velocity (V_k) of 1.5 – 2 m/s to avoid generating irritating air currents in the occupied area ($>0,25$ m/s). This is particularly relevant when using this type of diffuser under seats in locations such as auditoriums.

Shown below is an example giving a graph-based explanation of the selection method.

Design data

Auditorium with 410 seats. Total air supply volume in seating area: 22500 m³/h.
Supply temperature: 19 °C. Room temperature: 23 °C.
Installation of one diffuser per seat; volume per diffuser: 55 m³/h.

Results

Given the volume per diffuser (55 m³/h), taking into account the aforementioned selection criteria for this type of installation ($V_k < 2$ m/s), according to the selection table (page 6) the appropriate model would be the DSA 200.

To find out the sound power level and pressure drop for this model, refer to selection graph 2. This gives us the following information:

Pressure drop: **4 Pa**
Sound power level: **<20 dB(A)**

To find out the air velocity at the height of the seat (around 0,5 m), refer to selection graph 4. This gives us the following information:

Corrected velocity " V_h " at a height "h" of 0,5 m and with $\Delta T = -4$ °C:

$$V_h = 0,32 \times 1,15 = 0,37 \text{ m/s}$$

Product code. Example

The product code describes the model ordered by the customer.

DSA	Floor diffuser with slotted aluminium plate
DSA-PR	Steel plate floor diffuser with circular perforations
DSA-HV	Circular floor Swirl Diffuser, of ABS material

Ø150	Diffuser size
Ø200	Diffuser size

ØP	Connection plenum
----	-------------------

-	Manufactured in steel sheet
RAL	RAL coating upon request

Example:

DSA-200-P

Circular diffuser with slotted aluminium face plate with swirl air supply, 200 mm diameter and plenum.

DF-CP-MT Step Swirl Diffuser



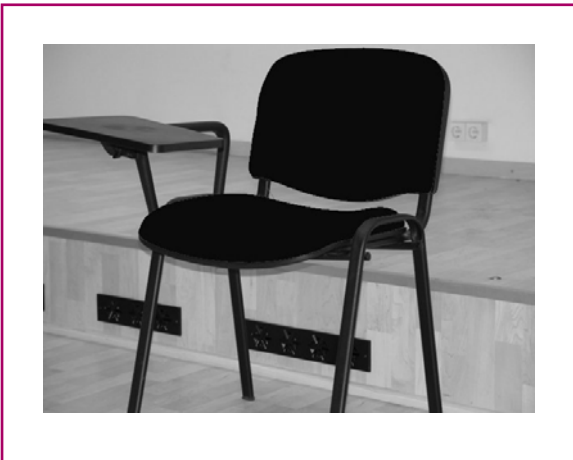
Description

The DF-CP-MT step swirl diffusers consist of a rectangular front plate incorporating 2 to 6 micro diffusers in a standard configuration.

The units are manufactured from sheet steel and come with a black coating (RAL 9005) as standard.

The diffuser can also be fitted with a connection plenum (front or side) in galvanised sheet steel.

The diffusers have a highly appealing aesthetics and may be coated in a different colour (upon request) to adapt to the décor of the installation site.



Applications

DF-CP-MT series diffusers are designed to provide air conditioning in theatres, auditoriums, cinemas, etc., offering a low profile that allows installation in low-level steps or stairs of a limited height.

