



KATALOG PRODUKTÓW PRODUCENT

KRATKI WENTYLACYJNE

NAWIEWNIKI SUFITOWE

NAWIEWNIKI SUFITOWE Z RUCHOMYMI DYSZAMI

NAWIEWNIKI WIROWE

NAWIEWNIKI KANAŁOWE

DYSZE

NAWIEWNIKI SZCZELINOWE

NAWIEWNIKI ŚCIENNE

NAWIEWNIKI DO POMIESZCZEŃ CZYSTYCH Z FILTRAMI ABSOLUTNYMI

NAWIEWNIKI WYPOROWE

NAWIEWNIKI PODŁOGOWO SCHODOWE

BIURO@CWK.COM.PL

Ladies and Gentlemen,

We are pleased to introduce the newly developed product catalogue of CWK.

We hope that the current version will suit Your needs and will help You choose the right products. We are open for any comments regarding this catalogue, which You can send us through an e-mail: biuro@cwk.com.pl. All products that we present in the catalogue are made in accordance with established plant standards and are certified by the PZH.

We would also like to interest you with our website **www.cwk.com.pl**, where there is a photo gallery of our products in the electronic catalogue, the list of prices and a video showing our companies machine park. In the „download” section there is a wrapper for AutoCAD called: „WENTYLE” , which will help You in the design with the products of CWK. We ask our prospective and regular customers to read the sales conditions which prevail in our company - details also on the website.

Feel free to contact our staff who are eager to help, and will provide You with any additional information, prepare a price offer or follow through with the order. CWK products can be purchased directly from us or one of our local distributors.

The Board of Directors

A bit about the company

CWK Sp. z o.o. is a polish family business that was founded in early 2000. The core of our business is the production of the ventilation endings and air conditioning, which are 100% made by our company. All products are modern and professional, made of aluminum or steel. Type KW grates and diffusers type AN are manufactured from extruded aluminum profiles according to the patented design. The patented design also has a solution for grates for round ducts KS and damper P structures.

To meet the needs of our customers for new designs of diffusers and exhaust units, we have modernized our machine park with the CNC controlled machines. This allows us to implement individual needs and the implementation of large orders in a short period of time. And our own powder coating plant enables us to provide the quick painting of these products in any RAL color.

Over a period of several years of activity a wide range of our products has been installed in the most prestigious buildings in the country and abroad.

Thank you

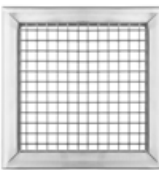
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www.cwk.com.pl

CWK Ltd. reserves the right to introduce changes in technical data

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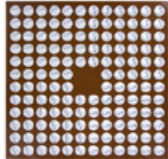
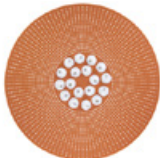
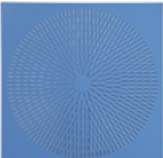
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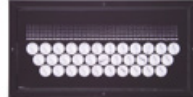
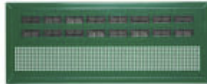
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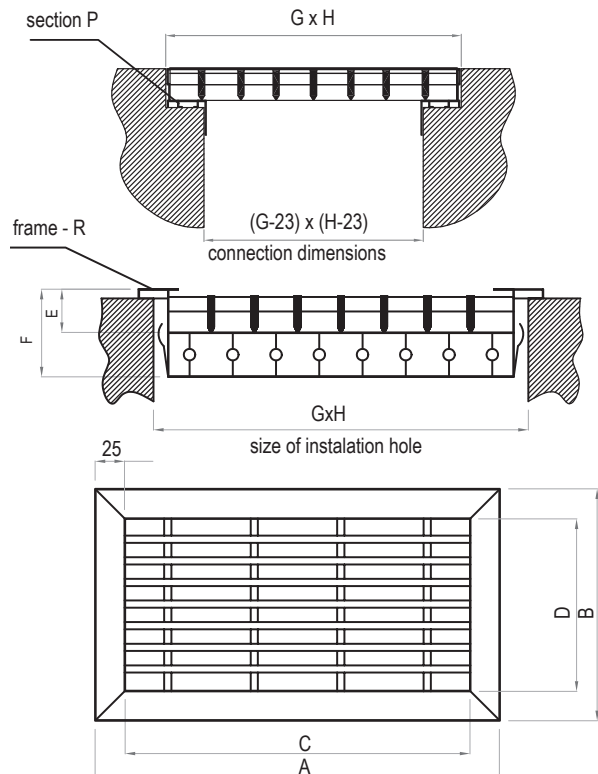
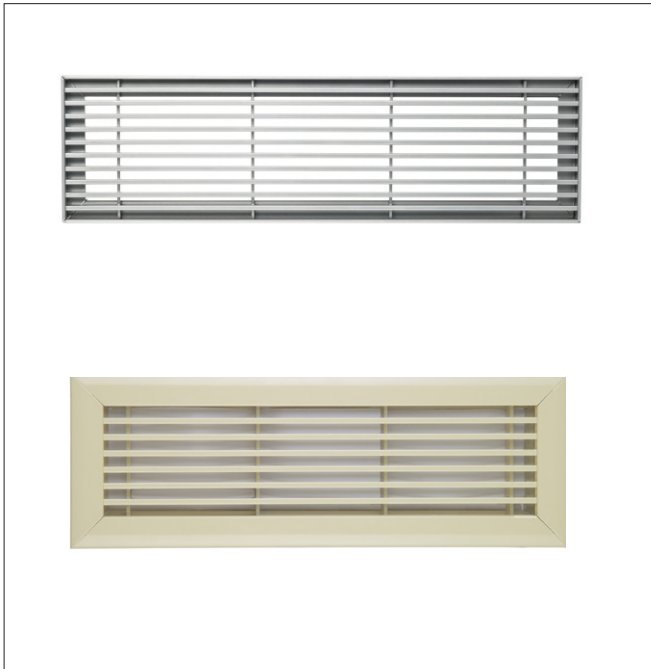
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DESCRIPTION

KPP and KPR are high quality and high static load resistance floor air grates, designed to supply and exhaust air. They are equipped with fixed blades and can be installed in the floor, in the wall or in the ventilation duct.

KPP-PP, KPR-PP are air grates additionally equipped with backward control throttle. Adjustable angle of the throttle allows for adjusting airflow capacity..

FEATURES

- designed to supply and exhaust air
- fixed blades
- high quality product
- high static load resistance
- air grates made of aluminium
- optional additional throttle allows for adjusting airflow capacity
- made in 45 standard sizes
- available in standard RAL 9003 colour
- upon customer's request, gates can be made in any size and colour from RAL palette
- given sizes are sizes of installation holes
- assembly with springs

INSTALLATION

Air grates can be mounted in the floor or in the wall using screws or springs (version KPR – with frame), or can be let in the floor and fixed with a section (version KPP).

If you are fitting the air grate in the wall, prepare an installation hole of a size $G \times H$ for the chosen air grate. Joints between the air grate and the wall or a duct should be sealed.

When installing the air grate in the floor, follow instruction for preparing the installation hole as presented on the above figure.

ORDER REFERENCE

KP - R - PP - 37 - RAL9003	
type	colour
version:	size (G x H)
R - frame, P - section	no throttle PP backward throttle

1.1 KPP, KPR

floor air grates

1

STANDARD SIZES

	1	2	3	4	5	6	7	8	9	10	11
A [mm]	130	180	230	280	330	430	530	630	830	1030	1230
B [mm]	130										
C [mm]	80	130	180	230	280	380	480	580	780	980	1180
D [mm]	80										
G [mm]	100	150	200	250	300	400	500	600	800	1000	1200
H [mm]	100										

	12	13	14	15	16	17	18	19	21	21
A [mm]	180	230	280	330	430	530	630	830	1030	1230
B [mm]	180									
C [mm]	130	180	230	280	380	480	580	780	980	1180
D [mm]	130									
G [mm]	150	200	250	300	400	500	600	800	1000	1200
H [mm]	150									

	22	23	24	25	26	27	28	29	30
A [mm]	230	280	330	430	530	630	830	1030	1230
B [mm]	230								
C [mm]	180	230	280	380	480	580	780	980	1180
D [mm]	180								
G [mm]	200	250	300	400	500	600	800	1000	1200
H [mm]	200								

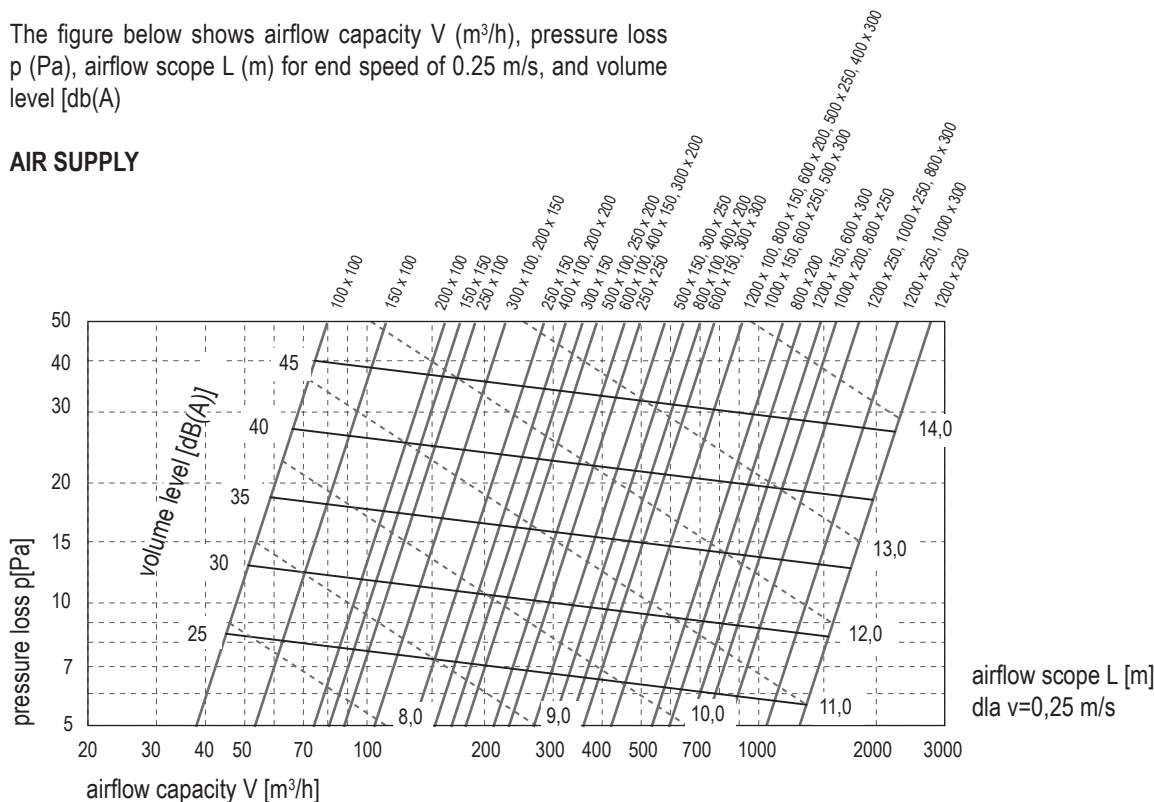
	31	32	33	34	35	36	37	38
A [mm]	280	330	430	530	630	830	1030	1230
B [mm]	280							
C [mm]	230	280	380	480	580	780	980	1180
D [mm]	230							
G [mm]	250	300	400	500	600	800	1000	1200
H [mm]	250							

	39	40	41	42	43	44	45
A [mm]	330	430	530	630	830	1030	1230
B [mm]	330						
C [mm]	280	380	480	580	780	980	1180
D [mm]	280						
G [mm]	300	400	500	600	800	1000	1200
H [mm]	300						

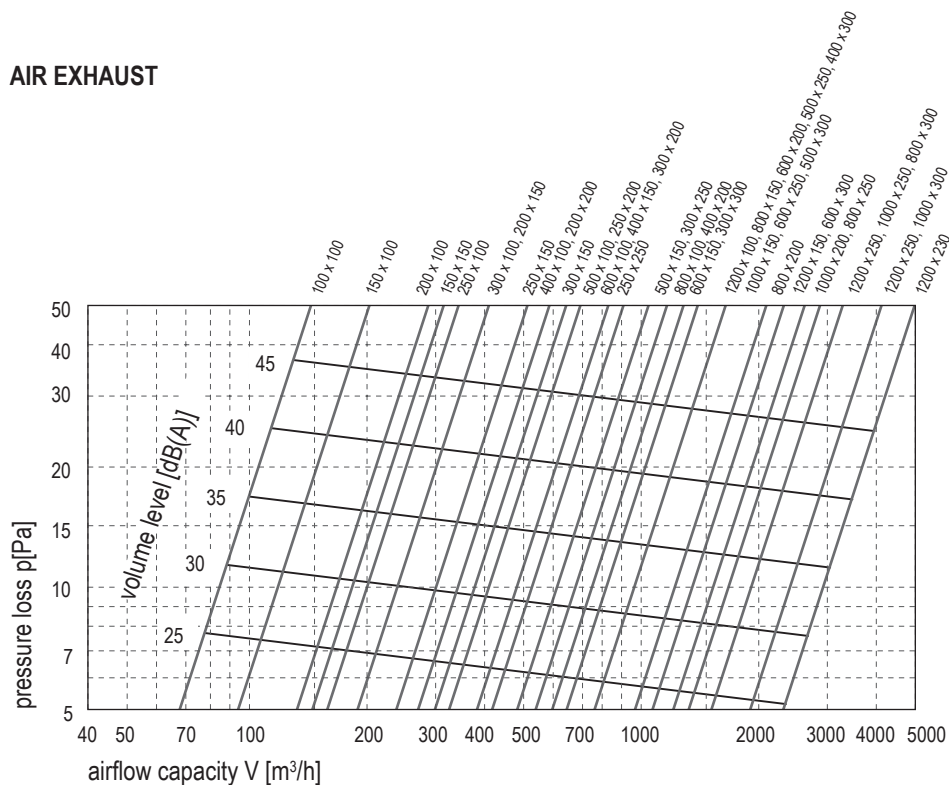
FEATURES

The figure below shows airflow capacity V (m³/h), pressure loss p (Pa), airflow scope L (m) for end speed of 0.25 m/s, and volume level [dB(A)]

AIR SUPPLY



AIR EXHAUST



1.1 KPP, KPR

floor air grates

1

RAPID SELECTION TABLE

SYMBOLS:

L - actual length in mm

H - actual length in mm

Q - value of air throw for m.
lengths

Ak - effective surface in m² per
m. length

V_k - effective speed w/m/s

X - range in m.

P_t - total pressure in Pa

NR - noise ratio in dB

		L	1000	1000	1000	1000	1000	1000	1000	1000
Q	H	H	50	75	100	125	150	200	250	300
m ³ /h/m	l/s/m	Ak	0,024	0,0370	0,0500	0,0630	0,0820	0,1080	0,1400	0,1720
100	27,8	V _k X P _t NR	1,2 2,3 0,8	0,8 1,9 0,3	0,6 1,6 0,2					
120	33,3	V _k X P _t NR	1,4 2,8 1,1	0,9 2,2 0,5	0,7 1,9 0,3					
140	38,9	V _k X P _t NR	1,6 3,2 1,5	1,1 2,6 0,6	0,8 2,2 0,4					
160	44,4	V _k X P _t NR	1,9 3,7 2,0	1,2 3,0 0,8	0,9 2,6 0,5					
180	50,0	V _k X P _t NR	2,1 4,1 2,5 8	1,4 3,3 1,1	1,0 2,9 0,6	0,8 2,6 0,4				
200	55,6	V _k X P _t NR	2,3 4,6 3,1 10	1,5 3,7 1,3	1,1 3,2 0,7	0,9 2,8 0,5				
250	69,4	V _k X P _t NR	2,9 5,8 4,9 16	1,9 4,6 2,0 7	1,4 4,0 1,1	1,1 3,6 0,7	0,8 3,1 0,4			
300	83,3	V _k X P _t NR	3,5 6,9 7,0 21	2,3 5,6 2,9 11	1,7 4,8 1,6	1,3 4,3 1,0	1,0 3,7 0,6	0,8 3,3 0,3	0,6 2,9 0,2	
350	97,2	V _k X P _t NR	4,1 8,1 9,5 25	2,6 6,5 4,0 15	1,9 5,6 2,2 9	1,5 5,0 1,4	1,2 4,4 0,8	0,9 3,8 0,5	0,7 3,3 0,3	0,6 3,0 0,2
400	111,1	V _k X P _t NR	4,6 9,2 12,4 28	3,0 7,4 5,2 19	2,2 6,4 2,9 12	1,8 5,7 1,8 8	1,4 5,0 1,1	1,0 4,3 0,6	0,8 3,8 0,4	0,6 3,4 0,2
450	125,0	V _k X P _t NR	5,2 10,4 15,7 31	3,4 8,3 6,6 22	2,5 7,2 3,6 15	2,0 6,4 2,3 11	1,5 5,6 1,3 5	1,2 4,9 0,8	0,9 4,3 0,5	0,7 3,9 0,3
500	138,9	V _k X P _t NR	5,8 11,5 19,4 34	3,8 9,3 8,2 25	2,8 8,0 4,5 18	2,2 7,1 2,8 13	1,7 6,2 1,7 8	1,3 5,4 1,0	1,0 4,8 0,6	0,8 4,3 0,4
600	166,7	V _k X P _t NR	6,9 13,8 28,0 38	4,5 11,1 11,8 29	3,3 9,6 6,4 23	2,6 8,5 4,1 18	2,8 7,5 2,4 12	1,5 6,5 1,4 6	1,2 5,7 0,8	1,0 5,2 0,5
700	194,4	V _k X P _t NR	8,1 16,1 38,1 42	5,3 13,0 16,0 33	3,9 11,2 8,8 27	3,1 9,9 5,5 22	2,4 8,7 3,3 16	1,8 7,6 1,9 10	1,4 6,7 1,1 5	1,1 6,0 0,7
800	222,2	V _k X P _t NR	9,3 18,4 49,7 46	6,0 14,8 20,9 37	4,4 12,8 11,5 30	3,5 11,4 7,2 25	2,7 10,0 4,3 20	2,1 8,7 2,5 14	1,6 7,6 1,5 8	1,3 6,9 1,0
900	250,0	V _k X P _t NR		6,8 16,7 26,5 40	5,0 14,4 14,5 33	4,0 12,8 9,1 28	3,0 11,2 5,4 23	2,3 9,8 3,1 17	1,8 8,6 1,8 11	1,5 7,7 1,2 7
1000	277,8	V _k X P _t NR		7,5 18,5 32,7 42	5,6 15,9 17,9 36	4,4 14,2 11,3 31	3,4 12,5 6,7 25	2,6 10,9 3,8 20	2,0 9,5 2,3 14	1,6 8,6 1,5 10
1200	333,3	V _k X P _t NR			6,7 19,1 25,8 41	5,3 17,1 16,2 36	4,1 14,9 9,6 30	3,1 13,0 5,5 24	2,4 11,4 3,3 19	1,9 10,3 2,2 14
1400	388,9	V _k X P _t NR				6,2 19,9 22,1 40	4,7 17,4 13,0 34	3,6 15,2 7,5 28	2,8 23,3 4,5 23	2,3 12,0 3,0 18

EXAMPLE OF SELECTION

While selecting, You should take into account the size of the air throw, noise level and range.

Range values given in the rapid selection tables correspond to the terminal velocity in the operating range of 0.25 m/s.

EXAMPLE

Needs
 Air flow rate 350 m³/h
 Range 4 m. plus amendments
 Noise level below 20 NR
 application consulting room
 needs pressure loss below 10 PA
 Speed effective below 3 m/s
 Location of the grate (grate) on the windowsill, 2 m. from the ceiling and 1 m. from the floor.

Before You use the table, calculate the adjusted range (X_c) based on the value of range (X), the distance between the ceiling and the grid (h) and the correction factor for slot grates mounted to the windowsill or floor C_s. Coefficient C_s for grates installed in the windowsill or the floor is always 1:1.

$$X_c = (X+h) * C_s$$

$$X_c = (4+2) * 1,1$$

$$X_c = 6,6 \text{ m.}$$

OFFER

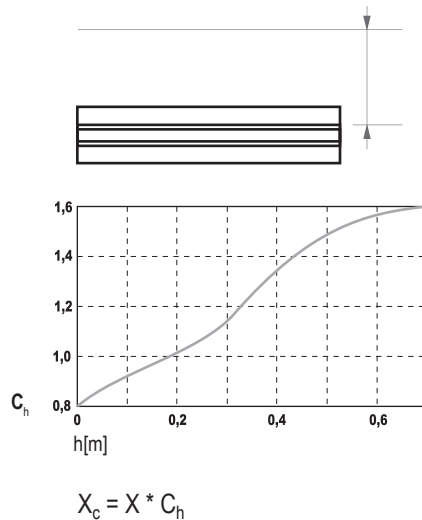
Given the size of the air throw 350 m³ / h and the range of 6.6 m., adjusted on the basis of the rapid selection table, we obtain the following values:

Q (Air flow rate) 250 m³/h (97,2 l/s)
 V_k (effective speed) 2,6 m/s
 X_c (adjusted range) 6,5 m.
 P_t (loss of pressure) 4,0 Pa
 NR (Noise level) 17

KPP type grate with dimensions 1000 x 75

CORRECTION FACTORS FOR MOUNTING ON THE WALL

In addition to a coefficient C_s mentioned earlier (for grates installed in the windowsill or floor), there is also a correction factor for the distance between the ceiling and the grate when it is mounted on the wall. It is a factor C_h, which for the free flow of air is 1,6.



Adjusted range = range x Ch, where h on the chart is the distance from the ceiling to the grate.

TIPS MAXIMUM DISTANCE - H MAX

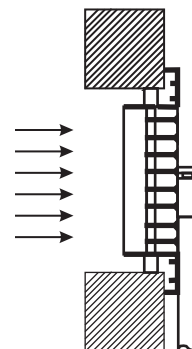
To get the desired stream of cold air, when the grate is mounted on the wall, it is recommended to not exceed the reported in the table below the distances between the grate and the ceiling (h max.) and the temperature difference Δt (the temperature difference between the air blown from the outside and the air in the room) .

Δt (°C)	0	6	9	12
h max (m)	0,65	0,37	0,25	0,13

MEASUREMENT OF FLOW

The stream size (Qv) is obtained from the product of the effective surface of the grate (Ak) and its effective speed (Vk): $qv \text{ (m}^3 / \text{h)} = Ak \text{ (m}^2 / \text{m.)} * Vk \text{ (m/s)} * 3600 * L / 100$

To obtain Vk, it is recommended to use thermal anemometer. (egg.: type TSI-VELOCILAC)



1.1 KPP, KPR

floor air grates

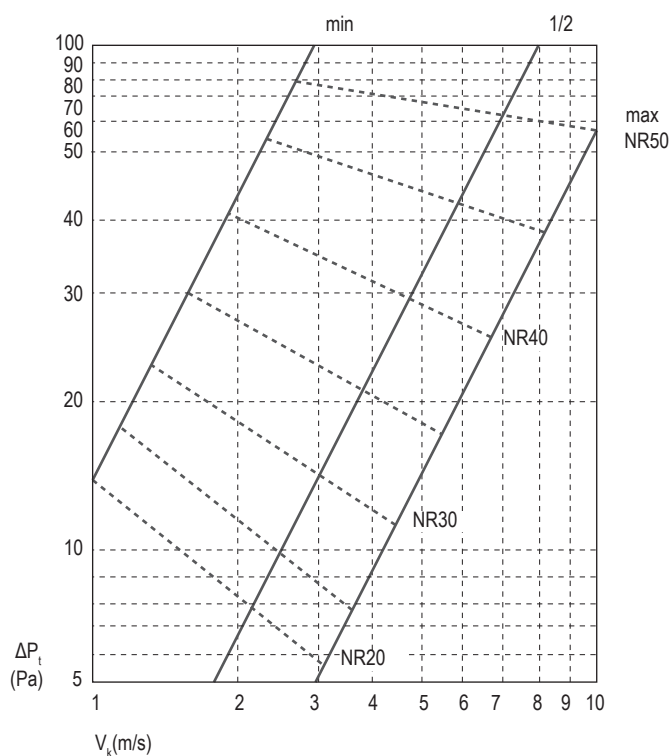
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PP damper control modifies the value of the noise level and pressure loss given in the rapid selection tables.

In the further material and on the chart below we provide the values of the noise level and the values of the total pressure loss (ΔP_t) for grate fitted with a damper control as a function of the parameters V_k (effective rate) and the percentage of damper opening (min. , 1/2 max.)

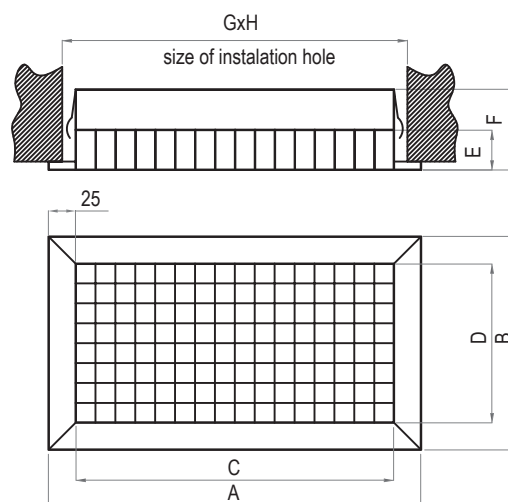
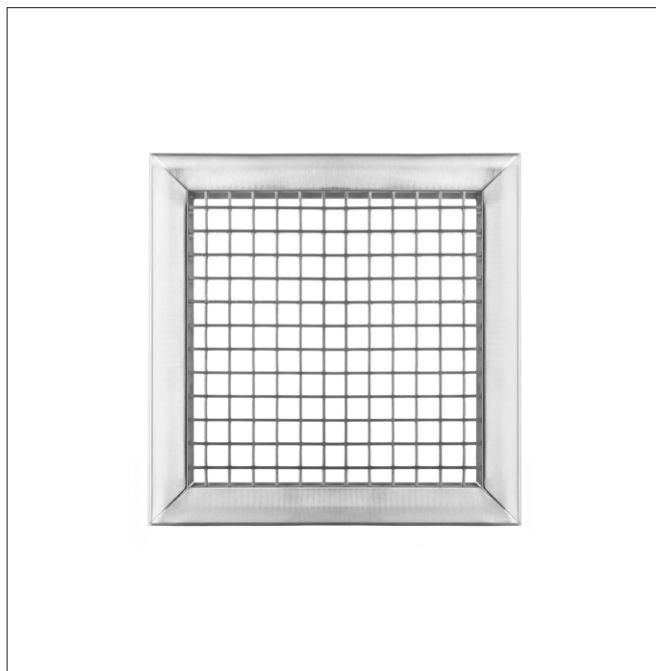
The graph shows the noise level NR as the sound power level (without silencing the room) for grate equipped with the damper.

The value V_k on the graph refers to the grid without a damper.



Correction factors should be used to the noise level as a function of A_k (effective area of air flow outlet) in accordance with the table below.

Δt (m2)	0,01	0,02	0,03	0,05	0,1	0,2
NR	-5,2	-1,9	0	+2,4	+5,8	+9,1



DESCRIPTION

KR are screen air grates designed to exhaust or allow for free flow of large quantities of air between rooms, with minimum pressure loss and low noise level. Grates are equipped with fixed screen blades and can be installed in the wall or in the ventilation duct.