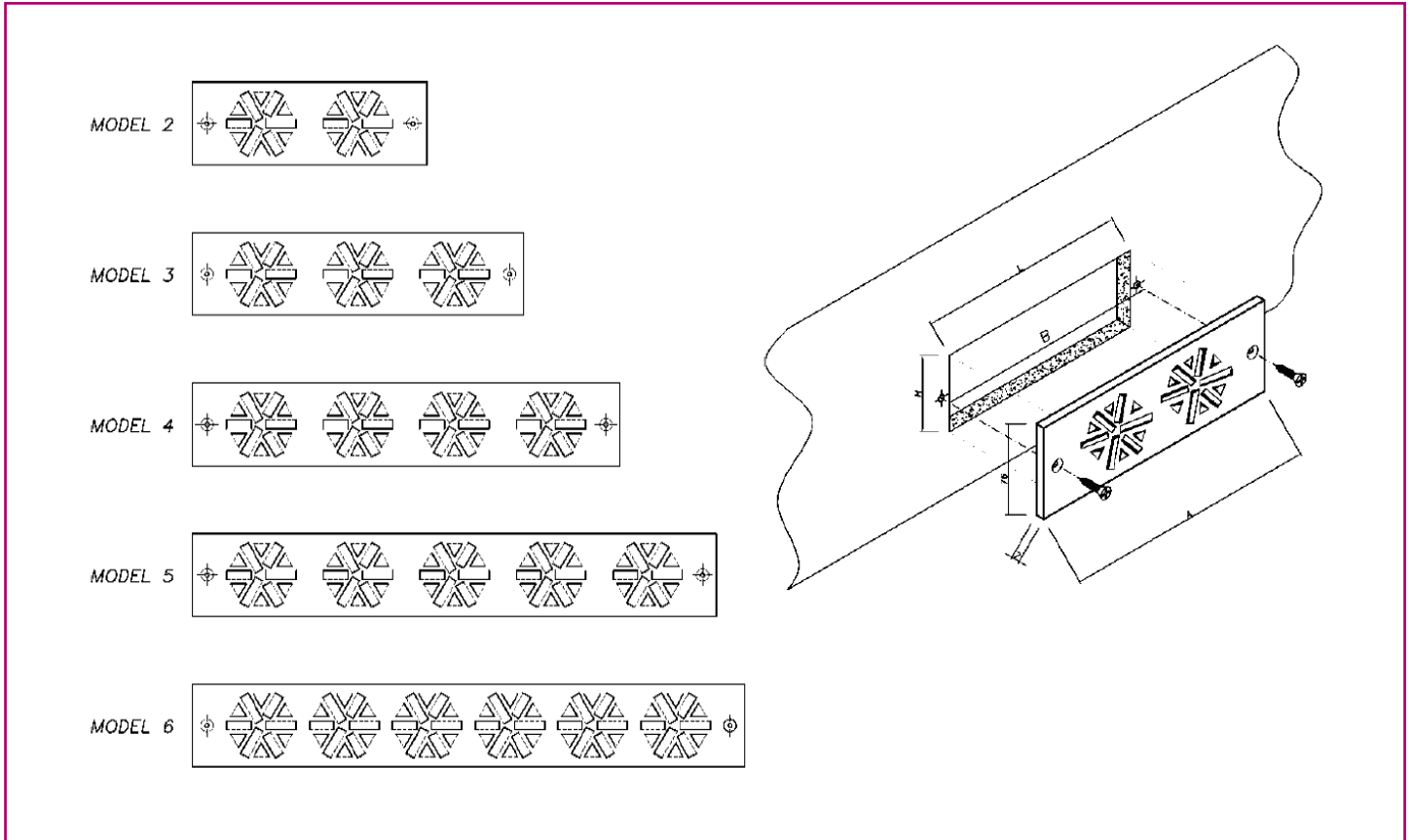
In the aforementioned locations, the diffusers are generally installed with one unit per seat, generating an individual microclimate which guarantees the necessary air ventilation for each person.

Given that the distance from the diffuser plate to the person's legs is very short, it is recommended to work with a maximum temperature difference (supply temp./room temp.) of ± 6 °C to avoid generating bothersome air currents.

Models and dimensions. DF-CP-MT diffuser

DF-CP-MT series diffusers can be manufactured in sets of 2, 3, 4, 5, or 6 swirl micro-diffusers. The diffusers can also be supplied with a plenum at the customer's request.

The diffusers come in the following models:



MODELS	NOMINAL		
	L x H	A	B
DF-CP-MT-2	165 x 65	212,5	186,5
DF-CP-MT-3	250 x 65	300	274
DF-CP-MT-4	340 x 65	387	361,5
DF-CP-MT-5	425 x 65	475	449
DF-CP-MT-6	450 x 65	500	474

Models and dimensions. DF-CP-MT diffuser

TOP ENTRY PLENUM

MODELS	NOMINAL		
	LxH	A	B
DF-CP-MT-2	165 x 65	212,5	160
DF-CP-MT-3	250 x 65	300	245
DF-CP-MT-4	340 x 65	387,5	335
DF-CP-MT-5	425 x 65	475	420
DF-CP-MT-6	450 x 65	500	445

SIDE ENTRY PLENUM

MODELS	NOMINAL		
	LxH	A	ØD
DF-CP-MT-2	165 x 65	212,5	79
DF-CP-MT-3	250 x 65	300	
DF-CP-MT-4	340 x 65	387,5	
DF-CP-MT-5	425 x 65	475	99
DF-CP-MT-6	450 x 65	500	

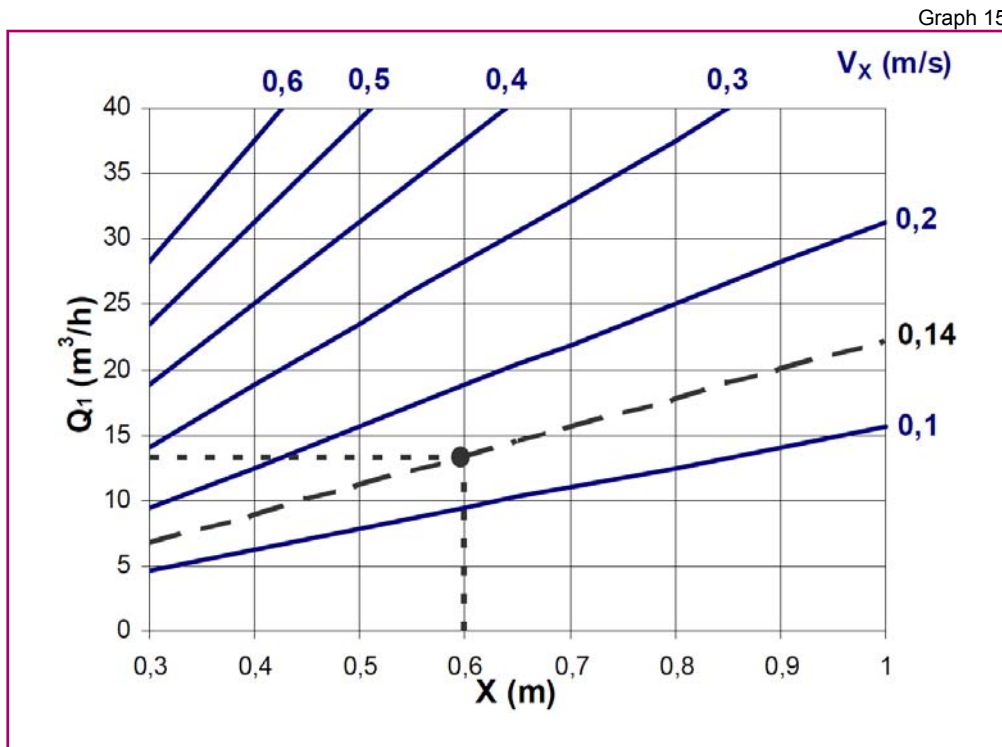
Technical data. DF-CP-MT diffuser

SOUNDS LEVEL SELECTION TABLE:

The air flow rate and pressure drop (values in parenthesis) for each diffuser size are determined according to the desired sound level.