FEATURES

- free flow of air between rooms, with minimum pressure loss and low noise level
- fixed screen blades
- air gates made of aluminium or ABS
- made in 81 standard sizes
- available in standard RAL 9003 colour
- upon customer's request, gates can be made in any size and colour from RAL palette
- given sizes are sizes of installation holes
- assembly with springs

INSTALLATION

Screen air grates KR can be fitted in the ventilation duct or in the wall using springs. If you are fitting the air grate in the wall, prepare an installation hole of a size G x H for the chosen air gate. Joints between the air gate and the wall or the duct should be sealed.

ORDER REFERENCE

KR/AL - 60	-	RAL9003
type		colour
AL or ABS		size (G x H)

1.2 KR

screen air grates

1

STANDARD SIZES

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
A [mm]	130	155	180	230	280	330	430	530	630	130	155	180	230	280	330	430	530	630
B [mm]	130									155								
C [mm]	80	105	130	180	230	280	380	480	580	80	105	130	180	230	280	380	480	580
D [mm]	80									105								
G [mm]	100	125	150	200	250	300	400	500	600	100	125	150	200	250	300	400	500	600
H [mm]	100									125								

	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
A [mm]	130	155	180	230	280	330	430	530	630	130	155	180	230	280	330	430	530	630
B [mm]	180									230								
C [mm]	80	105	130	180	230	280	380	480	580	80	105	130	180	230	280	380	480	580
D [mm]	130									180								
G [mm]	100	125	150	200	250	300	400	500	600	100	125	150	200	250	300	400	500	600
H [mm]	150									200								

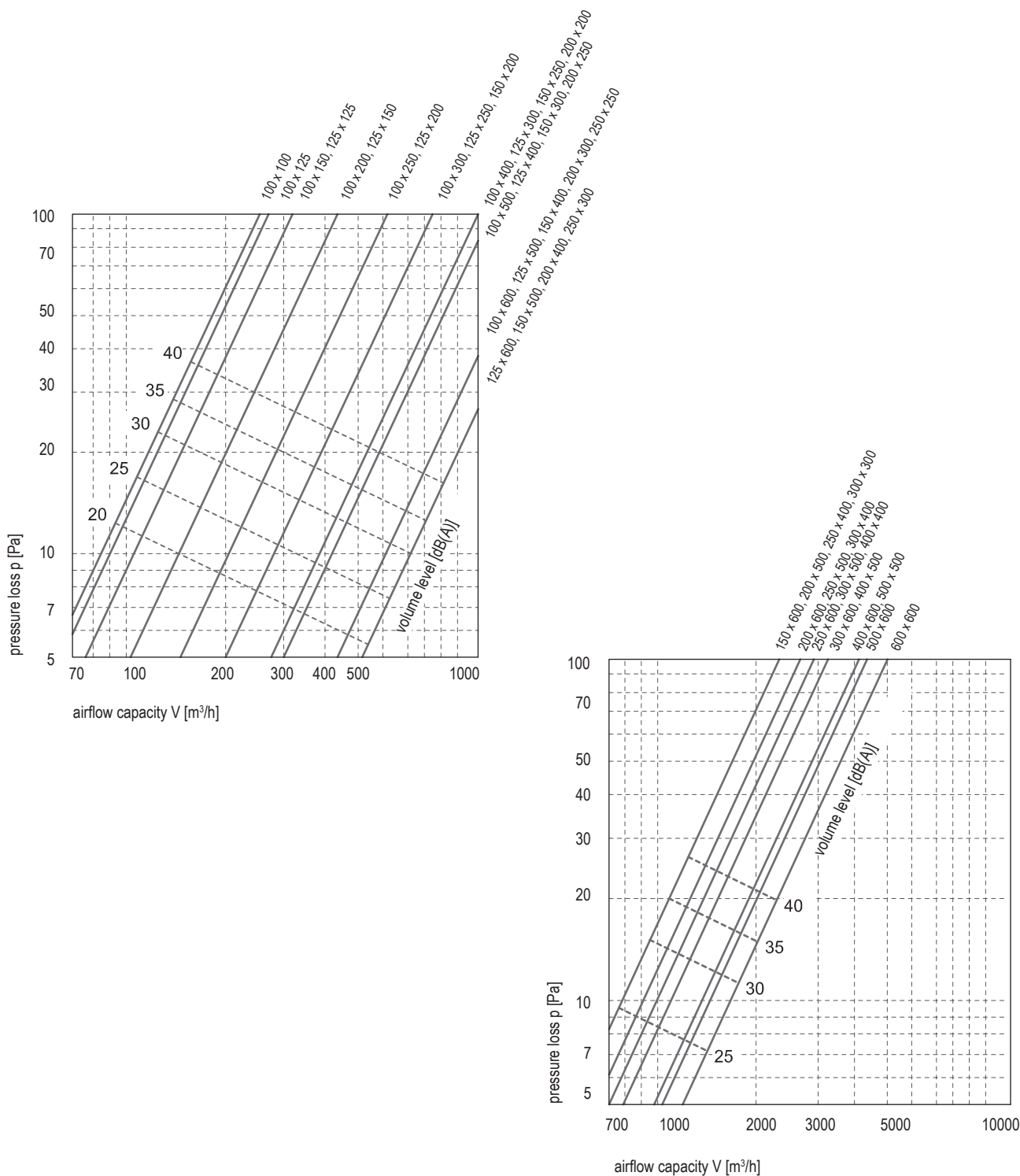
	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
A [mm]	130	155	180	230	280	330	430	530	630	130	155	180	230	280	330	430	530	630
B [mm]	280									330								
C [mm]	80	105	130	180	230	280	380	480	580	80	105	130	180	230	280	380	480	580
D [mm]	230									280								
G [mm]	100	125	150	200	250	300	400	500	600	100	125	150	200	250	300	400	500	600
H [mm]	250									300								

	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
A [mm]	130	155	180	230	280	330	430	530	630	130	155	180	230	280	330	430	530	630
B [mm]	430									530								
C [mm]	80	105	130	180	230	280	380	480	580	80	105	130	180	230	280	380	480	580
D [mm]	380									480								
G [mm]	100	125	150	200	250	300	400	500	600	100	125	150	200	250	300	400	500	600
H [mm]	400									500								

	73	74	75	76	77	78	79	80	81
A [mm]	130	155	180	230	280	330	430	530	630
B [mm]	630								
C [mm]	80	105	130	180	230	280	380	480	580
D [mm]	580								
G [mm]	100	125	150	200	250	300	400	500	600
H [mm]	600								

FEATURES

The figure below shows airflow capacity V (m³/h), pressure loss p (Pa), and volume level [dB(A)].



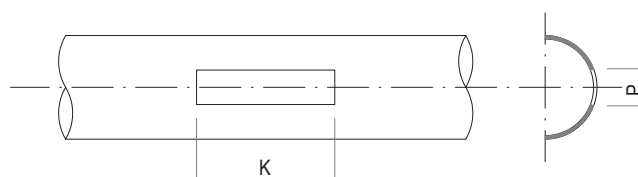
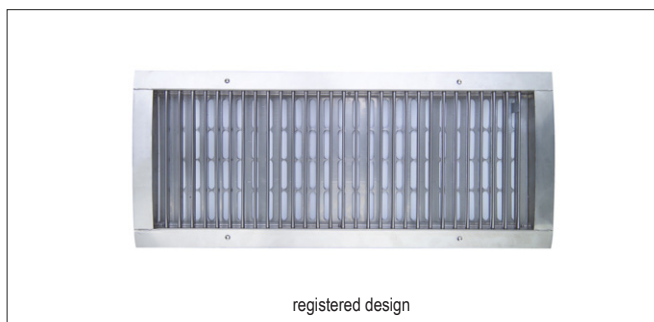
1.2 KR

screen air grates

1

RAPID SELECTION TABLE (GRILLE AND THE FRONT SURFACE IN A GRID, EXTRACTION)

		Wymiar (mm)	400x100 200x200	400x150 300x300 250x250	600x200 400x300 350x350	700x300 500x400 450x450	1000x350 900x400 600x600	1000x500 800x600 600x600	1300x500 1100x600 800x800	1600x500 1350x600 900x900	1650x600 1250x800 1000x1000
Q											
m ³ /h	l/s	A _k	0,0314	0,0489	0,1032	0,1769	0,3263	0,4485	0,5901	0,7512	0,9316
200	55,6	V _k P _s	1,8 3,8	1,1 1,5	0,5 0,3						
250	69,4	V _k P _s	2,2 5,9	1,4 2,4	0,7 0,5						
300	83,3	V _k P _s	2,7 8,5	1,7 3,5	0,8 0,8						
350	97,2	V _k P _s	3,1 11,5	2,0 4,7	0,9 1,1	0,5 0,4					
400	111,1	V _k P _s	3,5 15,0	2,3 6,2	1,1 1,4	0,6 0,5					
450	125,0	V _k P _s	4,0 19,0	2,6 7,8	1,2 1,8	0,7 0,6					
500	138,9	V _k P _s	4,4 23,5	2,8 9,7	1,3 2,2	0,8 0,7	0,4 0,2				
600	166,7	V _k P _s	5,3 33,8	3,4 13,9	1,6 3,1	0,9 1,1	0,5 0,3				
700	164,4	V _k P _s	6,2 46,0	4,0 19,0	1,9 4,3	1,1 1,4	0,6 0,4				
800	222,2	V _k P _s		4,5 24,8	2,2 5,6	1,3 1,9	0,7 0,6				
900	250,0	V _k P _s		5,1 31,4	2,4 7,0	1,4 2,4	0,8 0,7	0,6 0,4			
1000	277,8	V _k P _s		5,7 38,7	2,7 8,7	1,6 3,0	0,9 0,9	0,6 0,5			
1100	305,6	V _k P _s			3,0 10,5	1,7 3,6	0,9 1,1	0,7 0,6			
1200	333,3	V _k P _s			3,2 12,5	1,9 4,3	1,0 1,3	0,7 0,7			
1300	361,1	V _k P _s			3,5 14,7	2,0 5,0	1,1 1,5	0,8 0,8	0,6 0,4		
1500	416,1	V _k P _s			4,0 19,6	2,4 6,7	1,3 2,0	0,9 1,0	0,7 0,6		
1750	486,1	V _k P _s			4,7 26,6	2,7 9,1	1,5 2,7	1,1 1,4	0,8 0,8		
2000	555,6	V _k P _s			5,4 34,8	3,1 11,8	1,7 3,5	1,2 1,8	0,9 1,1	0,7 0,7	
2500	694,4	V _k P _s				3,9 18,5	2,1 5,4	1,5 2,9	1,2 1,7	0,9 1,0	0,7 0,7
3000	833,3	V _k P _s				4,7 26,6	2,6 7,8	1,9 4,1	1,4 2,4	1,1 1,5	0,9 1,0
3500	972,2	V _k P _s				5,5 36,2	3,0 10,7	2,2 5,6	1,6 3,3	1,3 2,0	1,0 1,3
4000	1111,1	V _k P _s					3,4 13,9	2,5 7,4	1,9 4,3	1,5 2,6	1,2 1,7
4500	1250,0	V _k P _s	Symbols: V _k - effective speed in m/s P _s - static pressure in Pa A _k - effective area in m ²				3,8 17,6	2,8 9,3	2,1 5,4	1,7 3,3	1,3 2,2
5000	1388,9	V _k P _s					4,3 21,7	3,1 11,5	2,4 6,6	1,8 4,1	1,5 2,7
6000	1666,7	V _k P _s					5,1 31,3	3,7 16,6	2,8 9,6	2,2 5,9	1,8 3,8
7000	1944,4	V _k P _s						4,3 22,6	3,3 13,0	2,6 8,0	2,1 5,2



DESCRIPTION

KS are air grates designed to supply and exhaust air. They can be installed directly in round ventilation ducts. They are equipped with vertical or horizontal blades with adjustable angle to allow for shaping the airflow as necessary. KS air grates are used in places where ventilation ducts are installed in visible places. They can supply air at temperature 8°C lower than temperature in the room where they are installed.

KS-P spiro air grates are additionally equipped with control throttle that allows for adjusting the airflow capacity.

KS-SP are spiro air grates with skew shutter that allows for adjusting the airflow capacity.

FEATURES

- adjustable airflow stream angle
- airflow stream can be adjusted by a throttle or a skew shutter
- made of tinplate, not painted
- upon customer's request, gates can be made in any size and colour from RAL palette
- given sizes are sizes of installation holes

INSTALLATION

Air grates KS are designed for installation in round ventilation ducts. Prepare an installation hole of a size K x P for the chosen air gate, then slide the air grate into the hole and fix it with metal plate screw. Joints between the air gate and the ventilation duct should be sealed.

Remember about the appropriate choice of the grate height in relation to the duct diameter – for details see the table with standard sizes.

ORDER REFERENCE

KS - P - H - 625x125 - K - RAL9006	
	colour (option)
	K- acid-proof sheet
	size (KxP)
	V vertical blades
	H horizontal blades
	2 row
	no throttle
P	control throttle
SP	skew control throttle
type	

1.3 KS

spiro air grates for round ducts

1

STANDARD SIZES

K [mm]	P [mm]	C [mm]	D [mm]	E [mm]	Air duct diameter [mm]
325	75	40	45	105	160 200 250
425				115	
525				125	
625				130	
825				150	
1025				165	
1225				185	
325	125	40	45	105	250 315 400
425				115	
525				125	
625				130	
825				150	
1025				165	
1225				185	
325	160	40	45	105	400 500 630
425				115	
525				125	
625				130	
825				150	
1025				165	
1225				185	
325	225	40	45	105	630 800 1000
425				115	
525				125	
625				130	
825				150	
1025				165	
1225				185	

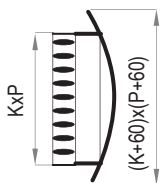
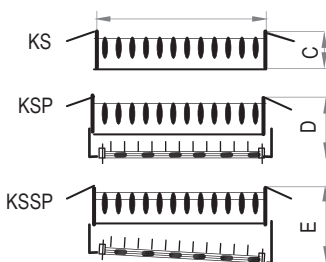
K - installation hole diameter

P - installation hole height

C - KS air grate depth

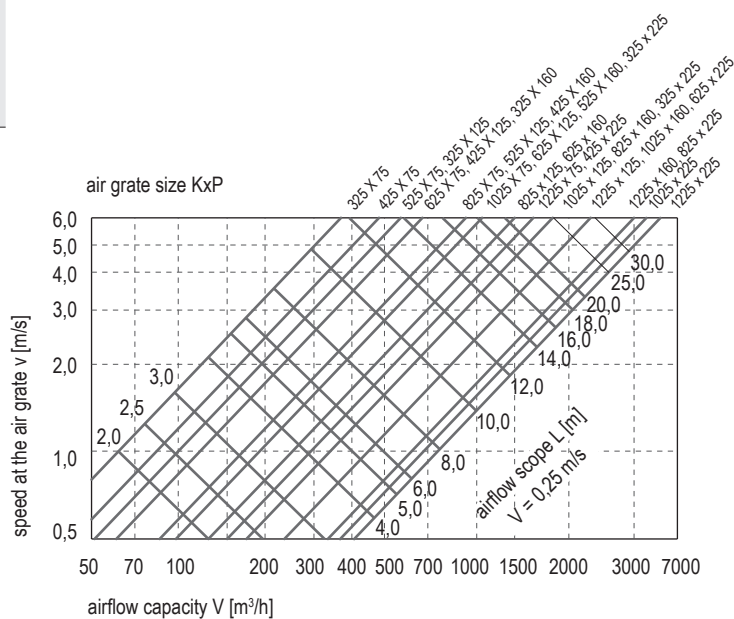
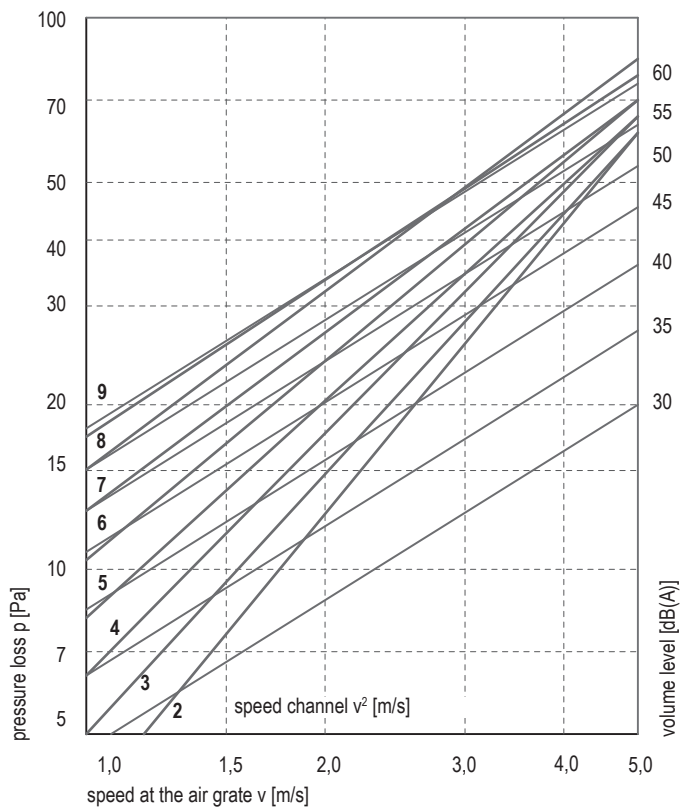
D - KS-P air grate depth

E - KS-SP air grate depth



FEATURES

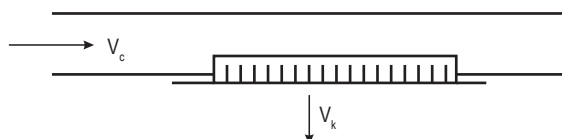
The figure shows airflow capacity V (m³/h), speed at the air grate (m/s), pressure loss p (Pa), airflow scope L (m) for end speed of 0.25 m/s, and volume level [dB(A)].



EXPLANATION OF THE TABLES

This table is based on a full laboratory research carried out in accordance with ISO 5219 (UNE 100.710) and ISO 5135 and 3741. The study was performed on the basis of air grates KS type. To obtain values for single-leaf hinged grates KS, values should be multiplied by the correction factors contained in the table. ATU (terminating equipment) is placed in the middle of the room with the free outflow of air.

- angle of inclination for both vertical and horizontal panels is 0°.
- The temperature difference between supplied air and the air in the room is $\Delta t \ 80^{\circ}\text{C}$.
- The volume level NR is determined by the volume of not silenced room, no damper, and the installation was performed as shown on the illustration below. $V_c < 0.5 V_k$ (V_c -speed in the channel, V_k -effective grate speed).



On the next page is a chart of the obtained values of pressure loss and noise levels for the grate fitted with the damper.

TABLE OF INTAKE GRATES SELECTION FOR ROUND DUCTS KS.

In the table, we can find the following selection parameters:

V_k = effective speed of air outflow in m/s

X = range for the final velocity of 0.25 m/s (free stream)

P_t = pressure loss in Pa

NR = noise level

While selecting you must take into account, the stream volume flow, noise level and the reach for the required final velocity. Values of range placed in the table correspond to the final velocity of 0.25 m/s

SELECTION EXAMPLE: REQUIREMENTS:

The volume flow rate	400 m ³ /h
Range	10 m
Noise level:	less than NR 45
Use:	Gym
pressure loss	less than 10 Pa
Effective speed	2 do 4 m/s

PROPOSAL:

The selection was made on the basis of the grate selection table for round ducts:

Q (Air flow rate)	400 m ³ /h (111,1 l/s)
V_k (effective speed)	2,3 m/s
X (adjusted range)	11 m a yaw angle panels 0o
P_t (loss of pressure)	3,4 Pa
NR (Noise level)	15

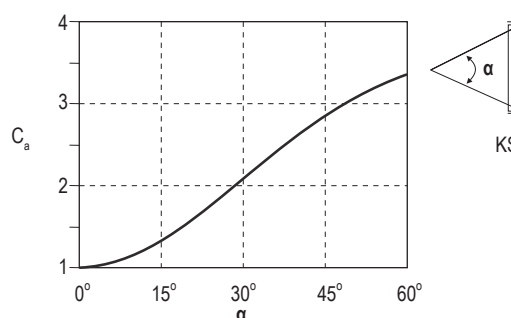
KS grate with dimensions 425 x 225

The obtained parameters show that the requirements, have been met.

CORRECTION FACTOR

For the deviation angle of the front row (vertical panels) correction factor is applied. This ratio (C_a) significantly affects the true or corrected range X_c . Assuming that in this case the panels deviation angle is 15°, the adjusted range would be as follows:

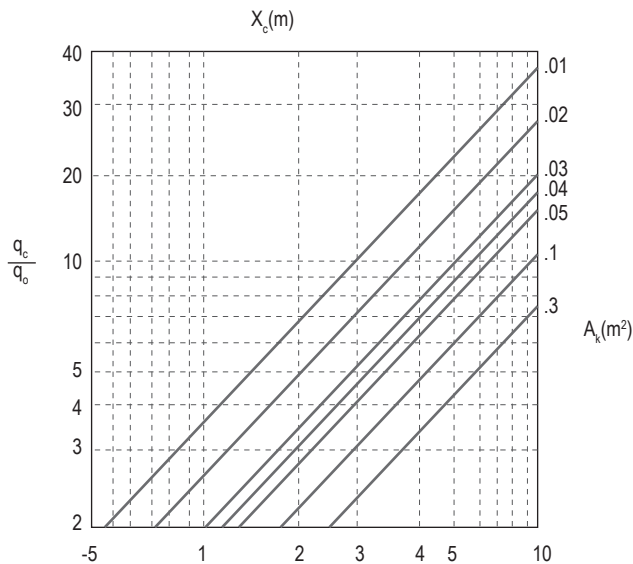
$$X_c = X * C_a \quad X_c = 11 * 1,35 \quad X_c = 14,9 \text{ m.}$$



spiro air grates for round ducts

INDUCTION

You can get the air flow in the room with the coefficient of induction factor (q_x / q_0), which define the parameters: X_c in m. (adjusted range) and A_k effective outlet area in m^2 , as shown in the figure below.



DAMPERS FOR GRATES FOR ROUND DUCTS.

Dampers, when connected to grates for round ducts, modify the noise and pressure losses shown in the table. The graph shows the noise levels and the total pressure loss (ΔP_t) for grates with a damper. Graph should be read with the parameters V_k (effective speed) and the percentage of damper opening (min, 1/2, max). Chart was prepared based on the damper research.

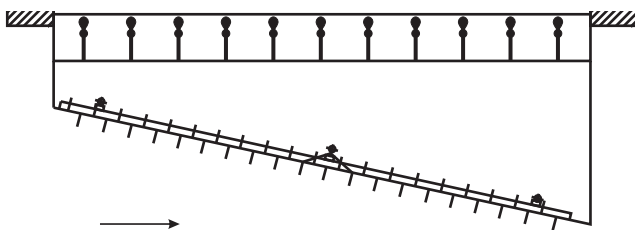
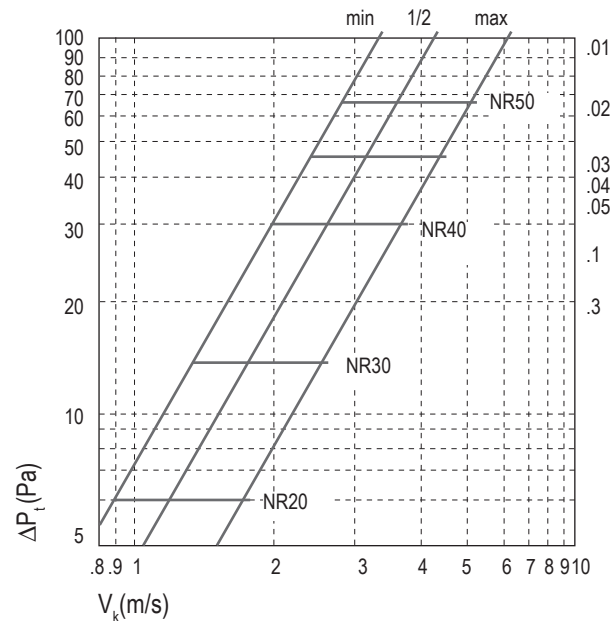


CHART FOR GRATE WITH A DAMPER



The noise level chart NR as a sound volume level (without silencing the room) for grate equipped with the damper.

The value V_k in the graph refers to the grate without a damper.

SOUND LEVEL ADJUSTMENTS

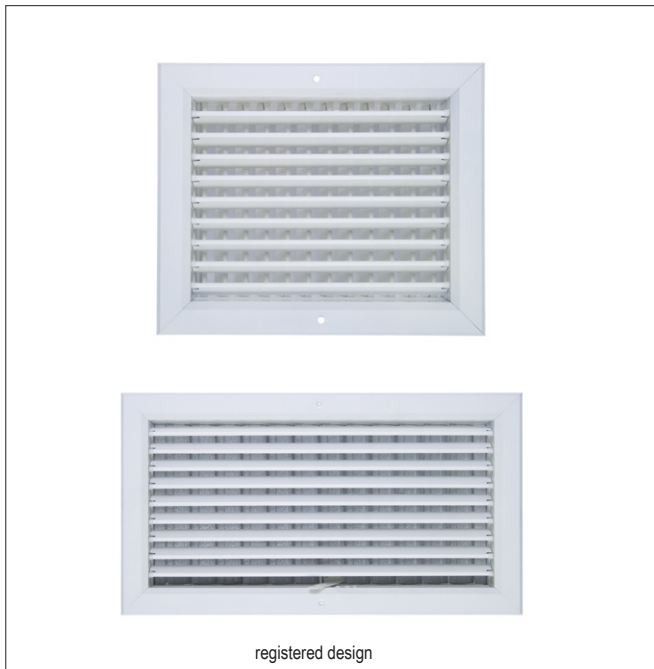
There are two types of corrections, one for A_k (effective outflow area) and the other for the ratio between the velocity of the duct (V_c) and an effective grate speed (V_k). These adjustments affect the noise level in the following manner:

1 Correction for outflow surface :

A_k (mf)	0,01	0,02	0,03	0,05	0,1
NR	-4,4	-1,6	0	+2,1	+4,8

2 Correction for the relationship between the velocity in the channel and the effective speed:

V_c/V_k	0	1	1,4	1,7	2
NR	-3,5	-3,5	-1,5	0	+1,5



- throttle blades are made of alum zinc metal plate
- made in 81 standard sizes
- upon customer's request, gates can be made in any size and colour from RAL palette
- given sizes are sizes of installation holes
- springs can be used instead of fitting holes
- the ability to manufacture acid-proof sheet

INSTALLATION

KW air grates are designed for installation in walls or ceilings at the end of the rectangular ventilation duct. Prepare an installation hole of a size G x H for the chosen air gate, put in the ventilation duct finished with metal cut out. Slide the air grate into the installation hole and fix it to the wall/ceiling using appropriate screws. Remember to seal joints between the air grate and the duct.

ORDER REFERENCE

KW - P - 1 - 45 - K	-	RAL9003
type		colour
		K- acid-proof sheet
	number (lub G x H)	
	1 row	
	2 row	
	SL fixed lamellas	
	_ no throttle	
	P concurrent throttle	
	PP backward throttle	

DESCRIPTION

KW are air grates designed to supply and exhaust air. They are equipped with vertical or horizontal blades with adjustable angle to allow for shaping the airflow as necessary.

KW-2 air grates are two-row grates, which are equipped with vertical or horizontal blades with adjustable angle to allow for shaping the supplied airflow in two directions.

KW-SL are the air crates with fixed lamellas set at 45 degrees angle. Crates don't have any PVC elements and can be used in places threaten by high temperature.