DF-CP-MT	AIR FLOW - SOUND POWER - PRESSURE DROP				
	m ³ /h (Pa)				
	25 dB(A)	30 dB(A)	35 dB(A)	40 dB(A)	45 dB(A)
2	26 (15)	32 (22)	39 (32)	48 (48)	59 (72)
3	37 (13)	45 (19)	55 (29)	67 (42)	82 (62)
4	47 (12)	57 (17)	70 (26)	85 (38)	104 (56)
5	56 (11)	69 (16)	84 (24)	102 (35)	125 (52)
6	65 (10)	80 (15)	98 (23)	119 (33)	145 (49)

The graph below shows the air velocity (of a micro-diffuser) measured at 100 mm from the floor according to the height of the unit. Depending on the number of elements that make up the plate, the velocity value shown in the graph is multiplied by that shown in table 2.



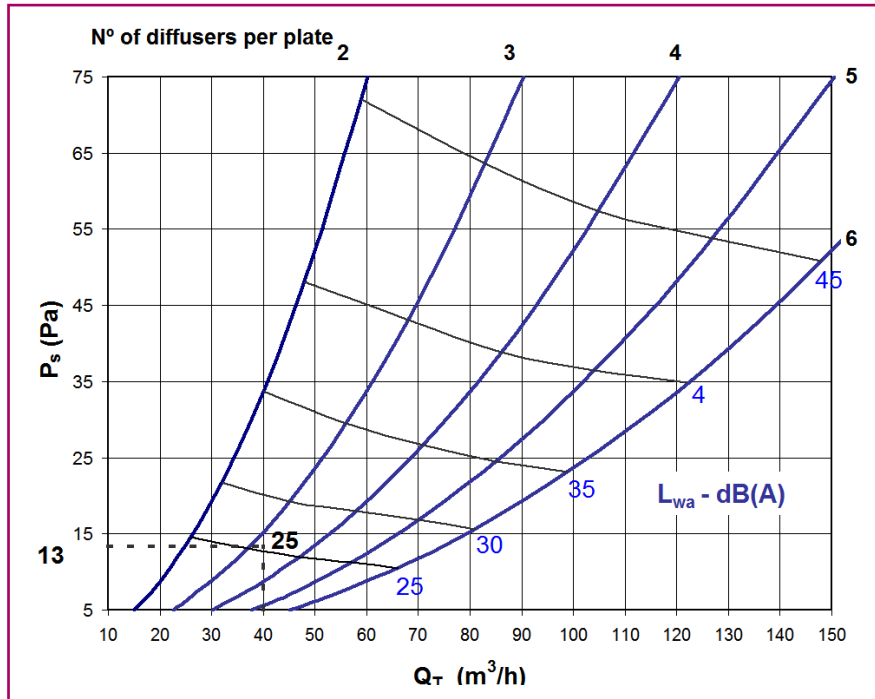
Nº micro-diffusers	2	3	4	5	5
V _x	1,41	1,73	2	2,24	2,45