KW-P, KW-P-2, KW-P-SL air grates are additionally equipped with control throttle. Adjustable angle of the throttle allows for regulating the airflow capacity.

FEATURES

- air grates profiles made of aluminium and available in standard RAL 9003 colour
- adjustable blades angle
- KW-P, KW-P-2, KW-P-SL air grates are additionally equipped with control throttle for adjusting the airflow capacity

FEATURES

The figure shows airflow capacity V (m³/h), pressure loss p (Pa), airflow scope L (m) for end speed of 0.25 m/s, and volume level [db(A)].

The airflow scope L relates to isothermal air supply.

air grates

1

STANDARD SIZES

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
A [mm]	150	175	200	250	300	350	450	550	650	150	175	200	250	300	350	450	550	650
B [mm]	150									175								
G [mm]	100	125	150	200	250	300	400	500	600	100	125	150	200	250	300	400	500	600
H [mm]	100									125								
n	2						4			2						4		
Weight KW [kg]	0,20	0,23	0,25	0,30	0,40	0,45	0,55	0,65	0,80	0,23	0,27	0,33	0,43	0,47	0,57	0,70	0,85	1,00
Weight KW-P [kg]	0,44	0,45	0,50	0,56	0,67	0,73	0,83	0,95	1,15	0,47	0,54	0,60	0,70	0,75	0,88	1,00	1,30	1,40

	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
A [mm]	150	175	200	250	300	350	450	550	650	150	175	200	250	300	350	450	550	650
B [mm]	200									250								
G [mm]	100	125	150	200	250	300	400	500	600	100	125	150	200	250	300	400	500	600
H [mm]	150									200								
n	2						4			2						4		
Weight KW [kg]	0,25	0,30	0,35	0,45	0,50	0,60	0,75	0,90	1,05	0,30	0,35	0,40	0,50	0,60	0,70	0,90	1,05	1,25
Weight KW-P [kg]	0,49	0,56	0,62	0,73	0,78	0,90	1,10	1,25	1,50	0,56	0,60	0,65	0,78	0,90	1,00	1,25	1,50	1,80

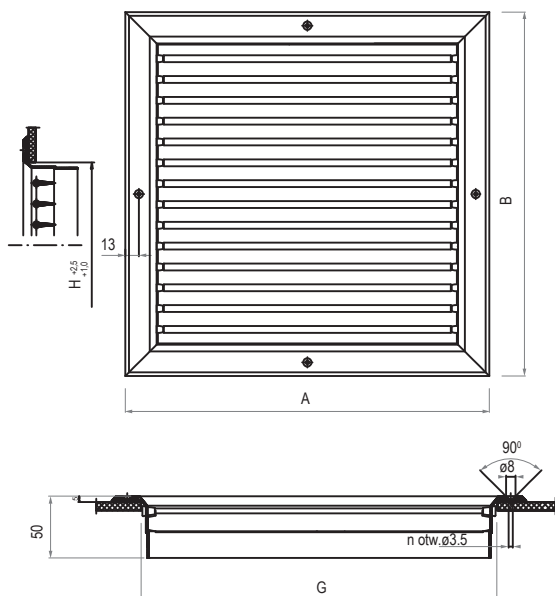
	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
A [mm]	150	175	200	250	300	350	450	550	650	150	175	200	250	300	350	450	550	650
B [mm]	300									350								
G [mm]	100	125	150	200	250	300	400	500	600	100	125	150	200	250	300	400	500	600
H [mm]	250									300								
n	2						4			2						4		
Weight KW [kg]	0,40	0,45	0,50	0,60	0,70	0,85	1,10	1,30	1,50	0,45	0,50	0,55	0,70	0,80	1,00	1,20	1,45	1,70
Weight KW-P [kg]	0,65	0,73	0,78	0,90	1,00	1,17	1,60	1,90	2,20	0,73	0,78	0,84	1,00	1,10	1,40	1,70	2,10	2,50

	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
A [mm]	150	175	200	250	300	350	450	550	650	150	175	200	250	300	350	450	550	650
B [mm]	450									550								
G [mm]	100	125	150	200	250	300	400	500	600	100	125	150	200	250	300	400	500	600
H [mm]	400									500								
n	2						4			2						4		
Weight KW [kg]	0,55	0,67	0,75	0,90	1,10	1,20	1,60	1,85	2,15	0,65	0,78	0,90	1,05	1,30	1,45	1,85	2,30	2,60
Weight KW-P [kg]	0,84	0,95	1,10	1,20	1,60	1,70	2,35	2,70	3,20	0,95	1,10	1,20	1,50	1,90	2,10	2,70	3,50	4,00

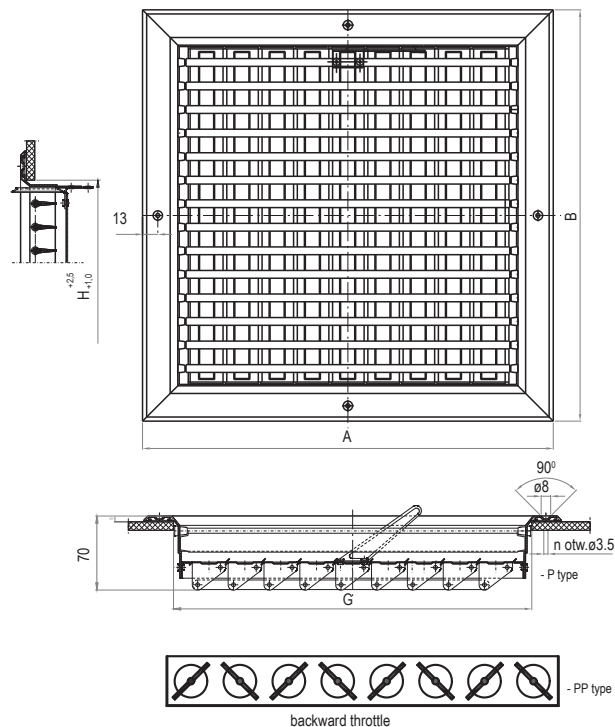
	73	74	75	76	77	78	79	80	81
A [mm]	150	175	200	250	300	350	450	550	650
B [mm]	650								
G [mm]	100	125	150	200	250	300	400	500	600
H [mm]	600								
n	2						4		
Weight KW [kg]	0,80	0,93	1,05	1,25	1,50	1,70	2,15	2,60	3,05
Weight KW-P [kg]	1,15	1,25	1,50	1,75	2,20	2,45	3,20	4,00	4,60

A – overall air grate width
 B – overall air grate height
 G – installation hole width
 H – installation hole height
 n – number of installation holes

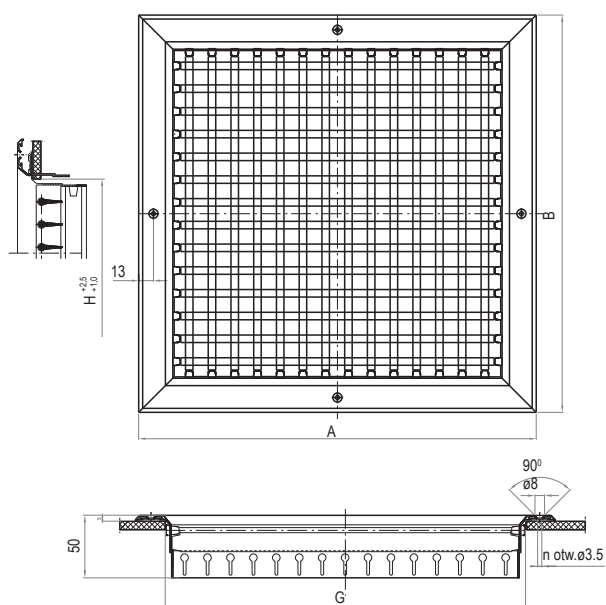
AIR GRATE KW



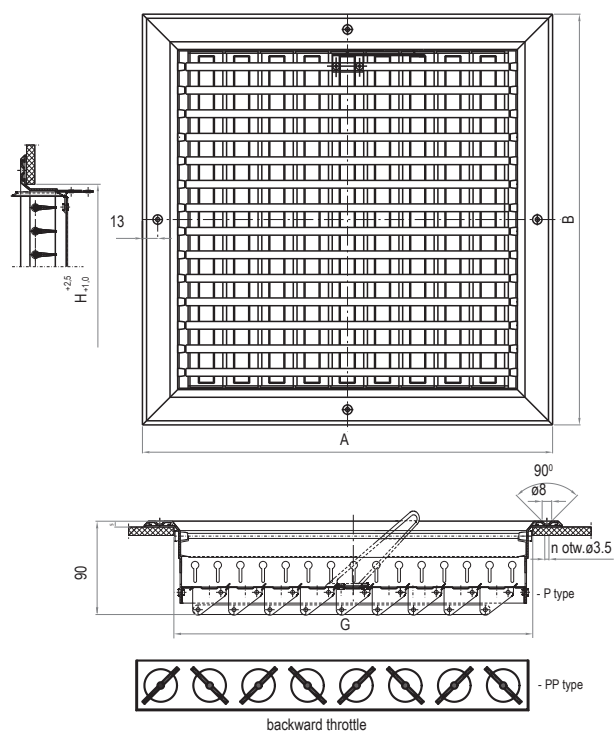
AIR GRATE KW-P



AIR GRATE KW-2



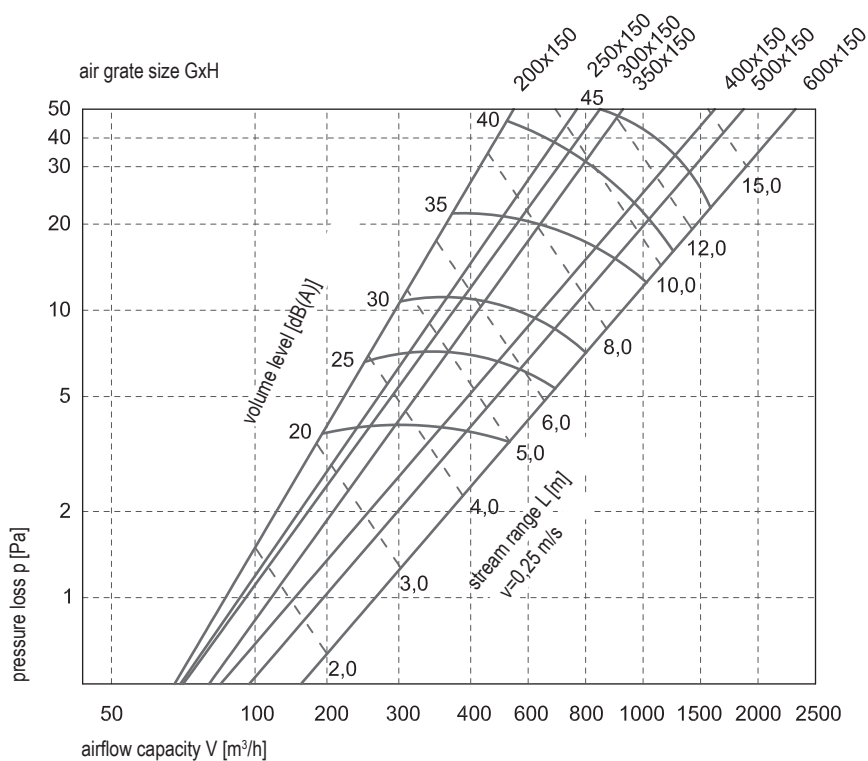
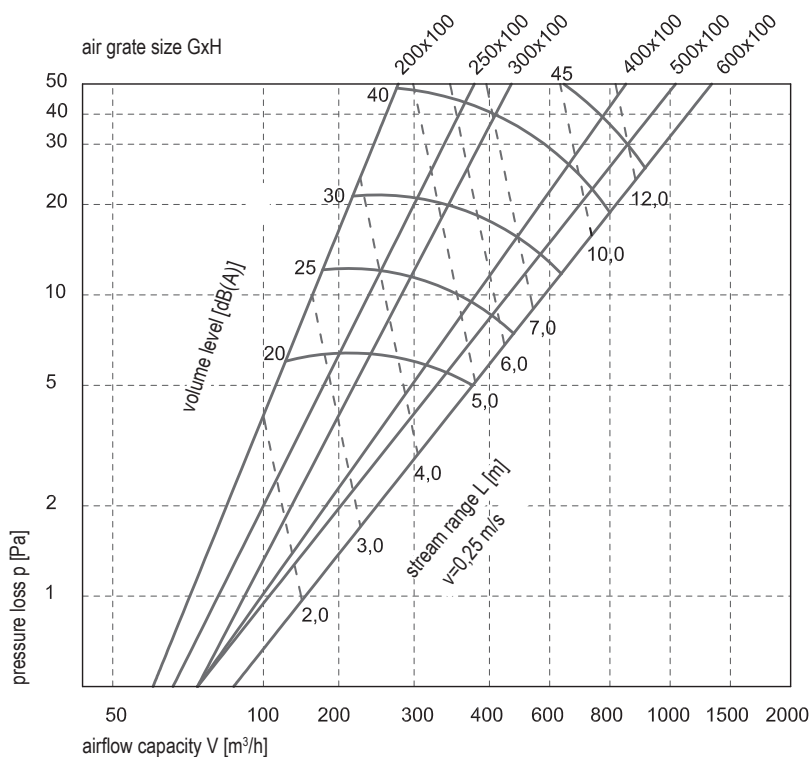
AIR GRATE KW-P-2



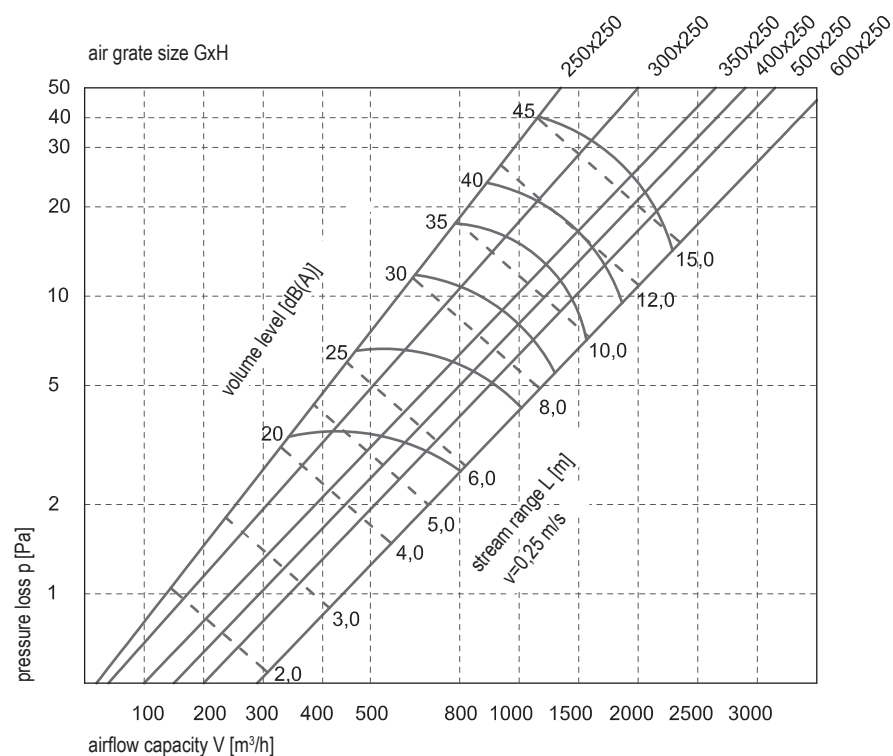
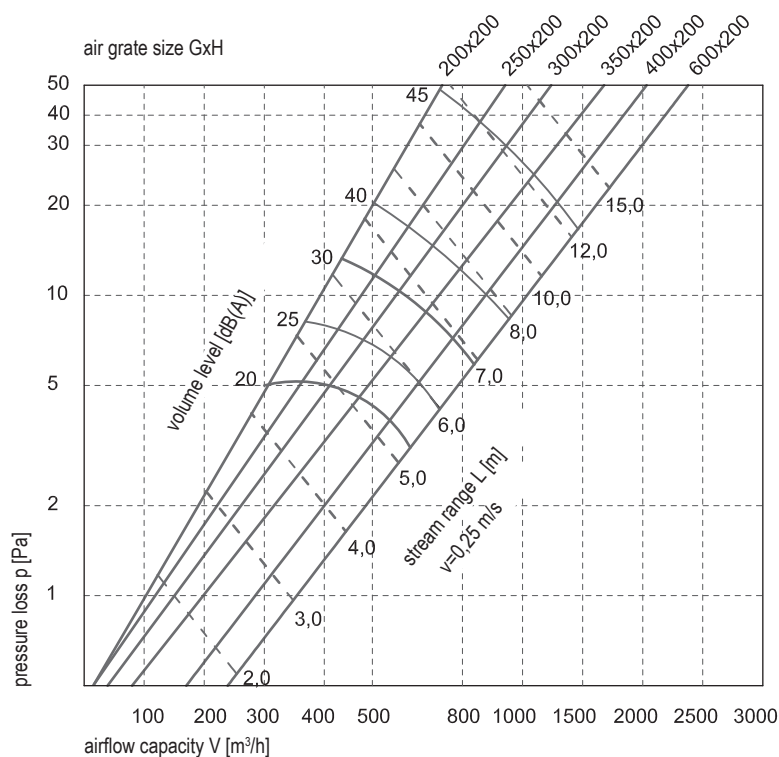
air grates

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FEATURES



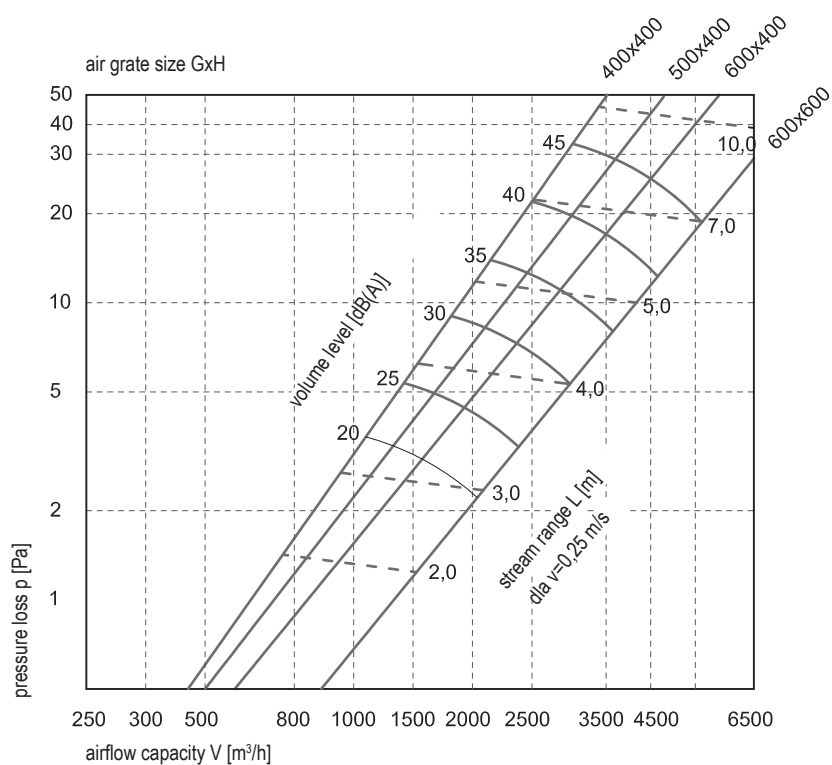
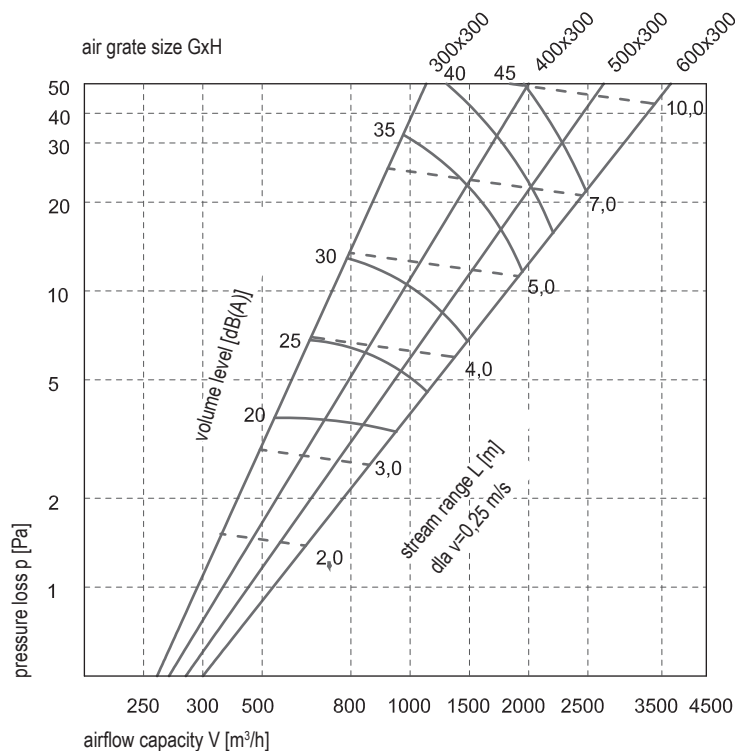
FEATURES



air grates

1

FEATURES



		Size (mm)	200x100	250x100	300x100 200x150	250x150	300x150	300x150 250x200	600x100 400x150 300x200	500x150 350x200	600x150 450x200 350x250 300x300	600x200 500x250 400x300	1000x150 750x200 600x250 500x300	1200x150 900x200 750x250 600x300	1100x200 900x250 750x300	1200x250 1000x300	
Q			A _k (m ²)	0,0098	0,0125	0,0148	0,0183	0,0224	0,0262	0,0309	0,0381	0,0474	0,0660	0,0801	0,0970	0,1210	0,1670
(m³/h)	(l/s)	α (°)	0 30	0 30	0 30	0 30	0 30	0 30	0 30	0 30	0 30	0 30	0 30	0 30	0 30	0 30	0 30
1200	333,3	V _k (m/s) X (m) P _t (Pa) NR (dB)							10,8 10,8 14,9 11,9 46,5 55,9 48 50	8,7 8,7 13,4 10,7 30,6 36,7 44 46	7,0 7,0 12,0 9,6 19,8 23,7 40 42	5,1 5,1 10,2 10,2 10,2 12,2 33 35	4,2 4,2 9,2 7,4 6,9 8,3 30 32	3,4 3,4 8,4 6,7 4,7 5,7 26 28	2,8 2,8 7,5 6,0 3,0 3,6 22 24	2,0 2,0 6,4 5,1 1,6 1,9 15 17	
1300	361,1	V _k (m/s) X (m) P _t (Pa) NR (dB)							11,7 11,7 16,1 12,9 54,6 65,6 50 54	9,5 9,5 14,5 11,6 35,9 43,1 46 48	7,6 7,6 13,0 10,4 23,2 27,9 42 44	5,5 5,5 11,0 8,8 12,0 14,4 35 37	4,5 4,5 10,0 8,0 8,1 9,8 32 34	3,7 3,7 9,1 7,3 5,5 6,7 28 30	3,0 3,0 8,1 6,5 3,6 4,3 24 26	2,2 2,2 6,9 5,5 1,9 2,2 17 19	
1400	388,9	V _k (m/s) X (m) P _t (Pa) NR (dB)							12,6 12,6 17,4 13,9 63,4 13,9 52 54	10,2 10,2 14,5 11,6 41,7 50,0 48 50	8,2 8,2 14,0 11,2 26,9 32,3 44 46	5,9 5,9 11,9 9,5 13,9 16,7 37 39	4,9 4,9 10,8 8,6 9,4 11,3 33 35	4,0 4,0 9,8 7,8 6,4 7,7 30 32	3,2 3,2 8,8 7,0 4,1 5,0 25 27	2,3 2,3 7,5 6,0 2,2 2,6 19 21	
1500	416,7	V _k (m/s) X (m) P _t (Pa) NR (dB)							10,9 10,9 16,7 13,4 47,8 57,4 50 52	8,8 8,8 15,0 12,0 30,9 37,1 45 47	6,3 6,3 12,7 10,2 15,9 19,1 39 41	5,2 5,2 11,5 9,2 10,8 13,0 35 37	4,3 4,3 10,5 8,4 7,4 8,9 31 33	3,4 3,4 9,4 7,5 4,7 5,7 27 29	2,5 2,5 8,0 6,4 2,5 3,0 21 23		
1600	444,4	V _k (m/s) X (m) P _t (Pa) NR (dB)	Correction factors for single-leaf hinged grates KW V _k = value from the table x 0,8 X = value from the table x 1,1 P _t = value from the table x 0,8 NR = value from the table x 0,9 Where: V _k = effective speed w m/s X = jet throw w m. P _t = pressure loss p (Pa) NR = noise ratio (dB) A _k = effective surface w m²						11,7 11,7 17,8 14,3 54,4 65,3 51 53	9,4 9,4 16,0 12,8 35,2 42,2 47 49	6,7 6,7 13,6 10,8 18,1 21,8 40 42	5,5 5,5 12,3 9,8 12,3 14,8 37 39	4,6 4,6 11,2 8,9 8,4 10,1 33 35	3,7 3,7 10,0 8,0 5,4 6,5 29 31	2,7 2,7 8,5 6,8 2,8 3,4 22 24		
1700	472,2	V _k (m/s) X (m) P _t (Pa) NR (dB)							10,0 10,0 17,0 13,6 39,7 47,6 48 50	7,2 7,2 14,4 11,5 20,5 24,6 42 44	5,9 4,9 13,1 10,5 13,9 16,7 38 40	4,9 4,9 11,9 9,5 9,5 11,5 34 36	3,9 3,9 10,6 8,5 6,1 7,3 30 32	2,8 2,8 9,1 7,2 3,2 3,8 24 26			
1800	500,0	V _k (m/s) X (m) P _t (Pa) NR (dB)							10,5 10,5 18,0 14,4 44,5 53,4 50 52	7,6 7,6 15,3 12,2 23,0 27,5 43 45	6,2 6,2 13,8 11,1 15,6 18,7 39 41	5,2 5,2 12,6 10,1 10,6 12,8 36 38	4,1 4,1 11,3 9,0 6,8 8,2 31 33	3,0 3,0 9,6 7,7 3,6 4,3 25 27			
1900	527,8	V _k (m/s) X (m) P _t (Pa) NR (dB)							11,1 11,1 19,0 15,2 49,6 59,5 51 53	8,0 8,0 16,1 12,9 25,6 30,7 45 47	6,6 6,6 14,6 11,7 17,4 20,8 41 43	5,4 5,4 13,3 10,6 11,8 14,2 37 39	4,4 4,4 11,9 9,5 7,6 9,1 33 35	3,2 3,2 10,1 8,1 4,0 4,8 26 28			
2000	555,6	V _k (m/s) X (m) P _t (Pa) NR (dB)							11,7 11,7 20,0 16,0 54,9 65,9 52 54	8,4 8,4 16,9 13,6 28,3 24,0 46 48	6,9 6,9 15,4 12,3 19,2 23,1 42 44	5,7 5,7 14,0 11,2 13,1 15,7 38 40	4,6 4,6 12,5 10,0 8,4 10,1 34 36	3,3 3,3 10,7 8,5 4,4 5,3 28 30			
2100	583,3	V _k (m/s) X (m) P _t (Pa) NR (dB)									8,8 8,8 17,8 14,2 31,2 37,5 47 49	7,3 7,3 16,2 12,9 21,2 25,5 43 45	6,0 6,0 14,7 11,7 14,5 17,4 39 41	4,8 4,8 13,1 10,5 9,3 11,2 35 37	3,5 3,5 11,2 8,9 4,9 5,9 29 31		
2200	611,1	V _k (m/s) X (m) P _t (Pa) NR (dB)									9,3 9,3 18,6 14,9 34,3 41,2 48 50	7,6 7,6 16,9 13,5 23,3 27,9 44 46	6,3 6,3 15,4 12,3 15,9 19,1 41 43	5,1 5,1 13,8 11,0 10,2 12,2 36 38	3,7 3,7 11,7 9,4 5,4 6,4 30 32		
2400	666,7	V _k (m/s) X (m) P _t (Pa) NR (dB)									10,1 10,1 20,3 16,3 40,8 49,0 50 52	8,3 8,3 18,5 14,8 27,7 33,3 46 48	6,9 6,9 16,8 13,4 18,9 22,7 43 45	5,5 5,5 15,0 12,0 12,1 14,6 38 40	4,0 4,0 12,8 10,2 6,4 7,6 32 34		
2600	722,2	V _k (m/s) X (m) P _t (Pa) NR (dB)	Remarks: • Above selection tables were based on laboratory tests in accordance with ISO 5219 (UNE 100.710) and ISO 5135 and 3741. The study included type KW grates. • The device placed in the middle of the room. • The distance between the top of the unit and the ceiling is 0.2 m • The room width is half the length of the room • The room height 3 + / - 0.5 m • Δt is equal to 10 °C. (The difference between the temperature of the supplied air and room air temperature). • Noise volume level is based on sound power level without silencing the room and without damper (mounted according to ISO). • To obtain data on the pressure loss or noise level for grate with damper, refer to the appropriate chart. • The values correspond to the final velocity of 0.25 m/s in the operation area.									10,9 10,9 22,0 17,6 47,9 57,5 52 54	9,0 9,0 20,0 16,0 32,5 39,0 48 50	7,4 7,4 18,2 14,5 22,2 26,6 45 47	6,0 6,0 16,3 13,0 14,3 17,1 40 42	4,3 4,3 13,8 11,1 7,5 9,0 34 36	
2800	777,8	V _k (m/s) X (m) P _t (Pa) NR (dB)										9,7 9,7 21,5 17,2 37,7 45,3 50 52	8,0 8,0 19,6 15,7 25,7 30,9 46 48	6,4 6,4 17,5 14,0 16,5 19,8 42 44	4,7 4,7 14,9 11,9 8,7 10,4 36 38		
3000	833,3	V _k (m/s) X (m) P _t (Pa) NR (dB)										10,4 10,4 23,1 18,5 43,3 52,0 52 54	8,6 8,6 21,0 16,8 29,5 35,4 48 50	6,9 6,9 18,8 15,0 19,0 22,8 44 46	5,0 5,0 16,0 12,8 10,0 12,0 38 40		
3200	888,9	V _k (m/s) X (m) P _t (Pa) NR (dB)										9,2 9,2 22,4 17,9 33,6 40,3 50 52	7,3 7,3 20,0 16,0 21,6 25,9 45 47	5,3 5,3 17,0 13,6 11,3 13,6 39 41			
3500	972,2	V _k (m/s) X (m) P _t (Pa) NR (dB)										10,0 10,0 24,5 19,6 40,2 48,2 52 54	8,0 8,0 21,9 17,5 25,8 31,0 48 50	5,8 5,8 18,6 14,9 13,6 16,3 41 43			
3800	1055,6	V _k (m/s) X (m) P _t (Pa) NR (dB)										10,9 10,9 26,6 21,2 47,4 56,8 54 56	8,7 8,7 23,8 19,0 30,4 36,5 50 52	6,3 6,3 20,2 16,2 16,0 19,2 43 45			
4100	1138,9	V _k (m/s) X (m) P _t (Pa) NR (dB)										9,4 9,4 25,7 20,5 35,4 42,5 51 53	6,8 6,8 21,8 17,5 18,6 22,3 45 47				
4500	1250,0	V _k (m/s) X (m) P _t (Pa) NR (dB)										10,3 10,3 28,2 22,5 47,7 51,2 54 56	7,5 7,5 24,0 19,2 22,4 26,9 47 49				

air grates

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GENERAL INFORMATION

EXAMPLE: REQUIREMENTS:

Air capacity flow rate:	450 m ³ /h (125 l/s)
Jet throw:	4 to 5 m.
The noise ratio	less than 30 NR
Use	office
Pressure loss	less than 5 Pa
effective speed	2 do 3,5 m/s

PROPORTION

Using the rapid selection table for grates and following the principles of comfort ventilation in the rooms, we find that the velocity of air flow must be up to 2 to 3.5 m/s.

Air capacity flow rate:	450 m ³ /h (125 l/s)
V _k (effective speed)	3,3 m/s
X _k (jet throw)	5 m at an angle of 0 °
P _t (pressure loss)	4,3 Pa
NR (noise level)	20 dB

KW Grate size 500x100 or 350x200

The obtained parameters show that the requirements have been met.

CORRECTION FACTORS FOR THE VALUE OF FLOW RANGE:

Some correction factors are obtained from the ratio between the width and length of the room or panels deviation angle and the distance between the ceiling and the grate. Such correction coefficients are obtained as follows:

A / L: The ratio between the length and width of the room that requires ventilation. For example, for the room of 4,5 m width and 4,5 m length, the indicator of the A/L ratio is 1.

Ca: indicator derived from the graph. For example, if the value of A / L = 1 for grate with deviation angle 0°, the Ca value equals to 1,3

Ch: correction indicator for the height derived from the distance between the grate and the ceiling. For the free stream Ch is always 1:1. For example, if the grate is placed at a distance of 0.2 m. from the ceiling, then the Ch indicator is 1.

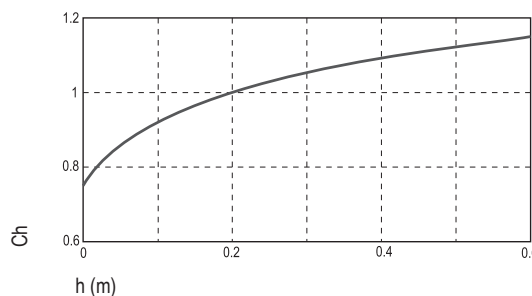
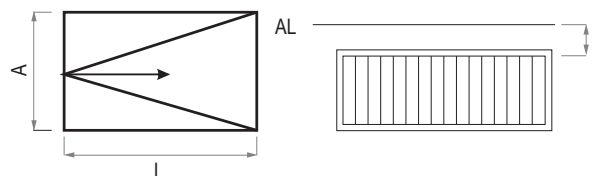
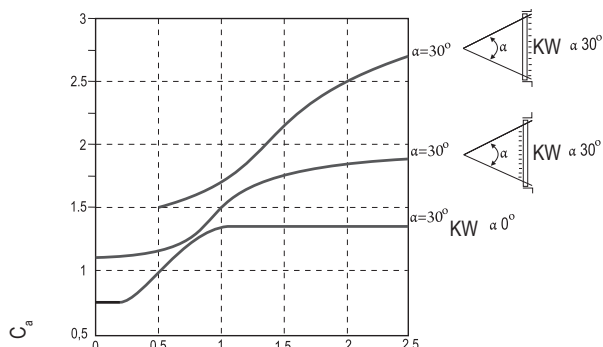
Once above correction indicators are calculated, the correction factor for the range (Kc) can be calculated using the following formula:

$$K_c = C_a * C_h \quad K_c = 1,2 * 1 = 1,3$$

In this case of selection using the table, we can get the value of the adjusted range (Xc):

$$X_c = K_c * X$$

$$X_c = 1,3 * X$$



TIPS:

1. MAXIMUM DISTANCE H MAX.

For proper flow of cold air, it is recommended not to exceed the recommended ranges between the ceiling and the grate (h max) and the temperature difference Δt (the difference between the temperature inside the room and supplied air temperature).

Δt (C)	0	6	9	12
h max (m)	0,65	0,37	0,25	0,13

2. THE MAXIMUM RECOMMENDED VELOCITY IN THE OPERATING AREA.

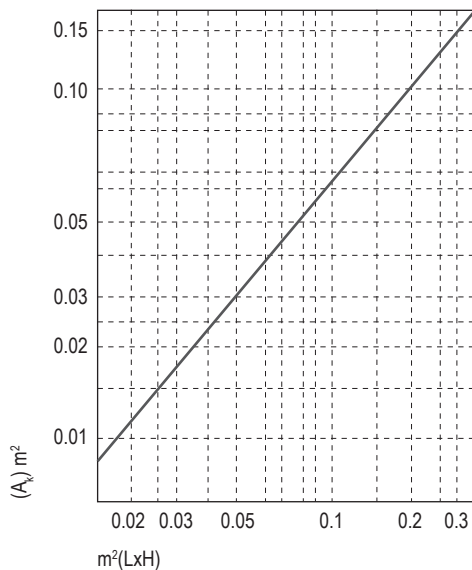
Due to the temperature difference between the room air and supplied air, the following maximum velocity V_z is recommended

	Δt Supply cold air (°C)			
	0	6	9	12
V_z maximum recommended	0,25	0,20	0,15	0,15
value m/s	0,30	0,25	0,20	0,15

3. MEASUREMENT OF THE VOLUME FLOW RATE

Volumetric flow rate of the air flow (q_v) is obtained from the product of the air grates effective surface (A_k) and its effective speed (V_k):
 $q_v \text{ (m}^3/\text{h)} = A_k \text{ (m}^2) \cdot V_k \text{ (m/s)} \times 3600$

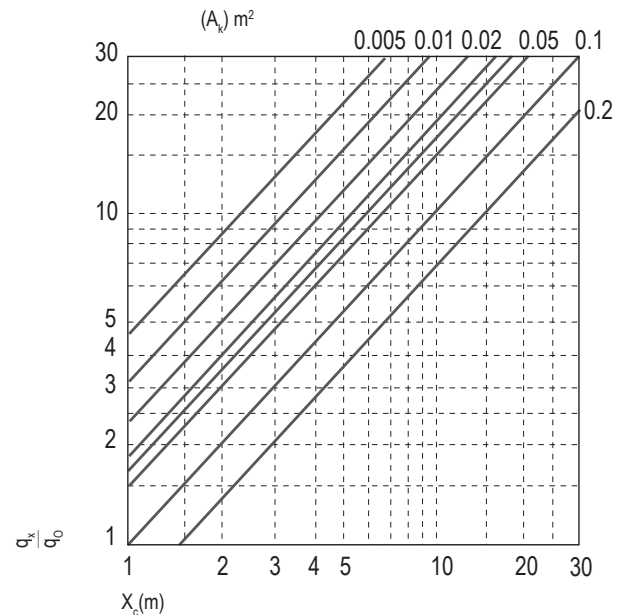
In order to calculate the value of A_k for grates not shown in the tables, You may use the figure below.



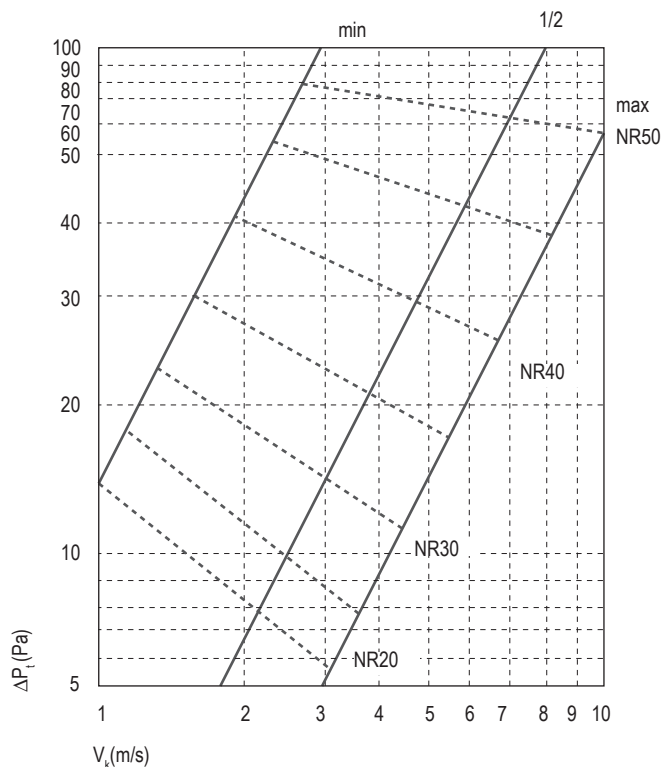
In the case of grates with the nominal area greater than 0.35 m^2 , the value of A_k will be 70% of that surface.

4. THE PHENOMENON OF INDUCTION

It is also possible to obtain the flow rate of air flow out of the so-called induction factor (q_x / q), which is determined by the following parameters: X_C m (adjusted range) and A_k open outlet area in m^2 , as shown in the figure below.



By studying the induction factor, You can also calculate the total induced volume by multiplying it by the volume flow rate of supplied air.



Ak (m²)	0,01	0,02	0,03	0,05	0,1	0,2
NR	-5,2	-1,9	0	+2,4	+5,8	+9,1

air grates

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The damper changes the values of the noise level and the flow resistance specified in the rapid selection tables.

Further in the material and on the corresponding graphs, there are shown the values of noise level and the total pressure loss (ΔP_t) for grates fitted with flow control dampers as the function of the volume flow parameter V_k (effective speed) and the percentage of the damper opening (min., 1/2, max.).

The graph shows the noise level NR as sound power intensity (without silencing the room) for grates fitted with a damper.

Correction factor should be applied to the noise level as a function of A_k (open outlet area) according to the table above.

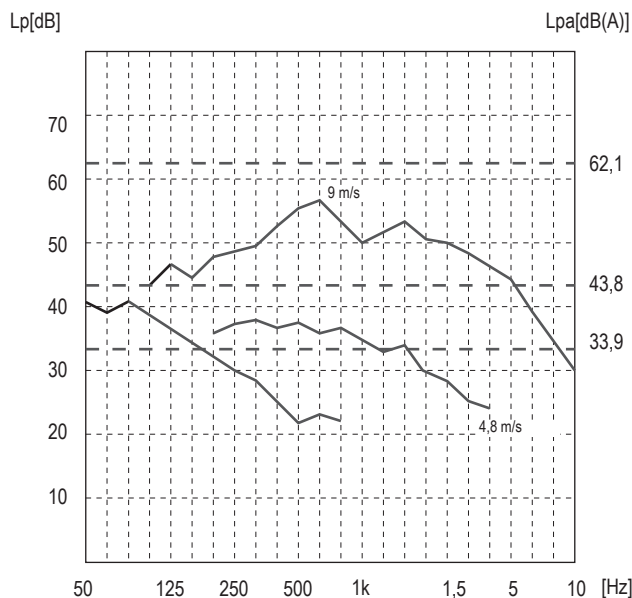
GRID TYPE KW

Duct dimensions	Max. net flow area	
	CxD	KW
mm	m2	m2
200x315	0,04	0,03
250x630	0,09	0,08
315x200	0,04	0,03
315x315	0,06	0,05
315x400	0,07	0,06
315x500	0,09	0,08
315x630	0,11	0,10
400x315	0,07	0,06
400x400	0,09	0,08
400x500	0,11	0,10
400x630	0,14	0,13
400x800	0,17	0,16
500x315	0,09	0,08
500x400	0,11	0,10
500x800	0,21	0,20
630x250	0,09	0,08
630x315	0,11	0,10
630x400	0,14	0,13
630x800	0,27	0,26
800x400	0,17	0,16
800x500	0,21	0,20
800x630	0,27	0,26

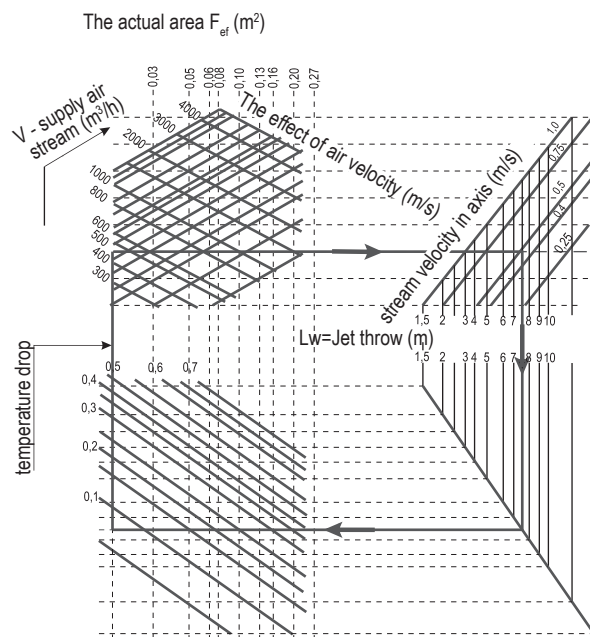
GRID TYPE KWP

Duct dimensions	Max. net flow area	
	CxD	KWP
mm	m2	m2
125x160	0,01	0,01
200x160	0,01	0,01
200x200	0,02	0,02
200x250	0,02	0,02
200x315	0,03	0,03
250x200	0,02	0,02
250x250	0,05	0,05
250x315	0,04	0,04
250x630	0,07	0,07
315x200	0,03	0,03
315x250	0,03	0,03
315x315	0,05	0,05
315x400	0,06	0,06
315x500	0,07	0,07
315x630	0,09	0,09
400x200	0,04	0,04
400x315	0,06	0,06
400x400	0,08	0,08
400x500	0,10	0,10
400x630	0,13	0,13
400x800	0,16	0,16

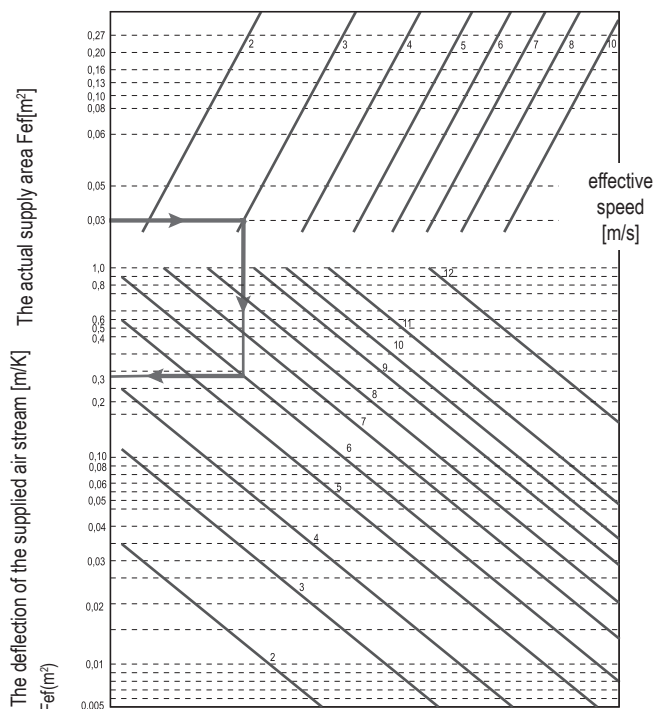
Sound power level L_p and adjusted sound power level L_{pa} of noise caused by the air flowing through the grate 315x315 (fully open) for different flow velocities.



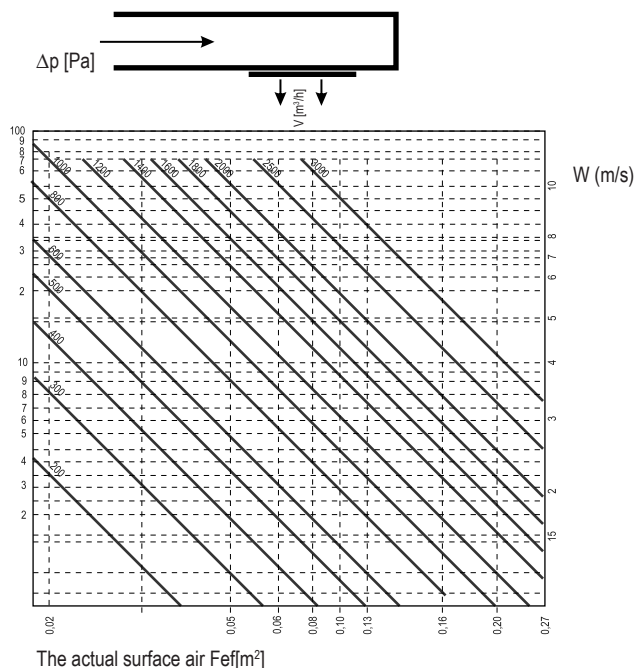
Stream range and the relative decrease of the temperature for the given airflow velocity.



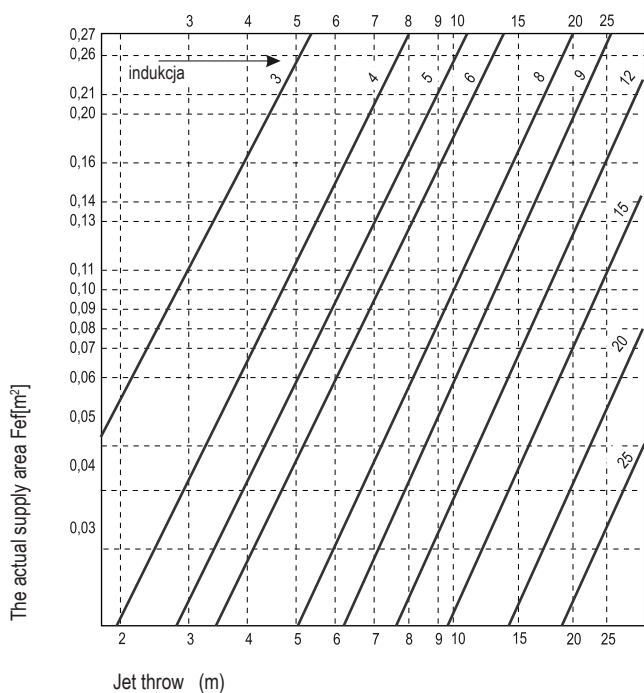
THE DEFLECTION OF THE SUPPLIED AIR STREAM



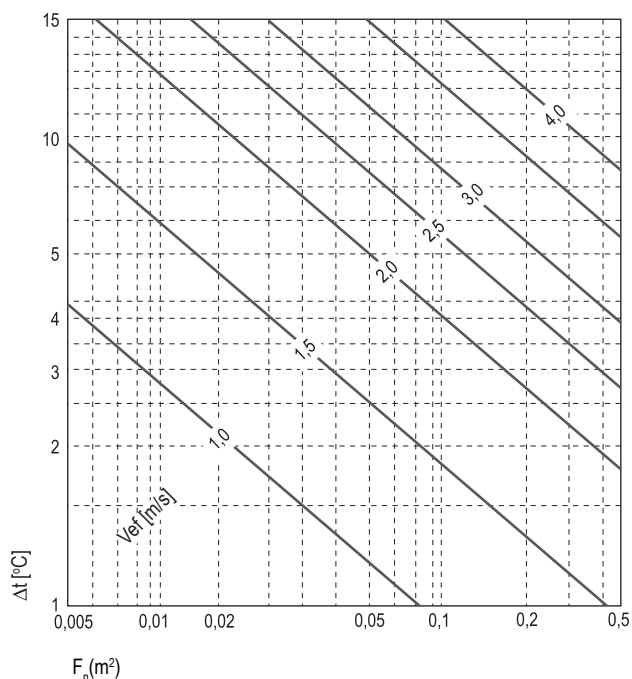
PRESSURE LOSS FOR GRATES



STREAM INDUCTION V_X / V_O FOR A GIVEN RANGE



THE MAXIMUM TEMPERATURE DIFFERENCE Δt_z IN THE ROOM-COOLING PROCESS



air grates

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RAPID SELECTION TABLE (VENTING GRATES) KW-SL

Q		D, mm.	200x100	250x100	300x100 200x150	400x100 200x200	500x100 350x150 250x200	600x100 400x150 250x200	500x150 400x200 300x250	600x150 450x200 350x250	300x300	500x200 400x250 350x300	800x150 600x200 500x250 400x300	800x150 600x250 500x300	1000x200 800x250 500x300	1000x250 800x300 600x400	1000x300 750x400	1200x300 900x400 700x500 600x600
m³/h	l/s	A _k	0,0076	0,0098	0,0121	0,0166	0,0217	0,0258	0,0345	0,0404	0,0416	0,0470	0,0560	0,0721	0,0915	0,1173	0,1462	0,1759
50	13,9	V _k P _s NR	1,8 3,5 12	1,4 2,1 7	1,1 1,5	0,8 0,8	0,6 0,5	0,5 0,3										
60	16,7	V _k P _s NR	2,2 5,0 17	1,7 3,1 12	1,4 2,1 7	1,0 1,1	0,8 0,7	0,6 0,4	0,5 0,3									
70	19,4	V _k P _s NR	2,5 6,8 21	2,0 4,2 16	1,6 2,8 11	1,2 1,5 5	0,9 1,0	0,8 0,6	0,6 0,4	0,5 0,2								
80	22,2	V _k P _s NR	2,9 8,9 24	2,3 5,5 19	1,8 3,7 15	1,3 2,0 8	1,0 1,3	0,9 0,8	0,6 0,5	0,6 0,3	0,5 0,2							
90	25,0	V _k P _s NR	3,3 11,3 27	2,6 7,0 22	2,1 4,7 18	1,5 2,5 11	1,2 1,6 7	1,0 1,0	0,7 0,6	0,6 0,4	0,6 0,2	0,5 0,2						
100	27,8	V _k P _s NR	3,6 13,9 30	2,8 8,6 25	2,3 5,8 21	1,7 3,1 14	1,3 2,0 9	1,1 1,2	0,8 0,8	0,7 0,5	0,7 0,3	0,6 0,3	0,5 0,2					
150	41,7	V _k P _s NR		4,3 19,3 36	3,4 13,1 31	2,5 7,0 25	1,9 4,5 20	1,6 2,8 14	1,2 1,7 9	1,0 1,0	1,0 0,7	0,9 0,6	0,7 0,4	0,6 0,2	0,5 0,2			
200	55,6	V _k P _s NR			4,6 23,2 39	3,3 12,4 32	2,6 8,1 27	2,2 4,9 22	1,6 3,0 17	1,4 1,8 11	1,3 1,2 7	1,2 1,1 6	1,0 0,8	0,8 0,4	0,6 0,3	0,5 0,2		
250	69,4	V _k P _s NR				4,2 19,4 38	3,2 12,6 33	2,7 7,7 28	2,0 4,7 22	1,7 2,9 17	1,7 1,9 13	1,5 1,7 11	1,2 1,2 7	1,0 0,7	0,8 0,4	0,6 0,2	0,5 0,2	
300	83,3	V _k P _s NR					3,8 18,2 38	3,2 11,0 32	2,4 6,8 27	2,1 4,1 22	2,0 2,8 17	1,8 2,4 16	1,5 1,7 12	1,2 0,9 6	0,9 0,6	0,7 0,4	0,6 0,2	0,5 0,1
400	111,1	V _k P _s NR						4,3 19,6 40	3,2 12,1 35	2,8 7,3 29	2,7 4,9 25	2,4 4,4 24	2,0 3,0 20	1,5 1,7 13	1,2 1,1 9	0,9 0,6	0,8 0,4	0,6 0,2
500	138,9	V _k P _s NR							4,0 18,9 41	3,4 11,5 35	3,3 7,7 31	3,0 6,8 29	2,5 4,7 25	1,9 2,6 19	1,5 1,7 15	1,2 1,0 9	0,9 0,6	0,8 0,4
600	166,7	V _k P _s NR								4,1 16,5 40	4,0 11,1 36	3,5 9,8 34	3,0 6,8 30	2,3 3,8 24	1,8 2,5 19	1,4 1,4 13	1,1 0,9 8	0,9 0,5
700	194,4	V _k P _s NR									4,7 15,1 40	4,1 13,3 38	3,5 9,3 34	2,7 5,2 28	2,1 3,4 23	1,7 1,9 17	1,3 1,2 12	1,1 0,7 6
800	222,2	V _k P _s NR											4,7 17,4 42	4,0 12,1 38	3,1 6,7 31	2,4 4,4 27	1,9 2,5 21	1,5 1,6 16
900	250,0	V _k P _s NR												4,5 15,3 41	3,5 8,5 30	2,7 5,6 24	2,1 3,2 19	1,7 2,0 13
1000	277,8	V _k P _s NR													3,9 10,5 37	3,0 6,9 33	2,4 4,0 22	1,9 2,5 16
1500	416,7	V _k P _s NR														4,6 15,5 43	3,6 8,9 37	2,8 5,6 32
2000	555,6	V _k P _s NR															4,7 15,8 45	3,8 10,0 40
3000	833,3	V _k P _s NR																4,7 13,0 44
4000	1111,1	V _k P _s NR																6,3 23,0 52
5000	1388,9	V _k P _s NR																7,9 36,0 59

Symbols:
 V_k = Effective speed in m/s
 P_s = Static pressure in Pa
 A_k = Effective surface $w \text{ m}^2$

Note:
 This selection table has been prepared based on laboratory testing in accordance with ISO 5219 (UNE 100.710) and ISO 5135 and 3741



DESCRIPTION

KWBP are air grates designed to exhaust air. External panel is made of perforated sheet.

KWBP are air grates additionally equipped with control throttle. Adjustable angle of the throttle allows for adjusting airflow capacity.

FEATURES

- made of aluminium and available in standard RAL 9003 colour
- external panel made of perforated sheet
- KWBP-P and KWBP-PP equipped with control throttle that allows for adjusting airflow capacity.
- perforation of the sheet can be adjusted
- made in 63 standard sizes
- upon customer's request, gates can be made in any size and colour from RAL palette
- given sizes are sizes of installation holes
- springs can be used instead of fitting holes
- the possibility of another perforation
- the ability to manufacture acid-proof sheet

INSTALLATION

Air grates KP can be mounted in the wall or ceiling, at the end of rectangular ventilation duct.

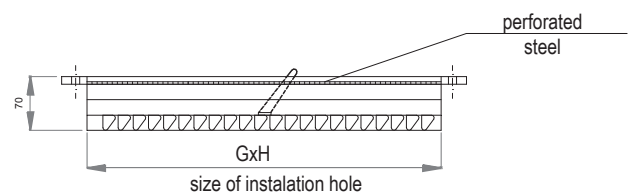
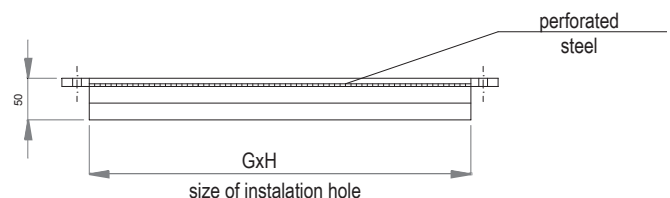
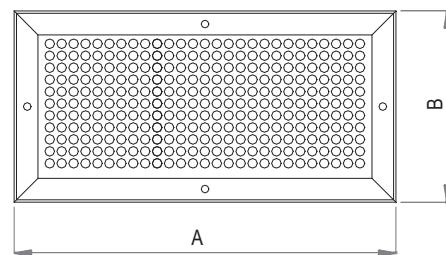
Prepare an installation hole of a size G x H for the chosen air gate, put in the ventilation duct finished with metal cut out. Slide the air grate into the installation hole and fix it to the wall/ceiling using appropriate screws. Remember to seal joints between the air grate and the duct.

ORDER REFERENCE

KWBP	- 45	- K	- RAL9003
			colour
			K- acid-proof sheet
			size (lub G x H)
			no throttle
	P		concurrent throttle
	PP		backward throttle
			type

FEATURES

The figures show airflow capacity V (m³/h), pressure loss p (Pa), and volume level [db(A)].



air grates with perforated sheet

STANDARD SIZES

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
A [mm]	150	175	200	250	300	350	450	550	650	150	175	200	250	300	350	450	550	650
B [mm]	150									175								
G [mm]	100	125	150	200	250	300	400	500	600	100	125	150	200	250	300	400	500	600
H [mm]	100									125								
n	2						4			2						4		

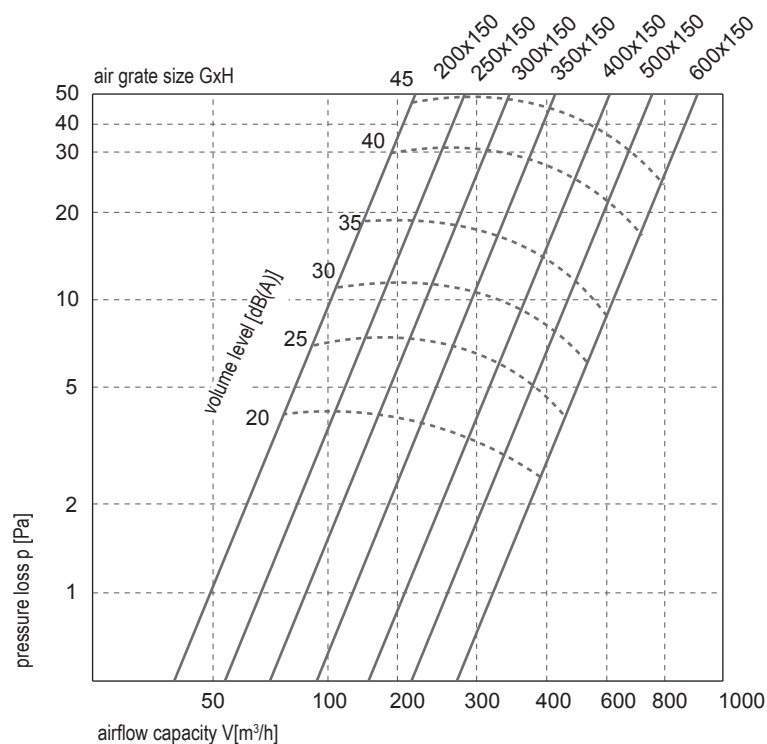
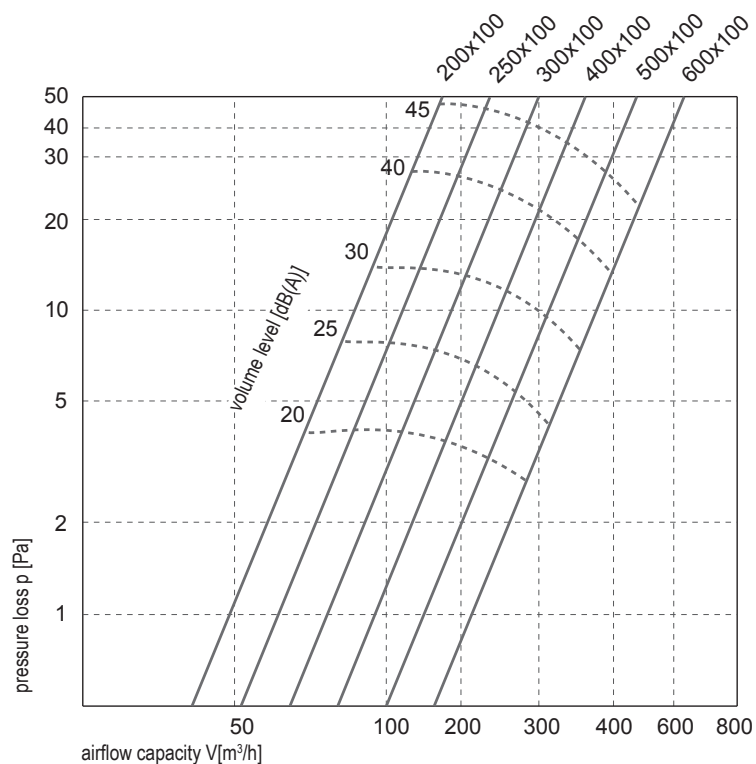
	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
A [mm]	150	175	200	250	300	350	450	550	650	150	175	200	250	300	350	450	550	650
B [mm]	200									250								
G [mm]	100	125	150	200	250	300	400	500	600	100	125	150	200	250	300	400	500	600
H [mm]	150									200								
n	2						4			2						4		

	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
A [mm]	150	175	200	250	300	350	450	550	650	150	175	200	250	300	350	450	550	650
B [mm]	300									350								
G [mm]	100	125	150	200	250	300	400	500	600	100	125	150	200	250	300	400	500	600
H [mm]	250									300								
n	2						4			2						4		

	55	56	57	58	59	60	61	62	63
A [mm]	150	175	200	250	300	350	450	550	650
B [mm]	450								
G [mm]	100	125	150	200	250	300	400	500	600
H [mm]	400								
n	2						4		

A – overall air grate width
B – overall air grate height
G – installation hole width
H – installation hole height
n – number of installation holes

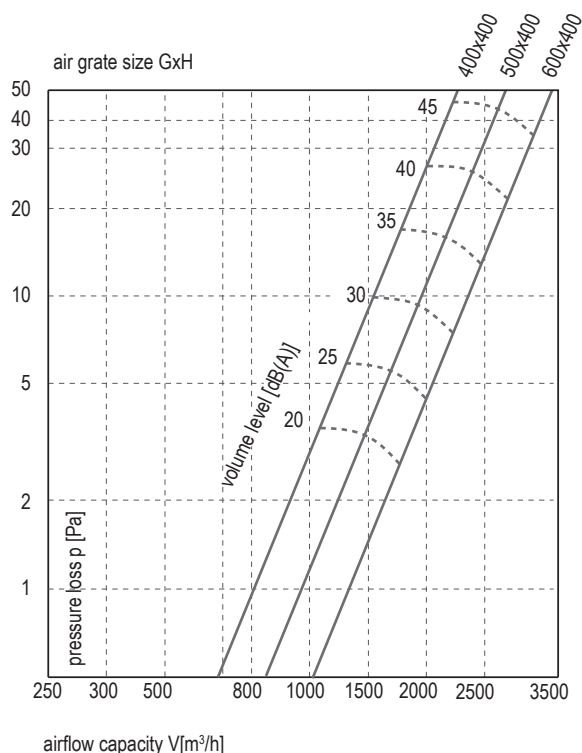
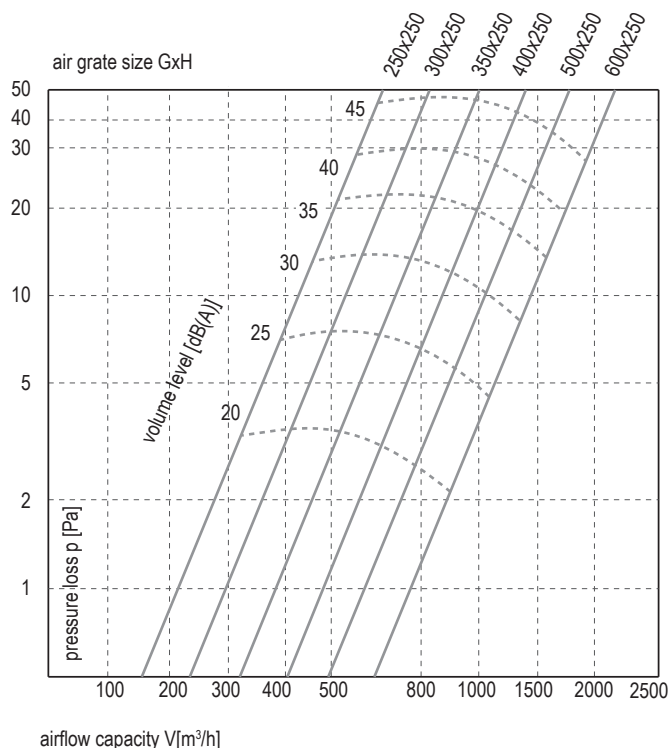
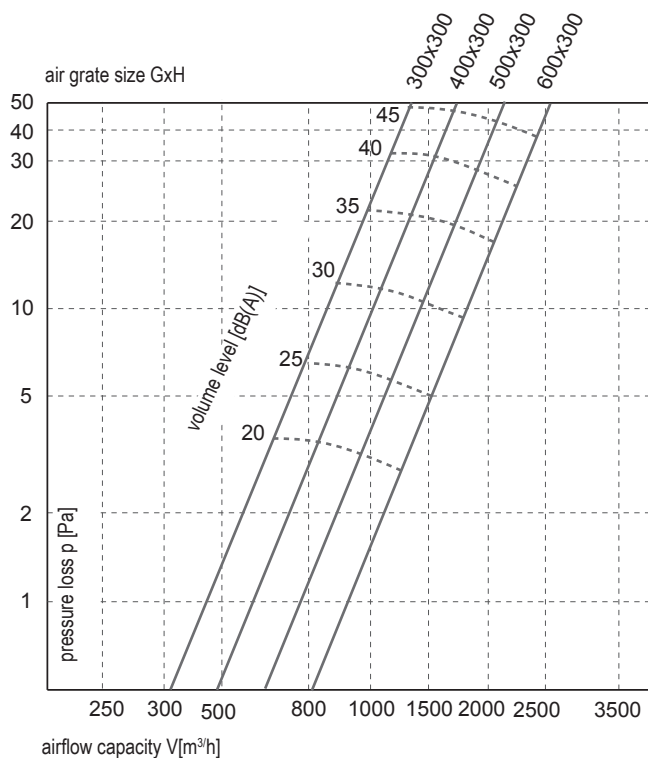
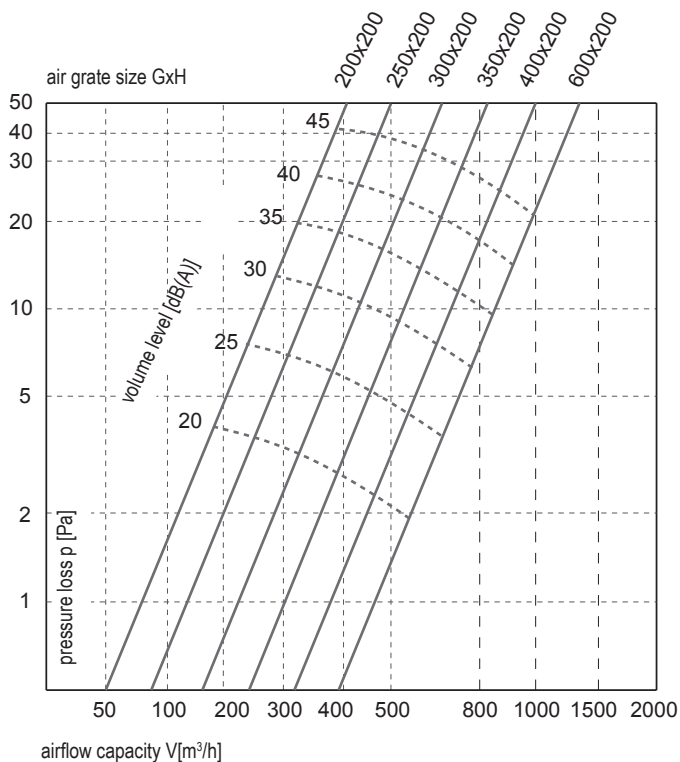
FEATURES

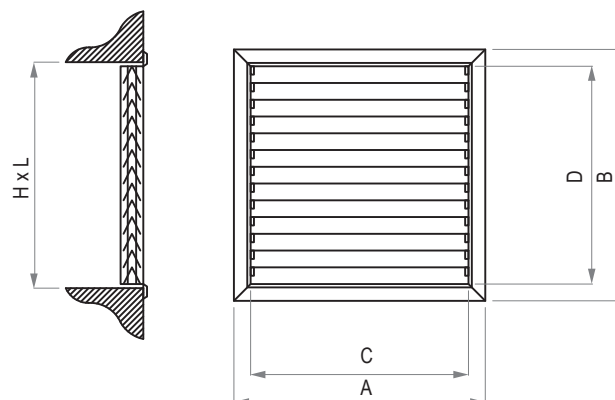
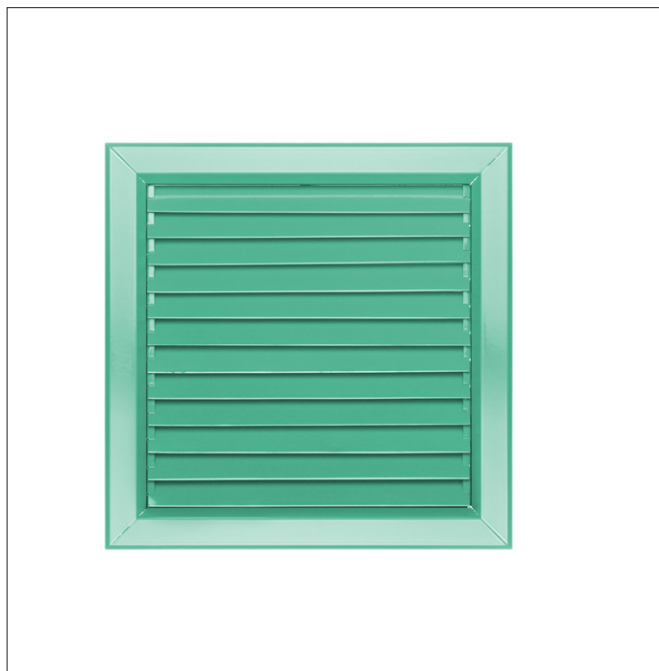


air grates with perforated sheet

1

FEATURES





DESCRIPTION

KWW are air grates designed to level out air pressure between rooms. They are equipped with fixed aluminium hiding blades. KWW can be installed in the wall between two rooms.

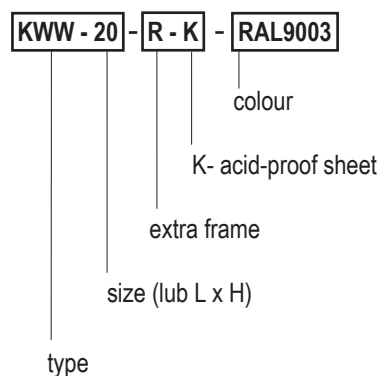
FEATURES

- level out air pressure between rooms
- fixed blades
- made of aluminium
- made in 81 standard sizes
- available in standard RAL 9003 colour
- upon customer's request, gates can be made in any size and colour from RAL palette
- given sizes are sizes of installation holes
- springs can be used instead of fitting holes
- available use an additional frame for the thin walls or doors
- the ability to manufacture acid-proof sheet

INSTALLATION

Air grates KP can be mounted in the wall using bolts or screws. Prepare an installation hole of a size L x H for the chosen air gate. seal joints between the air grate and the wall. Springs can be used instead of fitting holes.

ORDER REFERENCE



equalizing air grates

1

STANDARD SIZES

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
A [mm]	150	175	200	250	300	350	450	550	650	150	175	200	250	300	350	450	550	650
B [mm]	150									175								
G [mm]	100	125	150	200	250	300	400	500	600	100	125	150	200	250	300	400	500	600
H [mm]	100									125								
n	2						4			2						4		

	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
A [mm]	150	175	200	250	300	350	450	550	650	150	175	200	250	300	350	450	550	650
B [mm]	200									250								
G [mm]	100	125	150	200	250	300	400	500	600	100	125	150	200	250	300	400	500	600
H [mm]	150									200								
n	2						4			2						4		

	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
A [mm]	150	175	200	250	300	350	450	550	650	150	175	200	250	300	350	450	550	650
B [mm]	300									350								
G [mm]	100	125	150	200	250	300	400	500	600	100	125	150	200	250	300	400	500	600
H [mm]	250									300								
n	2						4			2						4		

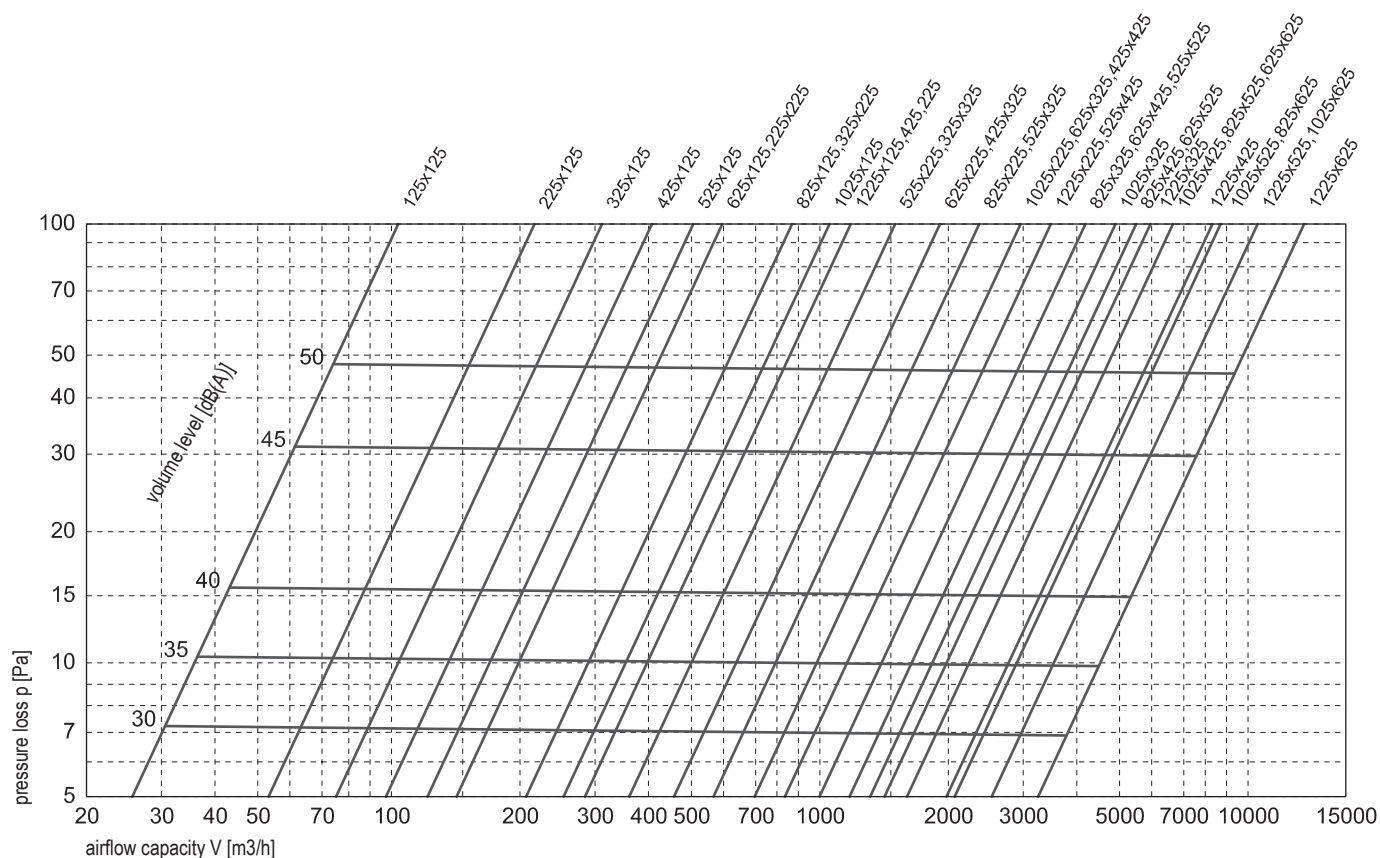
	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
A [mm]	150	175	200	250	300	350	450	550	650	150	175	200	250	300	350	450	550	650
B [mm]	450									550								
G [mm]	100	125	150	200	250	300	400	500	600	100	125	150	200	250	300	400	500	600
H [mm]	400									500								
n	2						4			2						4		

	73	74	75	76	77	78	79	80	81
A [mm]	150	175	200	250	300	350	450	550	650
B [mm]	650								
G [mm]	100	125	150	200	250	300	400	500	600
H [mm]	600								
n	2						4		

A – overall air grate width
B – overall air grate height
G – installation hole width
H – installation hole height
n – number of installation holes

FEATURES

The figures show airflow capacity V (m³/h), pressure loss p (Pa), and volume level [dB(A)].



equalizing air grates

1

RAPID SELECTION TABLE

Q		Sizes (mm)	300x100 200x150	400x100 200x200	500x150 350x200	400x200 300x250	500x200 400x250	600x200 500x250 400x300	600x250 500x300	600x350 500x400	700x400 600x500
m³/h	l/s	A _k	0,0156	0,0208	0,0390	0,0448	0,0560	0,0684	0,0855	0,1218	0,1652
50	13,9	V _k P _s	0,9 3,6	0,7 2,0	0,4 0,6						
60	16,7	V _k P _s	1,1 5,1	0,8 2,9	0,4 0,8						
70	19,4	V _k P _s	1,2 7,0	0,9 3,9	0,5 1,1	0,4 0,8					
80	22,2	V _k P _s	1,4 9,1	1,1 5,1	0,6 1,5	0,5 1,1	0,4 0,7				
90	25,0	V _k P _s	1,6 11,6	1,2 6,5	0,6 1,8	0,6 1,4	0,4 0,9				
100	27,8	V _k P _s	1,8 14,3	1,3 8,0	0,7 2,3	0,6 1,7	0,5 1,1	0,4 0,7			
120	33,3	V _k P _s	2,1 20,5	1,6 11,6	0,9 3,3	0,7 2,5	0,6 1,6	0,5 1,1	0,4 0,7		
140	38,9	V _k P _s	2,5 28,0	1,9 15,7	1,0 4,5	0,9 3,4	0,7 2,2	0,6 1,5	0,5 0,9		
160	44,4	V _k P _s		2,1 20,5	1,1 5,8	1,0 4,4	0,8 2,8	0,6 1,9	0,5 1,2		
180	50,0	V _k P _s		2,4 26,0	1,3 7,4	1,1 5,6	0,9 3,6	0,7 2,4	0,6 1,5	0,4 0,8	
200	55,6	V _k P _s			1,4 9,1	1,2 6,9	1,0 4,4	0,8 3,0	0,6 1,9	0,5 0,9	
250	69,4	V _k P _s			1,8 14,3	1,6 10,8	1,2 6,9	1,0 4,6	0,8 3,0	0,6 1,5	0,4 0,8
300	83,3	V _k P _s			2,1 20,5	1,9 15,6	1,5 10,0	1,2 6,7	1,0 4,3	0,7 2,1	0,5 1,1
350	97,2	V _k P _s			2,5 28,0	2,2 21,2	1,7 13,6	1,4 9,1	1,1 5,8	0,8 2,9	0,6 1,6
400	111,1	V _k P _s				2,5 27,7	2,0 17,7	1,6 11,9	1,3 7,6	0,9 3,7	0,7 2,0
500	138,9	V _k P _s					2,5 27,7	2,0 18,6	1,6 11,9	1,1 5,9	0,8 3,2
600	166,7	V _k P _s						2,4 26,7	1,9 17,1	1,4 8,4	1,0 4,6
700	194,4	V _k P _s							2,3 23,2	1,6 11,5	1,2 6,2
800	222,2	V _k P _s							2,6 30,4	1,8 15,0	1,3 8,1
900	250,0	V _k P _s								2,1 19,0	1,5 10,3
1000	277,8	V _k P _s								2,3 23,4	1,7 12,7
1200	333,3	V _k P _s									2,0 18,3
1400	388,9	V _k P _s	Symbols: V _k - effective speed in m / s P _s - static pressure in Pa A _k - effective area in m²								2,4 24,9
1600	444,4	V _k P _s									2,7 32,6



DESCRIPTION

AN are square supply diffusers designed for low- and medium-pressure installations, which can be used for both – supplying and exhausting air. They are installed in rooms of height up to 4.0 m. They can be used with constant and variable airflow. The air can be supplied at the temperature by 10°C lower than the temperature in the ventilated room. Fixed vanes suggest horizontal air supply, so it's recommended they are installed in ceilings.