Table 2: Correction values for 2 to 6 micro-diffusers

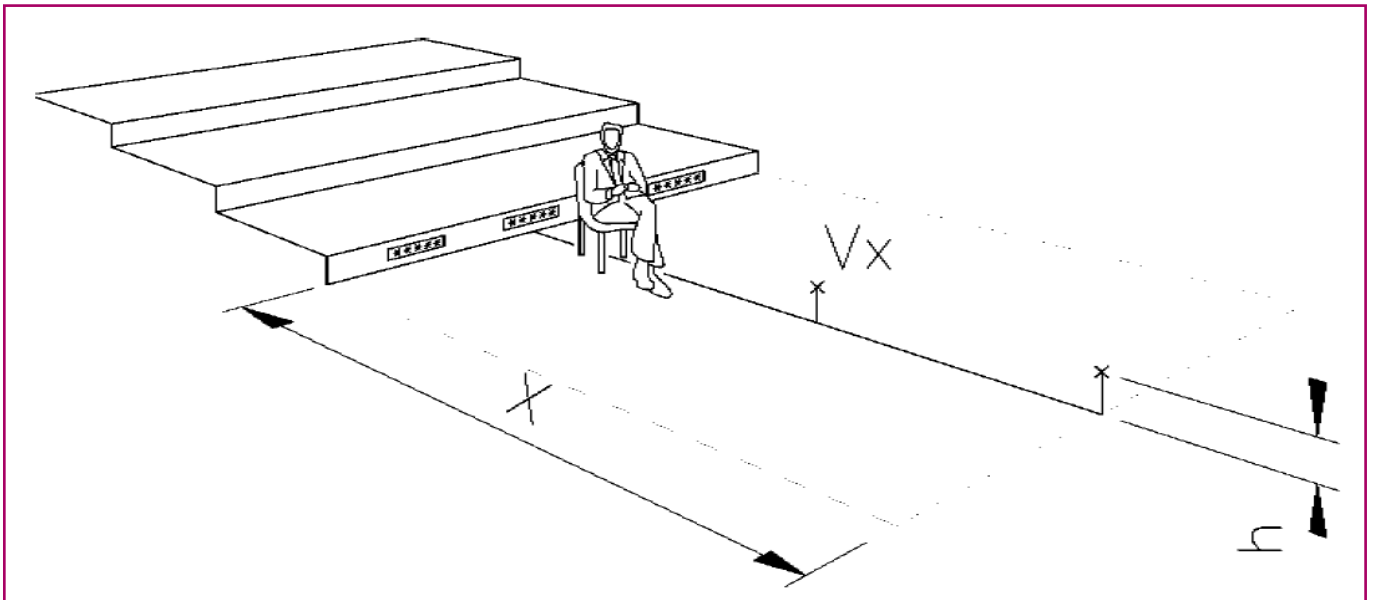
Technical data. DF-CP-MT diffuser

The graph below shows the sound level and pressure drop per plate, taking into account the number of diffusers installed.

Graph 16



EXPLICATIVE DRAWING:



SYMBOLS:

- Q₁** Supply flow per diffuser element in m³/h.
- Q_T** Supply flow per plate in m³/h.
- V_x** Velocity of diffuser element at distance X in m/s.
- X** Distance to diffuser in m.
- h** Height of measurement point above the ground in m.
- P_s** Pressure drop of the plate in Pa.
- dB(A)** Sound power level of the plate.

Selection example. DF-CP-MT diffuser

The selection table and graph shown in the present catalogue for the different existing models (diffusers without plenum) allow us to obtain, based on a supply flow per diffuser plate, the following parameters:

- Pressure drop and sound power level generated by the diffuser
- Velocity at a specific distance, measured at a height of 0,1 m above the ground

Our methodology can be explained by means of an example:

Preliminary data

A theatre with 200 seats requires the installation of DF-CP-MT step diffusers. The total supply volume for this type of diffuser is 8000 m³/h, supplying 40 m³/h per diffuser. Diffuser model DF-CP-MT-3 is to be installed in the tread of the step.

Height of installation above ground: $h = 0,1$ m
 Distance to diffuser (velocity measurement): $X = 0.6$ m
 Height of measurement point above the ground: $h_1 = 0,1$ m
 Volume per micro-diffuser: $Q_1 = 13,3$ m³/h

Results

By looking at both the sound power level and velocity graphs and applying the correction factor by the number of micro-diffusers, this gives us:

Pressure drop: **13 Pa**
 Sound power level: **25 dB(A)**
 Corrected velocity at a distance of 0,6 m from the diffuser: $V_x = 0,24$ m/s

Product code. Example

The product code describes the model ordered by the customer.

DF-CP-MT	Step Swirl Diffuser
2...6	N° of micro-diffusers
PS PL	Top entry plenum Side entry plenum
RAL 9005	Standard gloss black coating



Example:

DF-CP-MT-5-Ral 9005 Satin

Step swirl diffuser, with 5 micro-diffusers and RAL 9005 coating, designed for standard screw mounted installation.

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