AN-P, AN-PP are square supply diffusers equipped with control throttle. Adjustable angle of the throttle allows for adjusting airflow capacity.

Square diffusers AN, AN-P, AN-PP are available in 4 versions:

- standard 4-duct ,
- or 1-duct, 2-duct or 3-duct.

FEATURES

- made of aluminium profiles and available in standard RAL 9003 colour
- equipped with control throttle that allows for adjusting airflow capacity
- throttle blades made of profiled aluminium-zinc sheet
- can be made in 4 standard versions
- can be installed with connection can SR/AN
- made in 8 standard sizes
- upon customer's request, gates can be made in any size and colour from RAL palette
- Two types of external profile
- with the size 8, You can choose an external flat profile mounted in the coffered panels 600x600

INSTALLATION

Diffusers AN are designed for installation in the underslung ceilings. They can be installed individually or with the connection can. Prepare an installation hole of a size $\square C$ and slide the diffuser in. Remember to seal the joints. Fix the diffuser in using installation holes and appropriate screws. Installation with the connection can – see SR/AN.

ORDER REFERENCE

AN - P - III - 5 - PL - RAL9003			
type	-	size	flat profile
-	no throttle	-	colour
P	concurrent throttle	-	-
PP	backward throttle	-	-

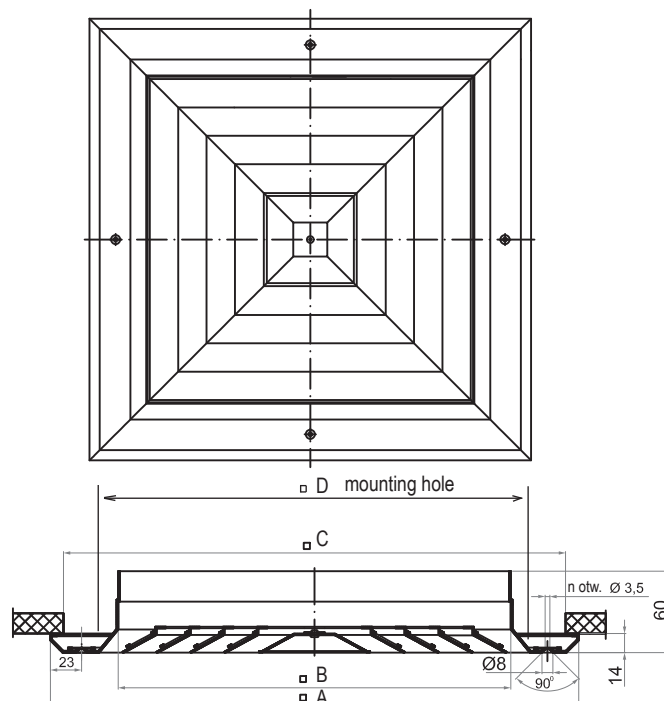
2.1 AN

square supply diffusers

STANDARD SIZES

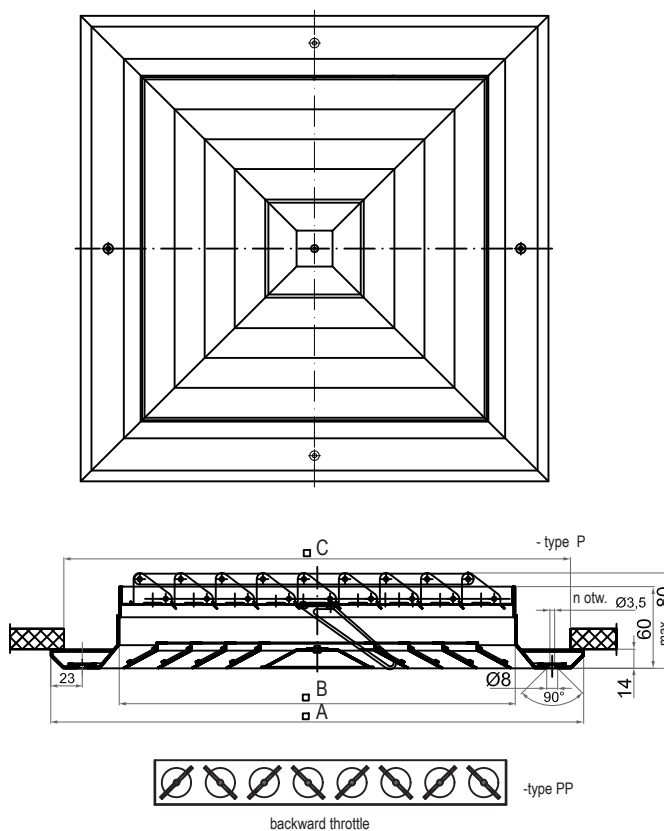
SUPPLY DIFFUSER AN

Nr	1	2	3	4	5	6	7	8
□A [mm]	240	290	340	390	440	490	540	590
□B [mm]	140	190	240	290	340	390	440	490
□C [mm]	215	265	315	365	415	465	515	565
□D [mm]	170	220	270	320	370	420	470	520
n	2				4			
Capacity [m³/h]	50 - 200	200 - 350	350 - 650	650 - 1000	850 - 1700	1350 - 2800	1850 - 3800	2250 - 4850
Weight [kg]	0,38	0,56	0,76	1,0	1,22	1,49	1,79	2,10



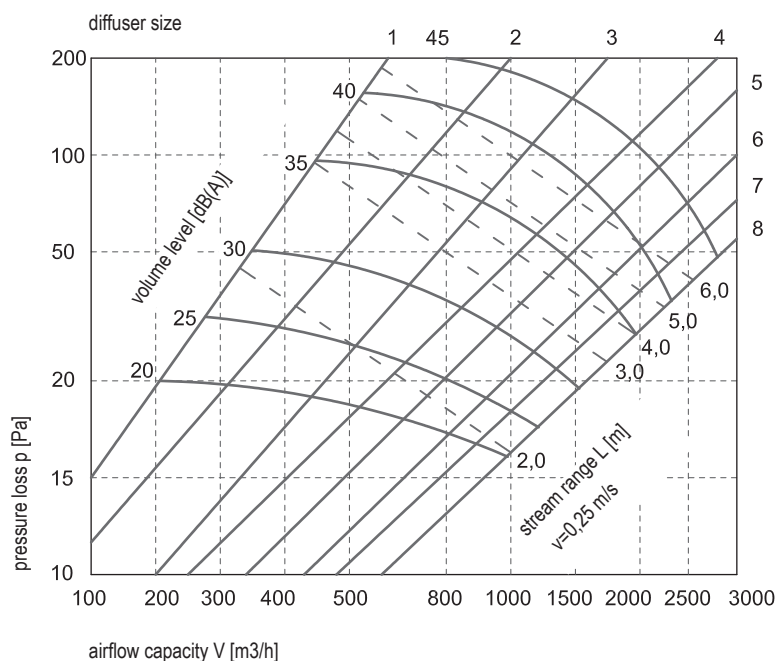
SUPPLY DIFFUSER AN-P

Nr	1	2	3	4	5	6	7	8
□A [mm]	240	290	340	390	440	490	540	590
□B [mm]	140	190	240	290	340	390	440	490
□C [mm]	215	265	315	365	415	465	515	565
□D [mm]	170	220	270	320	370	420	470	520
n	2				4			
Capacity [m³/h]	15 - 200	25 - 350	45 - 580	65 - 850	85 - 1150	110 - 1550	140 - 1950	170 - 2450
Weight [kg]	0,55	0,80	1,00	1,40	1,70	2,20	2,60	3,00



FEATURES

The figure shows airflow capacity V (m³/h), pressure loss p (Pa), airflow scope L (m) for end speed of 0.25 m/s, and volume level [db(A)].



2.1 AN

square supply diffusers

RAPID SELECTION TABLE AN IV

2

stream size		size	1	2	4	6	7	8	9
(m ³ /h)	(l/s)	A _k	0,0109	0,0244	0,0435	0,0679	0,0978	0,1331	0,1739
100	27,8	V _k X P _t NR	2,5 0,5 4,5 18	1,1 0,3 0,9					
120	33,3	V _k X P _t NR	3,1 0,6 6,5 22	1,4 0,4 1,3 6					
140	38,9	V _k X P _t NR	3,6 0,7 8,9 26	1,6 0,5 1,8 9					
160	44,4	V _k X P _t NR	4,1 0,8 11,6 29	1,8 0,5 2,3 13	1,0 0,4 0,7				
180	50,0	V _k X P _t NR	4,6 0,9 14,7 32	2,0 0,6 2,9 16	1,1 0,4 0,7				
200	55,6	V _k X P _t NR	5,1 1,0 18,2 35	2,3 0,7 3,6 18	1,3 0,5 1,1 6				
250	69,4	V _k X P _t NR	6,4 1,2 28,4 40	2,8 0,8 5,7 24	1,6 0,6 1,8 12	1,0 0,5 0,7			
300	83,3	V _k X P _t NR	7,6 1,5 40,9 45	3,4 1,0 8,2 28	1,9 0,7 2,6 16	1,2 0,6 1,1 7			
350	97,2	V _k X P _t NR	8,9 1,7 55,7 49	4,0 1,2 11,1 32	2,2 0,9 3,5 20	1,4 0,7 1,4 11	1,0 0,6 0,7		
400	111,1	V _k X P _t NR		4,6 1,3 14,5 35	2,6 1,0 4,6 24	1,6 0,8 1,9 15	1,1 0,7 0,9 7		
450	125,0	V _k X P _t NR		5,1 1,5 18,4 38	2,9 1,1 5,8 27	1,8 0,9 2,4 17	1,3 0,7 1,1 10		
500	138,9	V _k X P _t NR		5,7 1,7 22,7 41	3,2 1,2 7,1 29	2,0 1,0 2,9 20	1,4 0,8 1,4 13		
600	166,7	V _k X P _t NR		6,8 2,0 32,7 45	3,8 1,5 10,3 34	2,5 1,2 4,2 25	1,7 1,0 2,0 17	1,3 0,9 1,1	

stream size		size	1	2	4	6	7	8	9
(m ³ /h)	(l/s)	A _k	0,0109	0,0244	0,0435	0,0679	0,0978	0,1331	0,1739
700	194,4	V _k X P _t NR		8,0 2,3 44,5 49	4,5 1,7 14,0 37	2,9 1,4 5,7 28	2,0 1,2 2,8 21	1,5 1,0 1,5 15	1,1 0,9 0,9 9
800	222,2	V _k X P _t NR			5,1 2,0 18,3 41	3,3 1,6 7,5 32	2,3 1,3 3,6 24	1,7 1,1 2,0 18	1,3 1,0 1,1 12
900	250,0	V _k X P _t NR			5,7 2,2 23,1 44	3,7 1,8 9,5 35	2,6 1,5 4,6 27	1,9 1,3 2,5 21	1,4 1,1 1,4 15
1000	277,8	V _k X P _t NR			6,4 2,5 28,5 46	4,1 2,0 11,7 37	2,8 1,7 5,6 30	1,9 1,3 2,5 21	1,6 1,2 1,8 18
1200	333,3	V _k X P _t NR			7,7 3,0 41,1 51	4,9 2,4 16,9 42	3,4 2,0 8,1 34	2,5 1,7 4,4 28	1,9 1,5 1,6 23
1400	388,9	V _k X P _t NR				5,7 2,8 23,0 46	4,0 2,3 11,1 38	2,9 2,0 6,0 28	2,2 1,7 3,5 26
1600	444,4	V _k X P _t NR				6,5 3,2 30,0 49	4,5 2,7 14,5 41	3,3 2,3 7,8 35	2,6 2,0 4,6 30
1800	500,0	V _k X P _t NR				7,4 3,6 38,0 52	5,1 3,0 18,3 44	3,8 2,6 9,9 38	2,9 2,2 5,8 33
2000	555,6	V _k X P _t NR					5,7 3,3 22,6 47	4,2 2,9 12,2 41	3,2 2,5 7,1 35
2500	694,4	V _k X P _t NR					7,1 4,2 35,3 52	5,2 3,6 19,1 46	4,0 3,1 11,2 41
3000	833,3	V _k X P _t NR						6,3 4,3 27,4 51	4,8 3,7 16,1 45
3500	972,2	V _k X P _t NR						7,3 5,0 37,3 54	5,6 4,4 21,9 49
4000	1111,1	V _k X P _t NR						8,3 5,7 48,8 58	6,4 5,0 28,6 52

SYMBOLS:

V_k = Effective speed in m/s

X = radius in meters

P_t = total pressure in Pa

NR = noise level indicator in dB

While selecting You must take into account the noise level and range of the stream. The range given in the table refers to the maximum velocity in the operating area equal to 0,25 m/s

RAPID SELECTION TABLE AN AN III

stream size		size	1	2	4	6	7
(m ³ /h)	(l/s)	A _k	0,0089	0,0200	0,0355	0,0554	0,0798
100	27,8	V _k X P _t NR	3,1 0,6 8,5 17				
120	33,3	V _k X P _t NR	3,7 0,7 12,2 22				
140	38,9	V _k X P _t NR	4,4 0,8 16,6 25	1,9 0,6 3,3 9			
160	44,4	V _k X P _t NR	5,0 1,0 21,7 29	2,2 0,6 4,3 12			
180	50,0	V _k X P _t NR	5,6 1,1 27,5 32	2,5 0,7 5,4 15			
200	55,6	V _k X P _t NR	6,2 1,2 33,9 34	2,8 0,8 6,7 18	1,6 0,6 2,1 6		
250	69,4	V _k X P _t NR	7,8 1,5 53,0 40	3,5 1,0 10,5 23	2,0 0,8 3,3 12		
300	83,3	V _k X P _t NR	9,4 1,8 76,3 44	4,2 1,2 15,1 28	2,3 0,9 4,8 16	1,5 0,7 2,0 7	
350	97,2	V _k X P _t NR		4,9 1,4 20,6 32	2,7 1,1 6,5 20	1,8 0,8 2,7 11	
400	111,1	V _k X P _t NR		5,6 1,6 26,9 35	3,1 1,2 8,5 23	2,0 1,0 3,5 14	
450	125,0	V _k X P _t NR		6,3 1,8 34,0 38	3,5 1,4 10,8 26	2,3 1,1 4,4 17	1,6 0,9 2,1 10
500	138,9	V _k X P _t NR		6,9 2,0 42,0 40	3,9 1,5 13,3 29	2,5 1,2 5,5 20	1,7 1,0 2,6 12

stream size		size	1	2	4	6	7
(m ³ /h)	(l/s)	A _k	0,0109	0,0244	0,0435	0,0679	0,0978
600	166,7	V _k X P _t NR			4,7 1,8 19,2 33	3,0 1,4 7,9 24	2,1 1,2 3,8 17
700	194,4	V _k X P _t NR			5,5 2,1 16,1 37	3,5 1,7 10,7 28	2,4 1,4 5,2 21
800	222,2	V _k X P _t NR			6,3 2,4 34,1 40	4,0 1,9 14,0 31	2,8 1,6 6,7 24
900	250,0	V _k X P _t NR			7,0 2,7 43,1 43	4,5 2,2 17,7 34	3,1 1,8 8,5 27
1000	277,8	V _k X P _t NR			7,8 3,0 53,3 46	5,0 2,4 21,9 37	3,5 2,0 10,5 29
1200	333,3	V _k X P _t NR				6,0 2,9 31,5 41	4,2 2,4 15,2 34
1400	388,9	V _k X P _t NR				7,0 3,4 42,9 45	4,9 2,8 20,7 38
1600	444,4	V _k X P _t NR				8,0 3,9 56,0 48	5,6 3,2 27,0 41
1800	500,0	V _k X P _t NR					6,3 3,6 34,2 44
2000	555,6	V _k X P _t NR					7,0 4,0 42,2 47
2500	694,4	V _k X P _t NR					8,7 5,0 65,9 52
3000	833,3	V _k X P _t NR					10,4 6,0 94,9 57

SYMBOLS:

V_k = Effective speed in m/s

X = radius in meters

P_t = total pressure in Pa

NR = noise level indicator in dB

While selecting You must take into account the noise level and range of the stream. The range given in the table refers to the maximum velocity in the operating area equal to 0,25 m/s

2.1 AN

square supply diffusers

RAPID SELECTION TABLE AN II

2

Size strumienia		Wymiar	1	2	4	6	7	8	9
(m ³ /h)	(l/s)	A _k	0,0096	0,0215	0,0383	0,0598	0,0863	0,1174	0,1534
50	13,9	V _k X P _t NR	1,4 0,9 1,5						
60	16,7	V _k X P _t NR	1,7 1,1 2,1 9						
70	19,4	V _k X P _t NR	2,0 1,2 2,9 13	0,9 0,8 0,6					
80	22,2	V _k X P _t NR	2,3 1,4 3,8 16	1,0 0,9 0,6					
90	25,0	V _k X P _t NR	2,6 1,6 4,7 19	1,2 1,1 0,9					
100	27,8	V _k X P _t NR	2,9 1,8 5,9 22	1,3 1,2 1,2 5					
120	33,3	V _k X P _t NR	3,5 2,1 8,4 26	1,6 1,4 1,7 9	0,9 1,1 0,5				
140	38,9	V _k X P _t NR	4,1 2,5 11,5 30	1,8 1,6 2,3 13	1,0 1,2 0,5				
160	44,4	V _k X P _t NR	4,6 2,8 15,0 33	2,1 1,9 3,0 16	1,2 1,4 0,9				
180	50,0	V _k X P _t NR	5,2 3,2 19,0 36	2,3 2,1 3,8 19	1,3 1,6 1,2 7				
200	55,6	V _k X P _t NR	5,8 3,5 23,4 39	2,6 2,3 4,7 22	1,5 1,8 1,5 10				
250	69,4	V _k X P _t NR	7,2 4,4 36,6 44	3,2 2,9 7,3 28	1,8 2,2 2,3 15	0,8 1,5 0,5			
300	83,3	V _k X P _t NR		3,9 3,5 10,5 32	2,2 2,6 3,3 20	1,0 1,8 0,7			

Size strumienia		Wymiar	1	2	4	6	7	8	9
(m ³ /h)	(l/s)	A _k	0,0096	0,0215	0,0383	0,0598	0,0863	0,1174	0,1534
350	97,2	V _k X P _t NR		4,5 4,1 14,3 36	2,5 3,1 4,5 24	1,6 2,5 1,9 15	1,1 2,0 0,9 7	0,8 1,8 0,5	
400	111,1	V _k X P _t NR		5,2 4,7 18,7 39	2,9 3,5 5,9 27	1,9 2,8 2,4 18	1,3 2,3 1,2 10	0,9 2,0 0,6	
500	138,9	V _k X P _t NR		6,5 5,8 29,2 45	3,6 4,4 9,2 33	2,3 3,5 3,8 23	1,6 2,9 1,8 16	1,2 2,5 1,0 9	0,9 2,2 0,6
600	166,7	V _k X P _t NR			4,4 5,3 13,3 37	2,8 4,2 5,4 28	1,9 3,5 2,6 20	1,4 3,0 1,4 14	1,1 2,6 0,8 8
700	194,4	V _k X P _t NR			5,1 6,1 18,0 41	3,3 4,9 7,4 32	2,3 4,1 3,6 24	1,7 3,5 1,9 18	1,3 3,1 1,1 12
800	222,2	V _k X P _t NR			5,8 7,0 23,6 44	3,7 5,6 9,7 35	2,6 4,7 4,6 27	1,9 4,0 2,5 21	1,4 3,5 1,5 15
900	250,0	V _k X P _t NR			6,5 7,9 29,8 47	4,2 6,3 12,2 38	2,9 5,3 5,9 30	2,1 4,5 3,2 24	1,6 3,9 1,9 18
1000	277,8	V _k X P _t NR				4,6 7,0 15,1 41	3,2 5,8 7,3 33	2,4 5,0 3,9 26	1,8 4,4 2,3 21
1200	333,3	V _k X P _t NR				5,6 8,4 21,7 45	3,9 7,0 10,4 37	2,8 6,0 5,6 31	2,2 5,3 3,3 25
1400	388,9	V _k X P _t NR				6,5 9,8 29,6 49	4,5 8,2 14,2 41	3,3 7,0 7,7 35	2,5 6,1 4,5 29
1600	444,4	V _k X P _t NR					5,1 9,3 18,6 44	3,8 8,0 10,0 38	2,9 7,0 5,9 33
1800	500,0	V _k X P _t NR					5,8 10,5 23,5 47	4,3 9,0 12,7 41	3,3 7,9 7,4 35
2000	555,6	V _k X P _t NR					6,4 11,7 29,0 50	4,7 10,0 15,7 44	3,6 8,8 9,2 38

SYMBOLS:

V_k = Effective speed in m/s

X = radius in meters

P_t = total pressure in Pa

NR = noise level indicator in dB

While selecting You must take into account the noise level and range of the stream. The range given in the table refers to the maximum velocity in the operating area equal to 0,25 m/s

EXAMPLE OF SELECTION

REQUIREMENTS:

Volume flow:	400 m ³ /h
range	of 1 do 1,5 m.
noise level:	below 30 dB
use:	private clinics and offices
required pressure loss of	less than 10 Pa
Outflow speed	less than 3 m/s
number of directions	4

PROPOSAL:

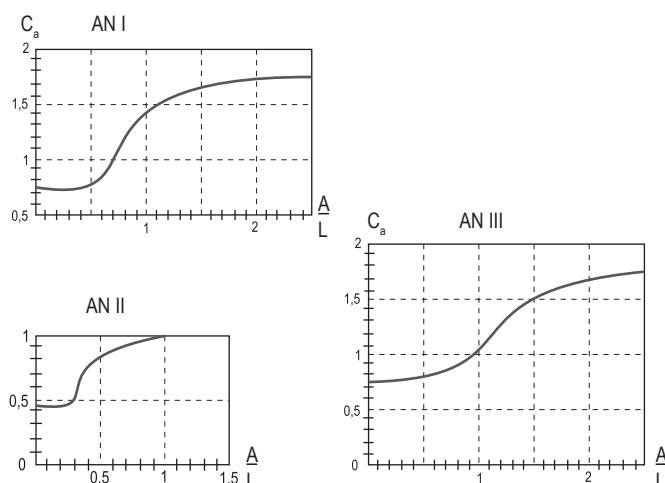
Based on the rapid selection table for the diffusers type AN IV and based on the general principles of ventilation comfort, we get the recommended outflow rate, the recommended value for this type of diffuser in the range of 2 to 3.5 m/s:

Q (stream)	400 m ³ /h (166 l/s)
X (range)	1,3 m.
NR (noise level)	24 dB
P _t (pressure loss)	4,6 Pa
V _k (effective speed)	2,6 m/s

AN diffuser type IV, the size (300x300 mm) (optionally can be equipped with an adjustable damper and mounting system). The obtained parameters show that the proposed solution met the requirements.

CORRECTION FACTOR FOR THE RATIO OF WIDTH / LENGTH OF THE ROOM

This ratio is called Ca. It is obtained from the ratio of the width to the length of the room. Rate applicable for the AN I, AN II, AN III diffusers. value of the indicator for type IV AN, AN II is 1, since both were tested in the square area (A / L = 1).



CORRECTION FACTOR FOR THE DISTANCE FROM THE DIFFUSER TO THE CEILING (CH)

In the case of the adjacent stream, when the diffuser is installed in one line with the ceiling, the value of Ch = 1
 For any stream when the diffuser is at a distance from the ceiling, Ch = 1,4. Adjusted range (XC) is obtained from the equation:

$$X_c = X * C_a * C_h$$

TIPS

1 THE MAXIMUM DISTANCE FROM THE CEILING TO THE DIFFUSER.

For the adjacent stream, it is recommended not to exceed the recommended in the table below the maximum distance from the ceiling to the diffuser (h max.) and the temperature difference ΔT (temperature difference between supplied air and room air).

Type AN IV:

$\Delta t(^{\circ}\text{C})$	0	6	9	12
hh max (m)	0,20	0,10	0,07	0,05

Types AN I, AN II, AN III:

$\Delta t(^{\circ}\text{C})$	0	6	9	12
hh max (m)	0,38	0,21	0,14	0,11

2. THE MINIMUM RECOMMENDED VELOCITY IN THE OPERATING AREA:

Due to the temperature difference between the room air and cold air supplied to the room, the following minimum velocity Vz is recommended:

Type AN IV:

$\Delta t(^{\circ}\text{C})$	0	6	9	12
V _z (m/s)	0,15	0,15	0,20	0,25

Types AN II:

$\Delta t(^{\circ}\text{C})$	0	6	9	12
V _z (m/s)	0,15	0,18	0,23	0,28

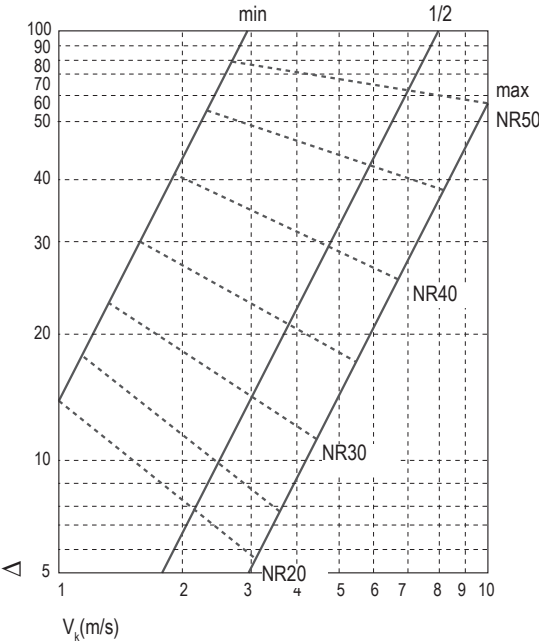
Typy AN I, AN III: (Diffuser close to the exterior wall / interior)

$\Delta t(^{\circ}\text{C})$	0	6	9	12
V _z (m/s)	0,15	0,20	0,25	0,30
	0,15	0,25	0,30	0,35

square supply diffusers

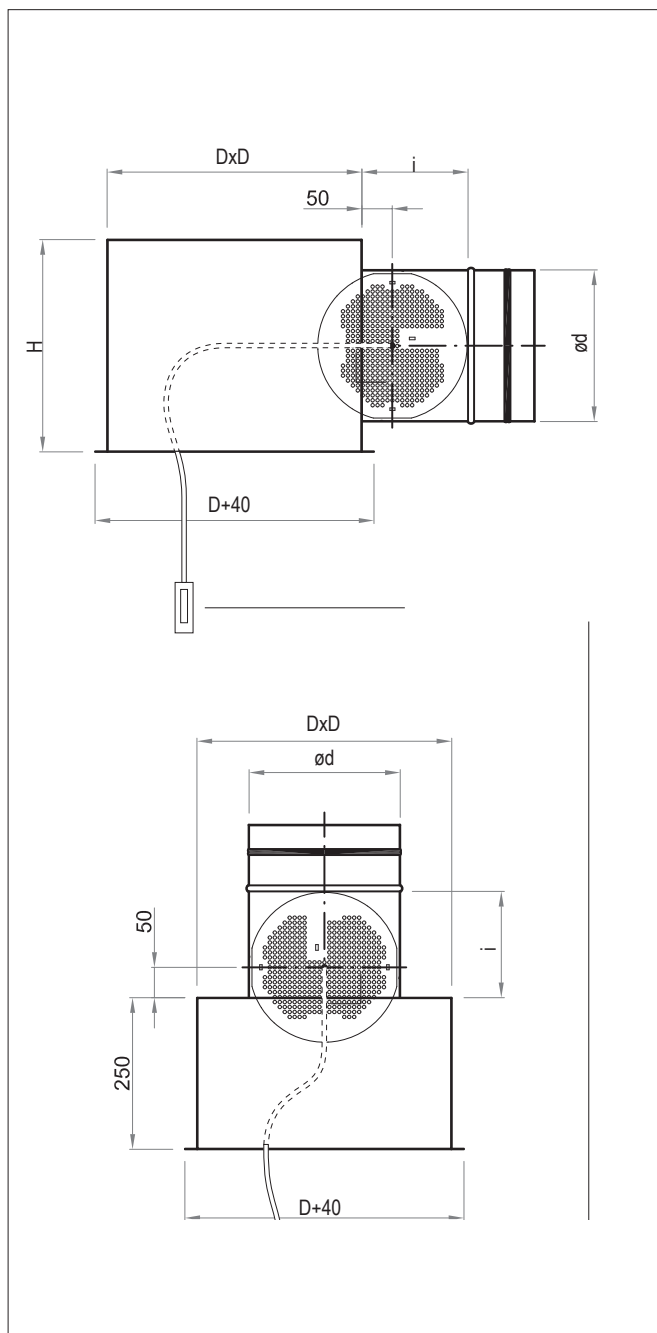
3. DAMPER ADJUSTING THE VOLUME FLOW RATE PP

2



Using the table shown below, use a correction factor to the noise level as a function of the diffuser A_k

A_k (m ²)	0,01	0,02	0,03	0,05	0,1	0,2
NR - wsp. popr.	-5,2	-1,9	0	2,4	5,8	9,1



Expansion boxes can be connected to the ventilation installation through the side or top.

Boxes can be thermally and acoustically insulated from the inside by K-Flex rubber mat.

Upon customer's request we can make other types of expansion boxes accordingly to provided drawings. .

ORDER REFERENCE

SR / AN - 4 - PZ - I - g

b side connection

g top connection

_ non-insulated

I insulated

_ no throttle

PW throttle controlled from inside.

PZ throttle controlled from outside.

size

diffuser type

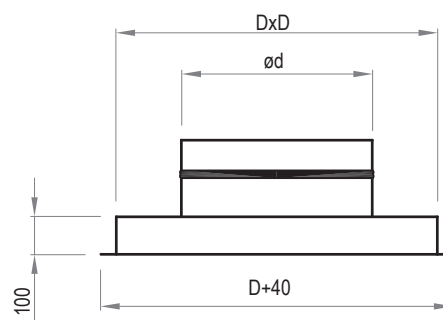
SR expansion box

PS spiro transition

STANDARD SIZES

	1	2	3	4	5	6	7	8
D [mm]	170	220	270	320	370	420	470	520
H[mm]	260	300	350	420	470	520	570	620
Ød [mm]	158	198	248	313	370	420	470	520
i [mm]	130	150	175	210	240	270	300	330

PS - Spiro transition



DESCRIPTION

SR/AN are expansion boxes for AN diffusers. They stabilize the air-flow and ensure uniform air supply to the diffuser. Expansion boxes connect diffusers with ventilation installation. They are made of zinc-coated sheet, joint by non-welded Click-Clock connection.

2.1 SR/AN

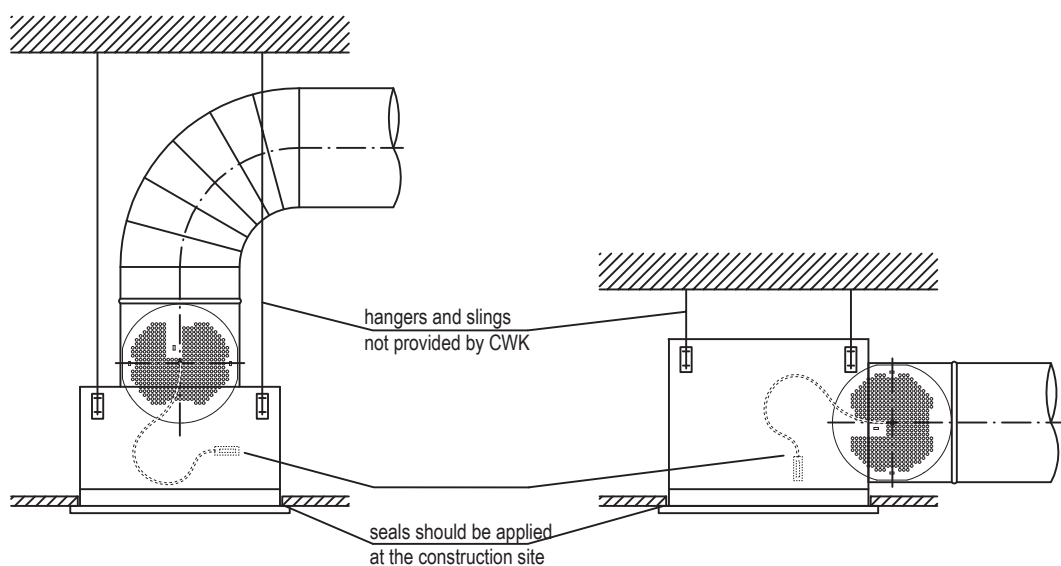
expansion boxes for diffusers AN

INSTALLATION

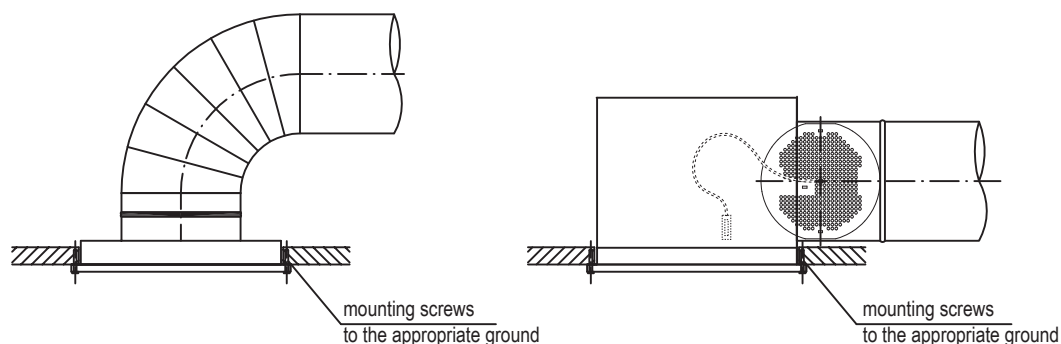
2

Expansion boxes SR/AN are designed for installation in the underslung ceilings. Prepare an installation hole of a size ØD mm. The box can be mounted on the ceiling by appropriate hangers (bars, pins...) or installation slings, or can be mounted directly on the underslung ceiling plane. Upon customer's request, boxes can be equipped with factory slings.

INSTALLATION IN THE ROOF



ASSEMBLY FOR SUSPENDED CEILING





DESCRIPTION

ASPs are rectangle supply ceiling diffusers for low- and mid-pressure systems. They can be used for both air supply and exhaust systems. They are installed in rooms up to 4m high. They are adjusted to work with constant and variable airflow. The supplied air can be 10°C cooler than the temperature inside the room. Thanks to fixed blades, they can be used for horizontal air supply. It is recommended to install them horizontally in the ceiling.

FEATURES

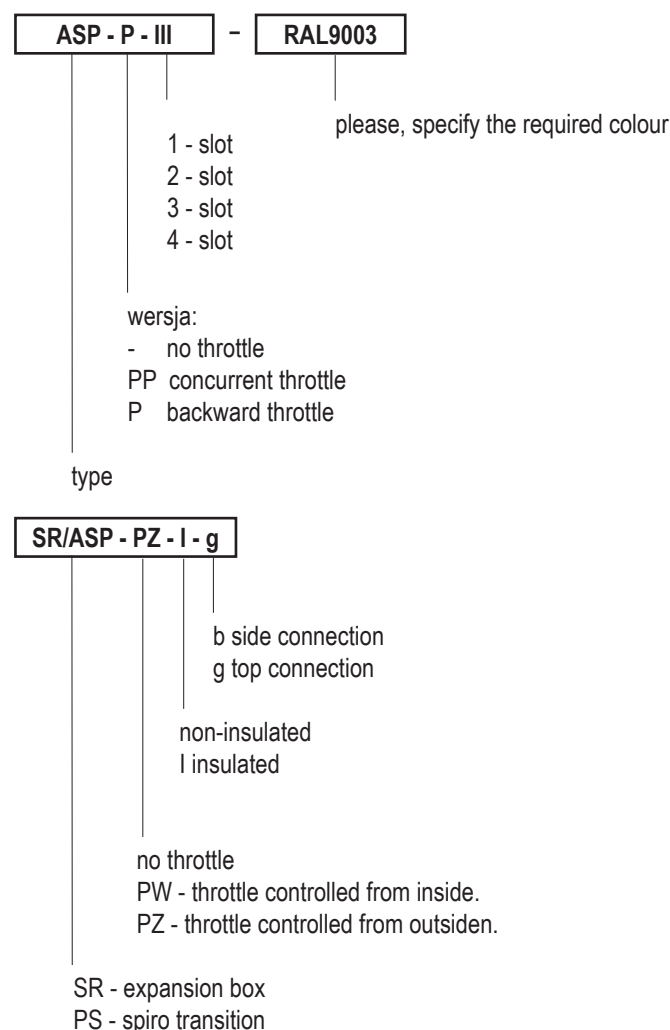
- ceiling diffusers are made of aluminium profiles, default colour: RAL 9003
- ASP-P ceiling diffusers are additionally equipped with a damper which allows for adjustment of air-flow efficiency
- damper lamels are made of aluminium-zinc coated profiled metal sheet
- 4 variants available
- available for set-up with a SR/ASP plenum box
- on special request, it can be manufactured in any size and RAL colour

TECHNICAL DESCRIPTION

The ASP air diffuser is made of aluminium blades and a steel front panel, all painted with white polyester paint (RAL 9003 by default). The air vent assures air-supply in four directions. The central cone and blades are fastened to an external frame, which makes them virtually invisible. The diffuser can be connected to a system of canals via an adjustment plenum box.

sizes	E	F	Z	X	D1
1x600	595	473	310	438	248
2x600	595	473	310	374	248
3x600	595	473	370	310	313
4x600	595	473	370	247	313
1x625	620	498	310	465	248
2x625	620	498	310	399	248
3x625	620	498	370	335	313
4x625	620	498	370	272	313
1x675	670	548	310	513	248
2x675	670	548	310	449	248
3x675	670	548	370	385	313
4x675	670	548	370	322	313

ORDER REFERENCE



2.2 ASP

ceiling diffusers with a full plate

RECOMMENDED SPEED

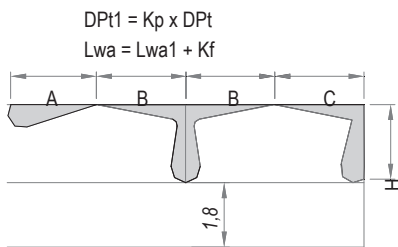
ASP	Vmin m/s	Vmax m/s
1 x 600 / 625 / 675	2,5	4,5
2 x 600 / 625 / 675	2,5	4,5
3 x 600 / 625 / 675	2,5	4,5
4 x 600 / 625 / 675	2,5	4,5

CONNECTION DIAMETER m²

ASP	Afree m ²	Qmin m ³ /h	Qmax m ³ /h
1x600	.0269	242	455
2x600	.0449	404	760
3x600	.0604	545	1020
4x600	.0732	658	1240

CORRECTION FACTOR FOR DPT AND LWA1

ASP		100% Open	50% Open	10% Open
1 x 600 / 625 / 675	Dpt (Kp)	1	1,82	4,55
	Lwa1 (Kf)	+0	+6	+15
2 x 600 / 625 / 675	Dpt (Kp)	1	4,38	7,5
	Lwa1 (Kf)	+0	+6	+15
3 x 600 / 625 / 675	Dpt (Kp)	1	4,17	8,33
	Lwa1 (Kf)	+0	+6	+16
4 x 600 / 625 / 675	Dpt (Kp)	1	3	18
	Lwa1 (Kf)	+0	+7	+16

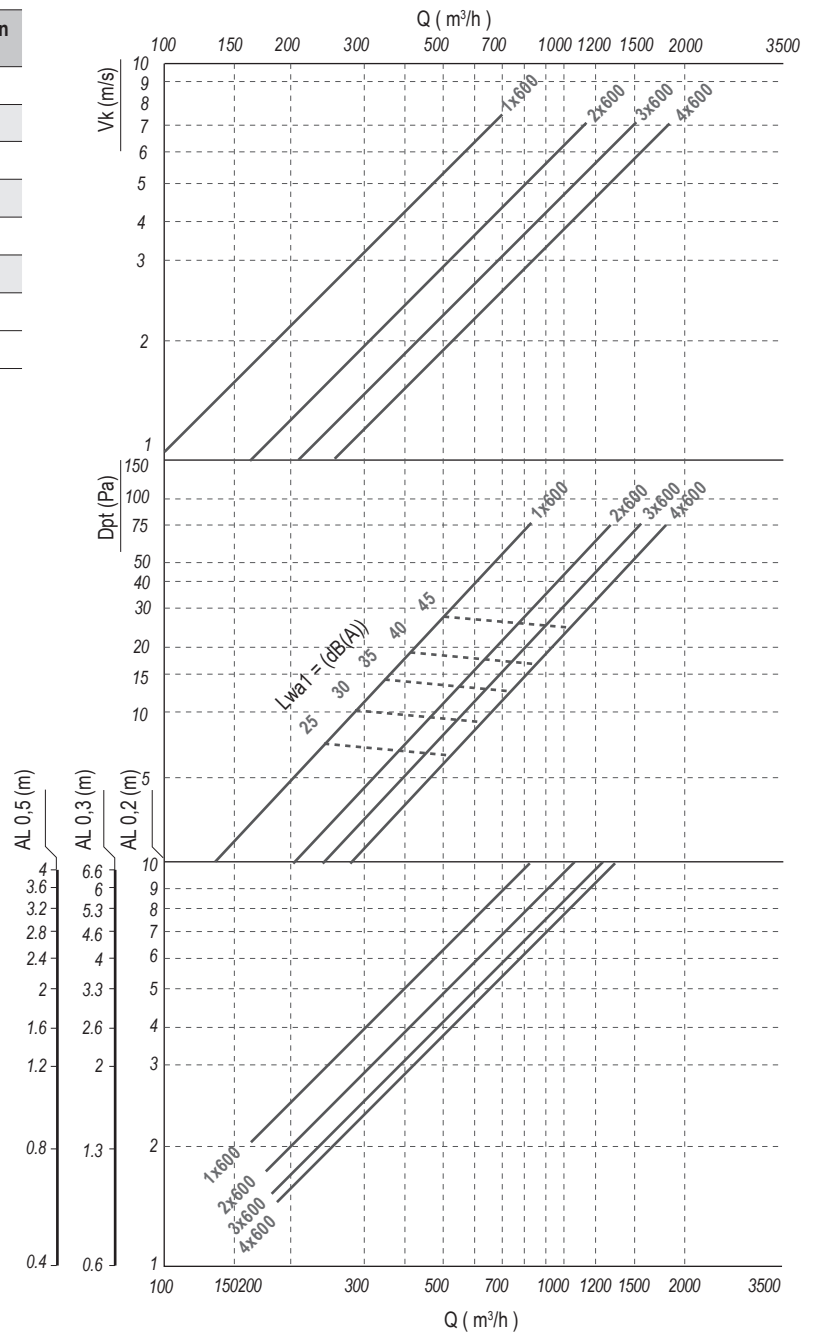


$$AL_{0,2} = A$$

$$AL_{0,2} = B + H$$

$$AL_{0,2} = C + H$$

THE SPEED OF THE CONNECTION, PRESSURE LOSS



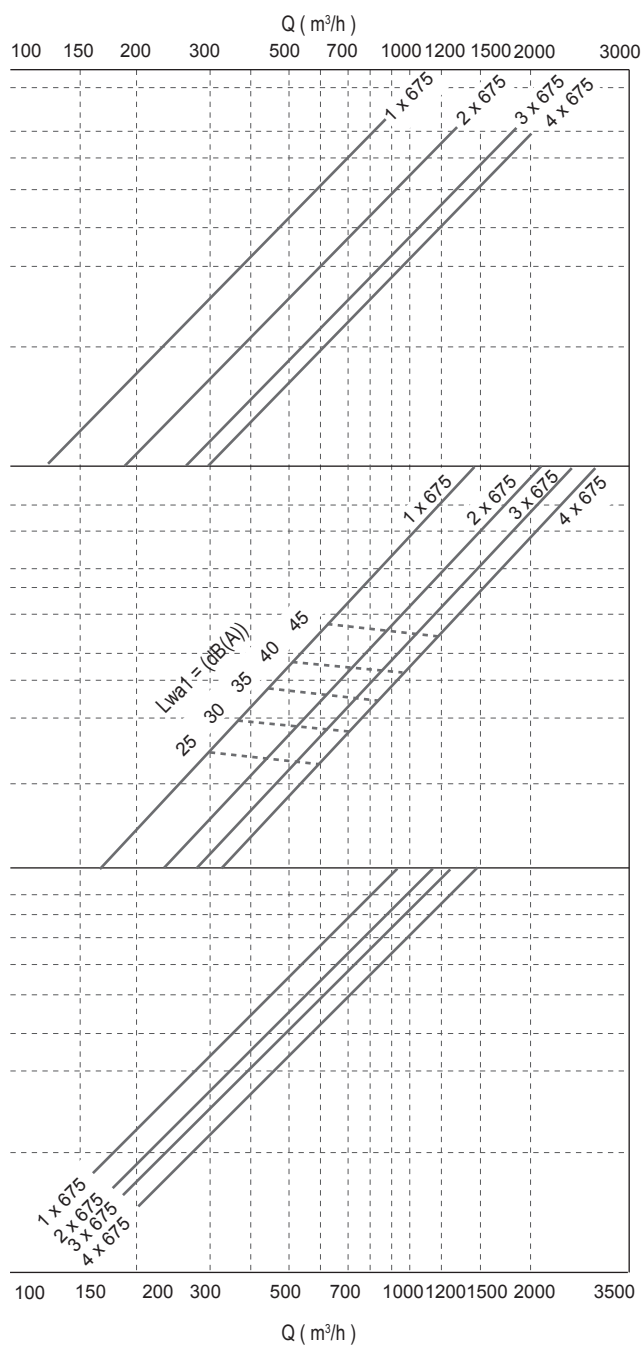
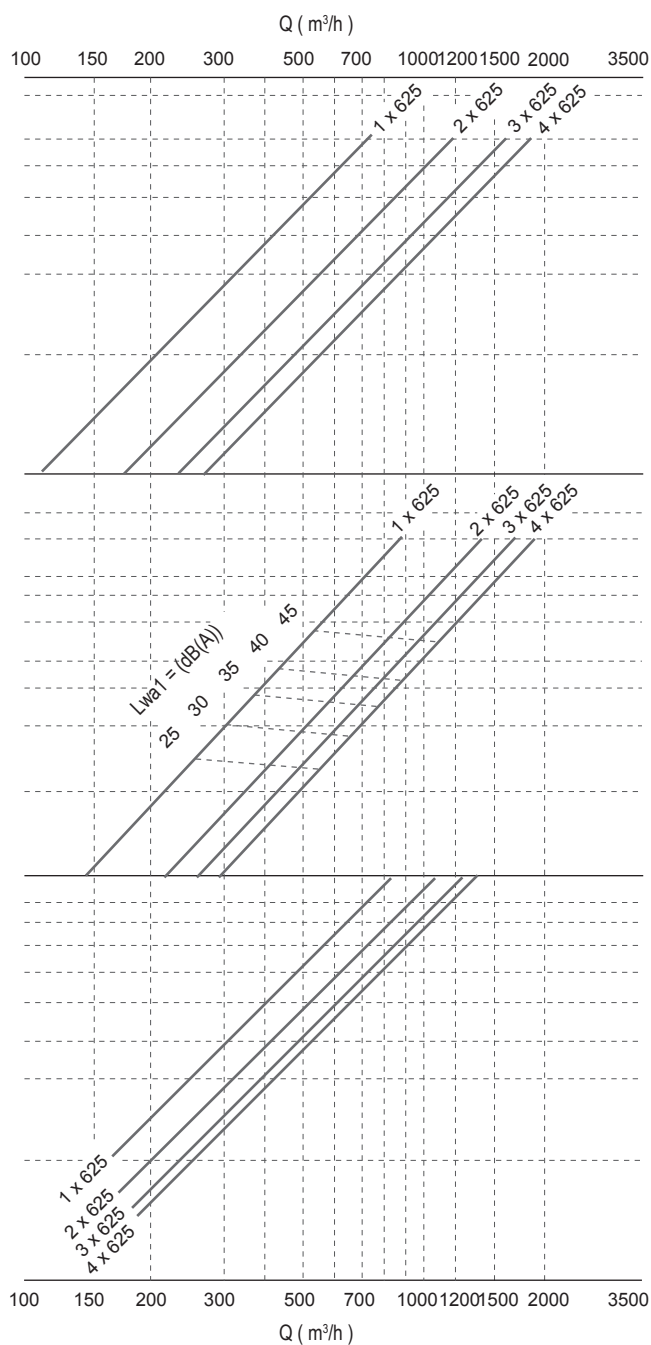
CONNECTION DIAMETER m²

ASP	Afree m ²	Qmin m ³ /h	Qmax m ³ /h
1x625	.0279	255	445
2x625	.0468	410	795
3x625	.0639	575	1080
4x625	.0762	685	1290

CONNECTION DIAMETER m²

ASP	Afree m ²	Qmin m ³ /h	Qmax m ³ /h
1x675	.0316	285	535
2x675	.0516	465	873
3x675	.0711	640	1200
4x675	.0857	770	1450

AND SOUND LEVEL, VENTILATION COANDY EFFECT. ASP + PLMONOTE:

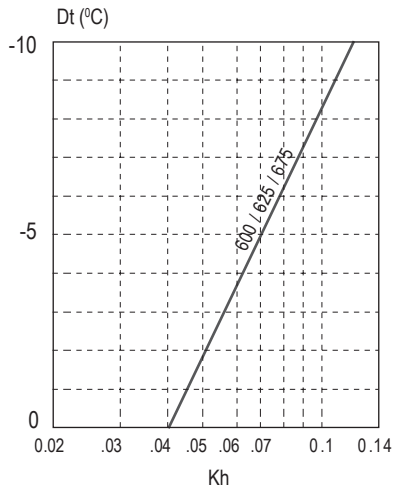


2.2 ASP

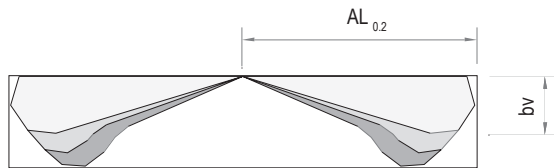
ceiling diffusers with a full plate

2

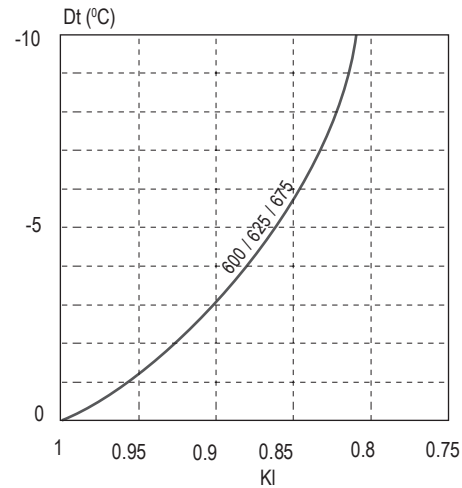
THE CORRECTION FACTOR FOR VERTICAL AIRFLOW (BV) OR AZ DT (-).



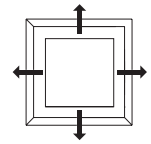
K_h = The correction factor for vertical airflow



THE CORRECTION FACTOR FOR DT(-). RANGE (L0.2) DT(-).



K_I = The correction factor for the range

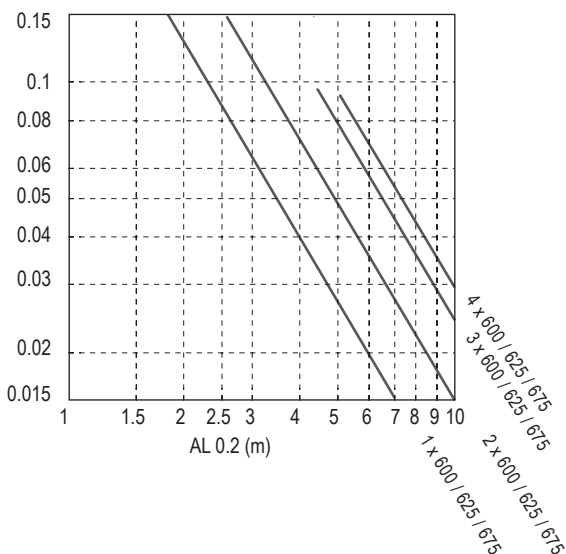


$$b_v = K_h \times AL_{0.2}$$

$$AL'_{0.2} (Dt < 0) = K_I \times AL_{0.2}$$

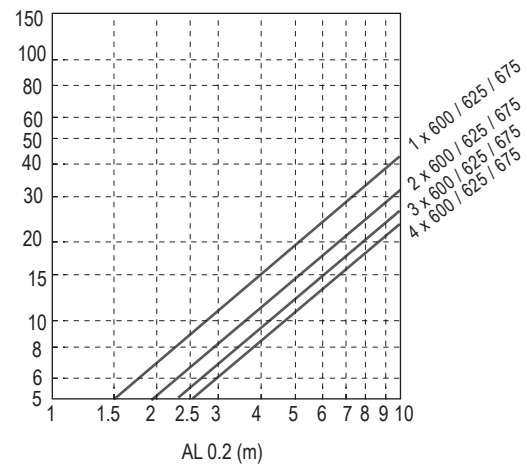
TEMPERATURE DISTRIBUTION

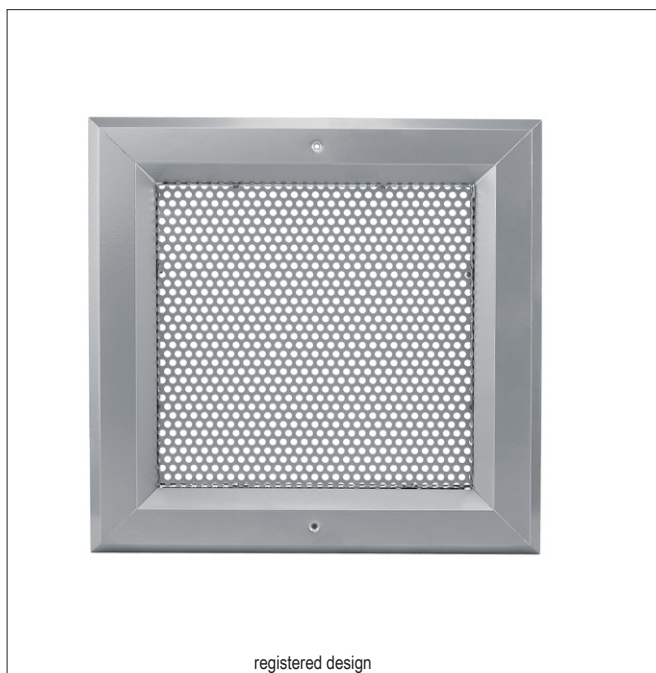
$$\frac{Dtl}{Dtz} = \frac{t_{room} - t_x}{t_{room} - t_{supply}}$$



INDUCTION FACTOR

$$i = \frac{Q_r}{Q_0} = \frac{Q_{whole \text{ in } x}}{Q_{supply}}$$





DESCRIPTION

AW are square exhaust diffusers designed for low- and medium-pressure installations, which can be used with constant and variable airflow. It is recommended they are installed in ceilings plane.

AW-P are square exhaust diffusers equipped with a control throttle. Adjustable angle of the throttle allows for adjusting airflow capacity.

FEATURES

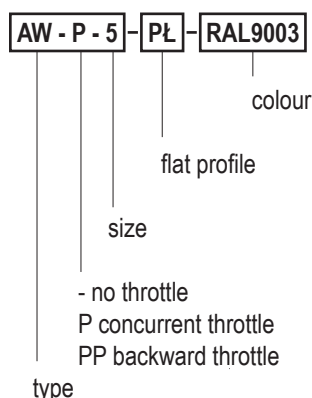
- made of aluminium profiles and decorative perforated sheet, available in standard RAL 9003 colour
- AW-P diffusers are equipped with control throttle that allows for adjusting airflow capacity
- throttle blades made of profiled aluminium-zinc sheet
- can be installed with an expansion can SR/AW
- made in 8 standard sizes
- upon customer's request, gates can be made in any size and colour from RAL palette
- given sizes are sizes of installation holes
- Two types of external profile
- with the size 8, You can choose an external flat profile mounted in the coffered panels 600x600

INSTALLATION

Diffusers AW are designed for installation in the underslung ceilings. They can be installed individually or with the expansion can. Prepare an installation hole of a size $\square C$ and slide the diffuser in. Remember to seal the joints. Fix the diffuser in, using installation holes and appropriate screws.

Installation with the connection can: see SR/AW

ORDER REFERENCE



2.3 AW

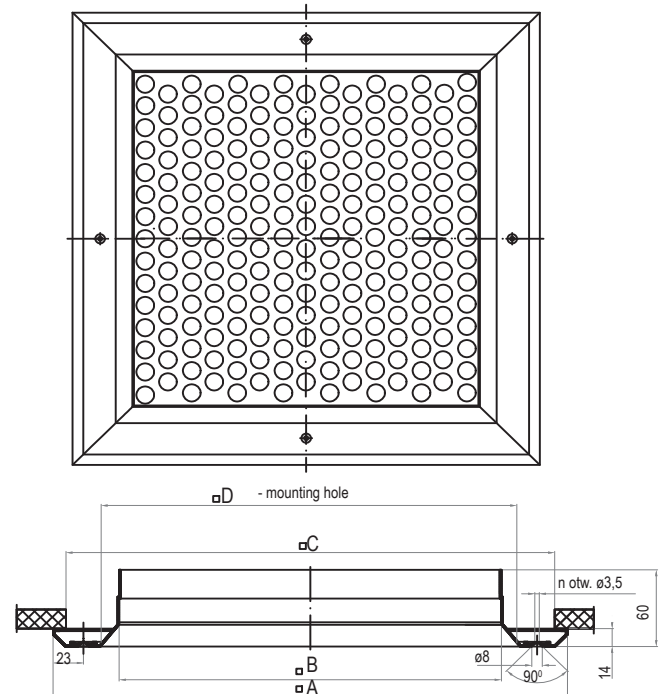
square exhaust diffusers

STANDARD SIZES

2

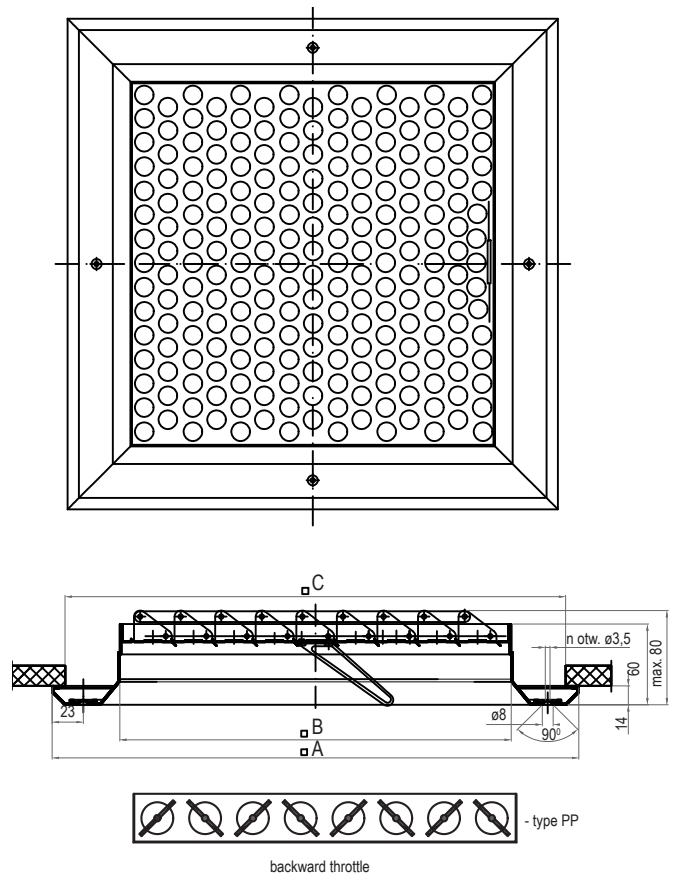
EXHAUST DIFFUSER AW

Nr	1	2	3	4	5	6	7	8
□A [mm]	240	290	340	390	440	490	540	590
□B [mm]	140	190	240	290	340	390	440	490
□C [mm]	215	265	315	365	415	465	515	565
□D [mm]	170	220	270	320	370	420	470	520
n	2				4			
Capacity [m³/h]	15 - 200	25 - 350	45 - 580	65 - 850	85 - 1150	110 - 1550	140 - 1950	170 - 2450
Weight [kg]	0,35	0,47	0,60	0,73	0,85	1,00	1,12	1,30



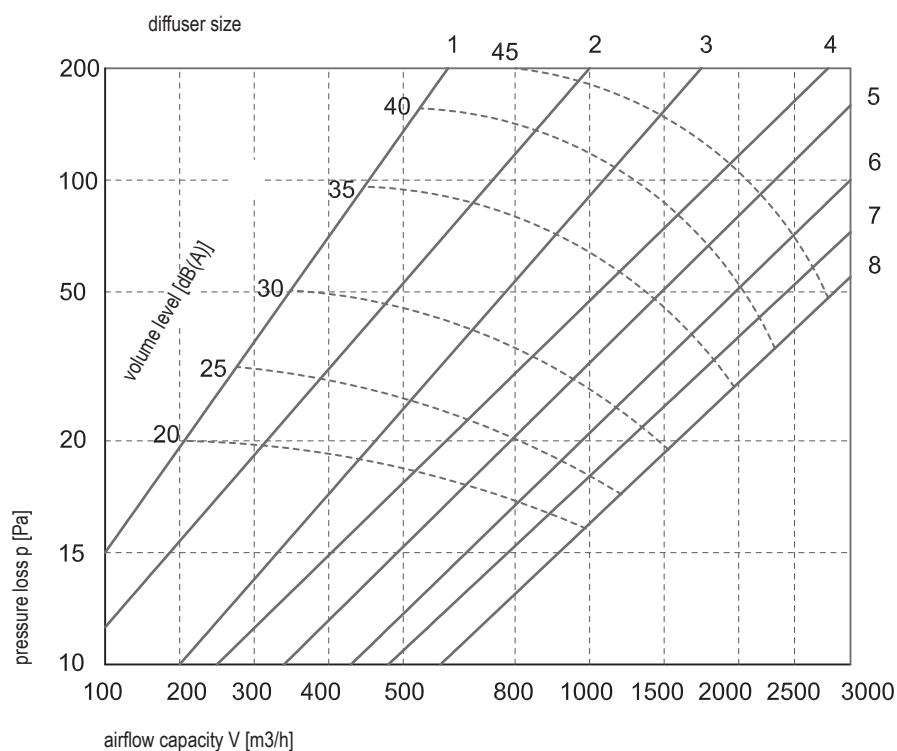
EXHAUST DIFFUSER AW-P

Nr	1	2	3	4	5	6	7	8
□A [mm]	240	290	340	390	440	490	540	590
□B [mm]	140	190	240	290	340	390	440	490
□C [mm]	215	265	315	365	415	465	515	565
□D [mm]	170	220	270	320	370	420	470	520
n	2				4			
Capacity [m³/h]	15 - 200	25 - 350	45 - 580	65 - 850	85 - 1150	110 - 1550	140 - 1950	170 - 2450
Weight [kg]	0,55	0,80	1,00	1,40	1,70	2,20	2,60	3,00



FEATURES

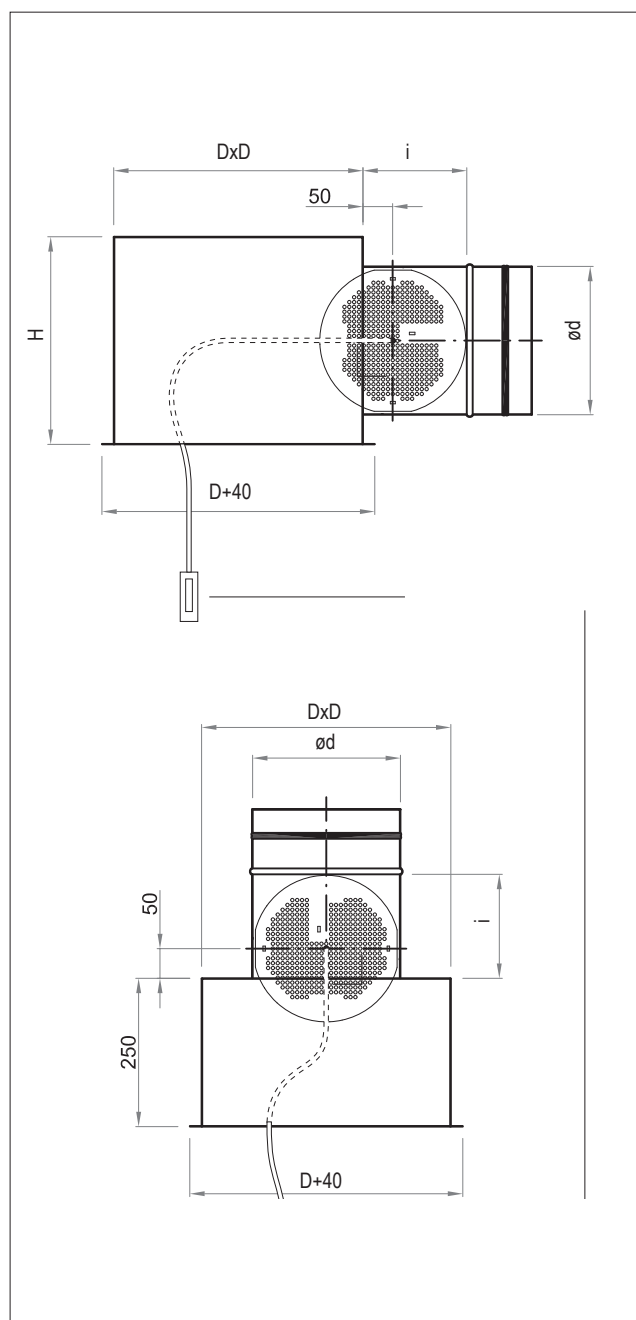
The figure shows airflow capacity V (m³/h), pressure loss p (Pa), airflow scope L (m) for end speed of 0.25 m/s, and volume level [dB(A)].



2.3 SR/AW

expansion boxes for diffusers AW

2



DESCRIPTION

SR/AW are expansion boxes for diffusers AW. They stabilize the airflow and ensure uniform air supply to the diffuser. Expansion boxes connect diffusers with ventilation installation. They are made of zinc-coated sheet, joint by non-welded Click-Clock connection.

In standard expansion boxes are equipped on the ferrule with machine crimped rubber gasket.

Expansion boxes can be connected to the ventilation installation through the side or top.

Boxes can be thermally and acoustically insulated from the inside by K-Flex rubber mat.

Upon customer's request we can make other types of expansion boxes accordingly to provided drawings.

ORDER REFERENCE

SR / AW - 4 - PZ - I - g

b side connection
g top connection

_ non-insulated
I insulated

_ no throttle
PW throttle controlled from inside.
PZ throttle controlled from outside.

size

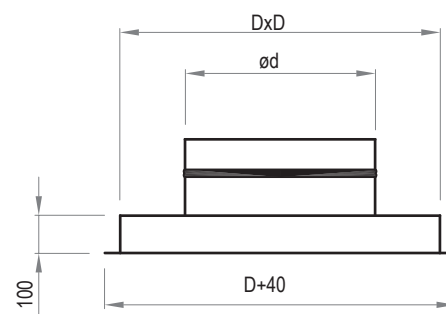
diffuser type

SR expansion box
PS spiro transition

STANDARD SIZES

	1	2	3	4	5	6	7	8
D [mm]	170	220	270	320	370	420	470	520
H[mm]	260	300	350	420				
Ød [mm]	158	198	248	313				
i [mm]	130	150	175	210				

PS - SPIRO TRANSITION

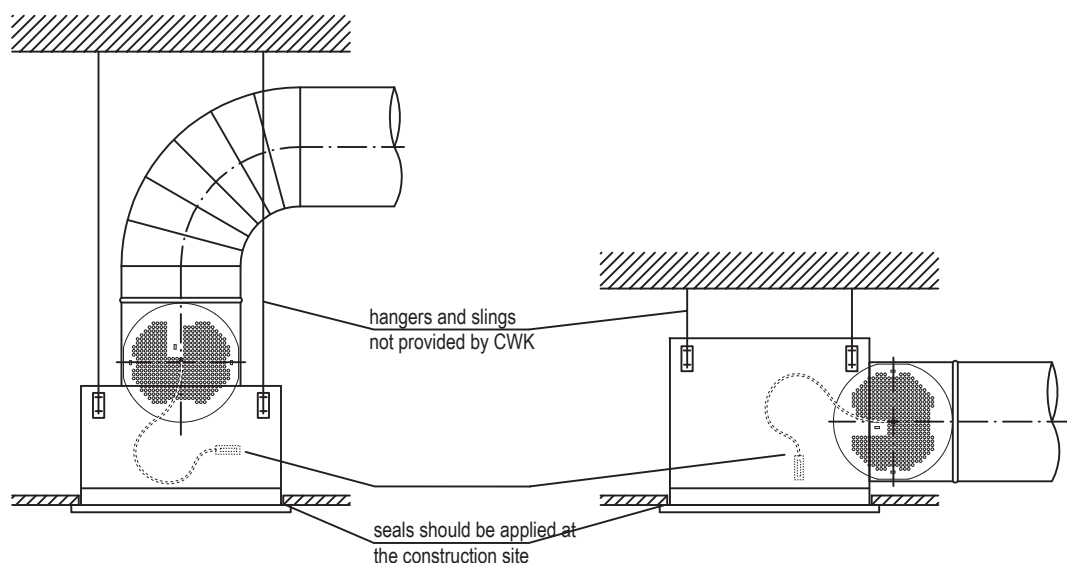


INSTALLATION

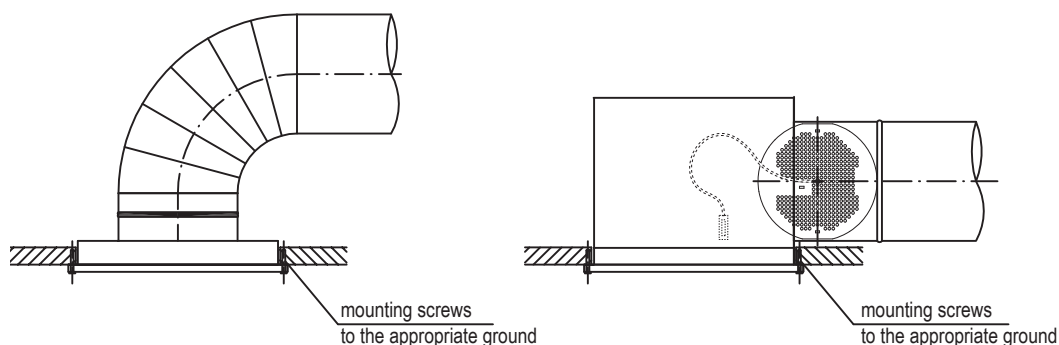
Expansion boxes SR/AW are designed for installation into the under-slung ceilings. Prepare an installation hole of a size ØD mm. The box can be mounted on the ceiling by appropriate hangers (bars, pins...) or installation slings, or can be mounted directly on the underslung ceiling plane. Upon customer's request, boxes can be equipped with factory slings.

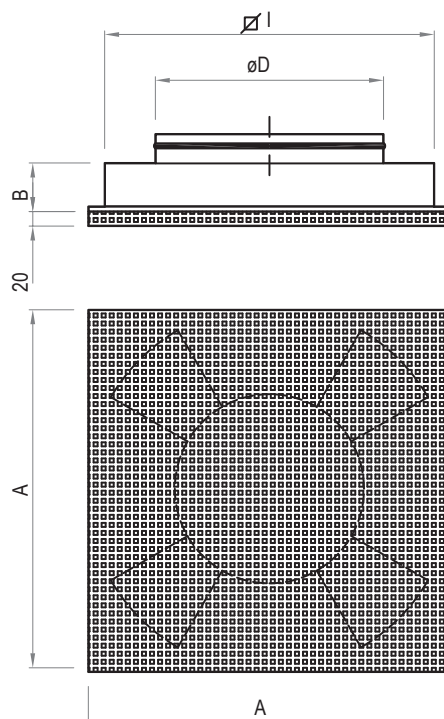
2

INSTALATION IN THE ROOF



ASSEMBLY FOR SUSPENDED CEILING





DESCRIPTION

KPKN, KPKW are square perforated supply-exhaust air grates designed for low- and medium-pressure installations. They can supply or exhaust air and can be used with constant and variable airflow. The air can be supplied at the temperature by 12°C than the temperature in the ventilated room. This makes them appropriate for cooling facilities with special micro-climate requirements.

KPKN are equipped with a regulated screen, which allows for limiting directions of the airflow. It is recommended to install KPKN into the ceiling. KPKW are designed for exhausting air. They are not equipped with screens. Additional features comprise lacunar panel PK used instead underslung ceiling panels.

FEATURES

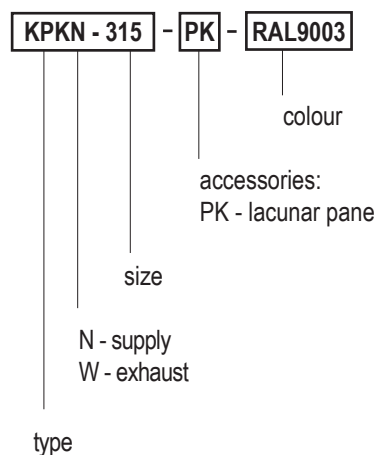
- regulated screen allows of limiting directions for the airflow
- wide throttling scope
- easy installation
- can be installed with an expansion can SR/KPKN
- throttle blades made of zinc-coated steel sheet
- available in standard RAL 9003 colour
- upon customer's request, can be made in any colour from RAL palette

STANDARD SIZES

Size	A [mm]	B [mm]	Ø D [mm]	□ I [mm]
100	250	55	98	205
125	300	55	123	255
160	400	55	158	355
200	500	55	198	455
250	500	55	248	455
315	600	55	313	555
400	600	55	398	555

□ I - installation hole size

ORDER REFERENCE



2.4 KPKN, KPKW

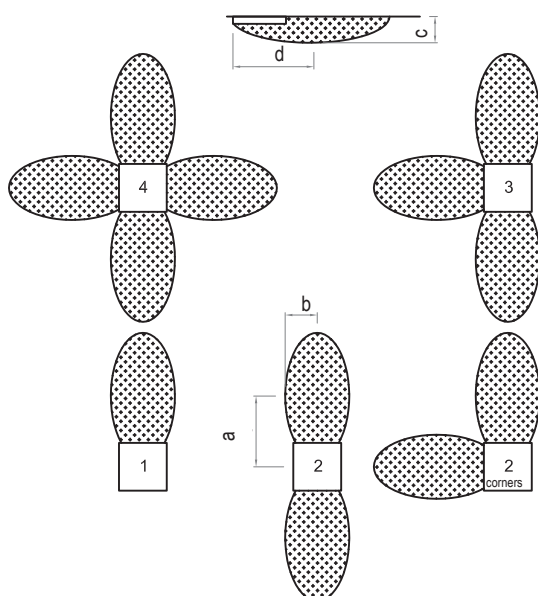
square perforated supply-exhaust air grates

AIR SUPPLY FEATURES

Due to internal manually controlled screen, it is possible to control the number of directions for air supply.

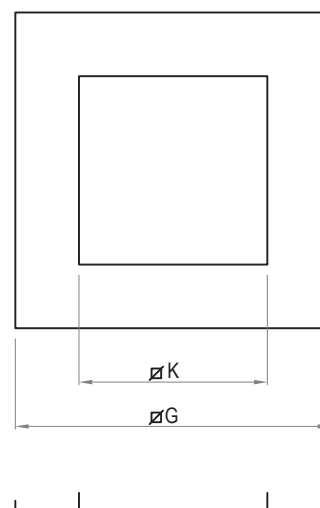
The figures show possible airflow directions. Depending on the number of directions, the airflow scope L (m) for the end speed $v=0.2$ m/s should be reviewed using data from the table below.

	4	3	2	2 corner	1
a	-	0.39	1.0	0.5	0.91
b	-	0.39	0.51	0.41	0.3
c	0.051	0.051	0.049	0.05	0.061
d	0.39	0.39	0.41	0.4	0.41

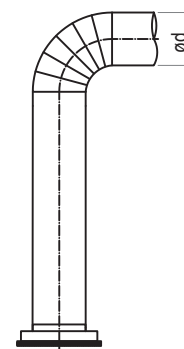


LACUNAR PANEL PK

PK is a lacunar panel for air grates KPKN and KPKW. It is used in place of underslung ceiling panel, if the size of the air grate is smaller than the ceiling panel size.



PK	□ K [mm]	□ G [mm]
100	205	595
125	255	
160	355	
200	455	
250	555	
315	555	
400	555	



INSTALLATION

KPKN, KPKW are connected directly to the expansion box SR/KPKN or optionally to the ventilation duct of a round diameter.

For installation with the expansion box, see: SR/KPKN.

FEATURES

The figure shows airflow capacity V (m³/h), pressure loss p (Pa), air-flow scope L (m) for end speed of 0.2 m/s, and volume level [dB(A)].

The figures relate to the air grate installed into the ceiling. Airflow scope reflects 4-direction airflow option.

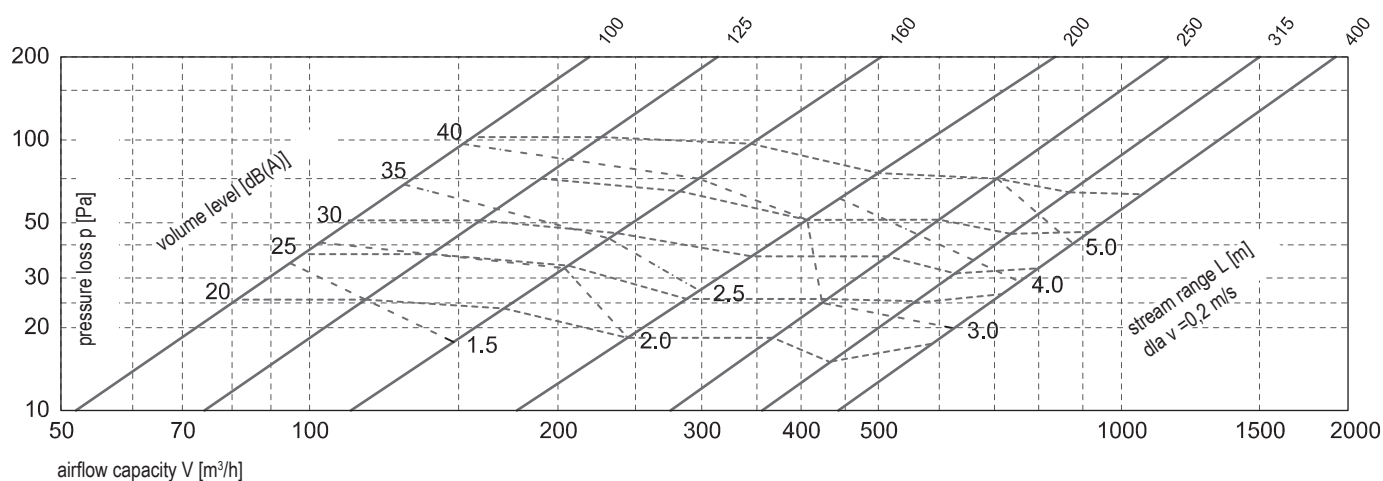
For limited airflow directions the scope should be reviewed using the figures from the table below

1 direction	2 corner directions	3 directions
1,62 - 2,21*	1,19 - 1,53*	1,09 - 1,31*

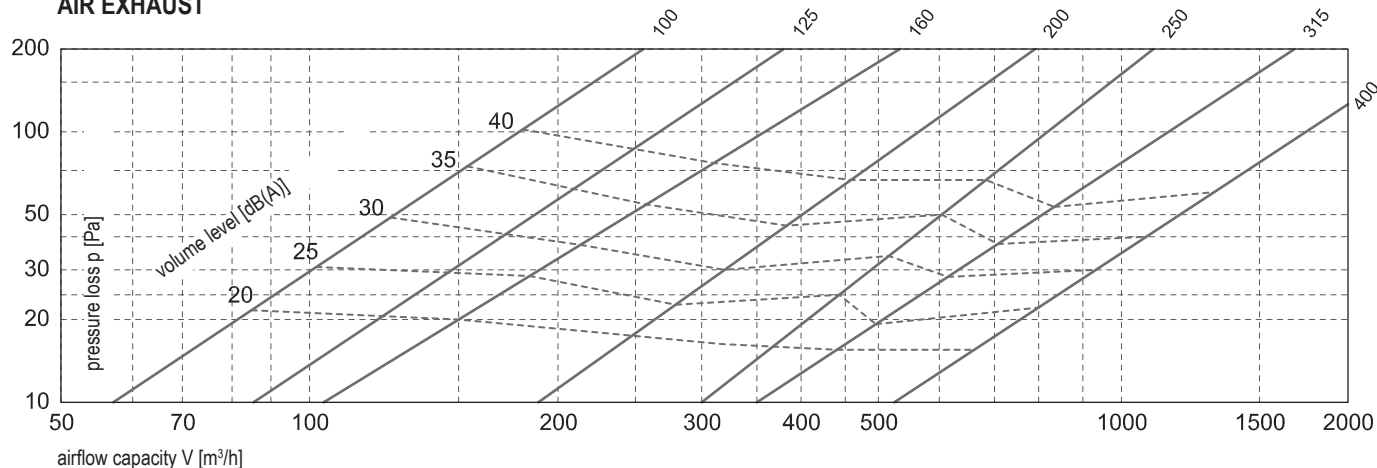
* - depends on the setting of the screen

2

AIR SUPPLY



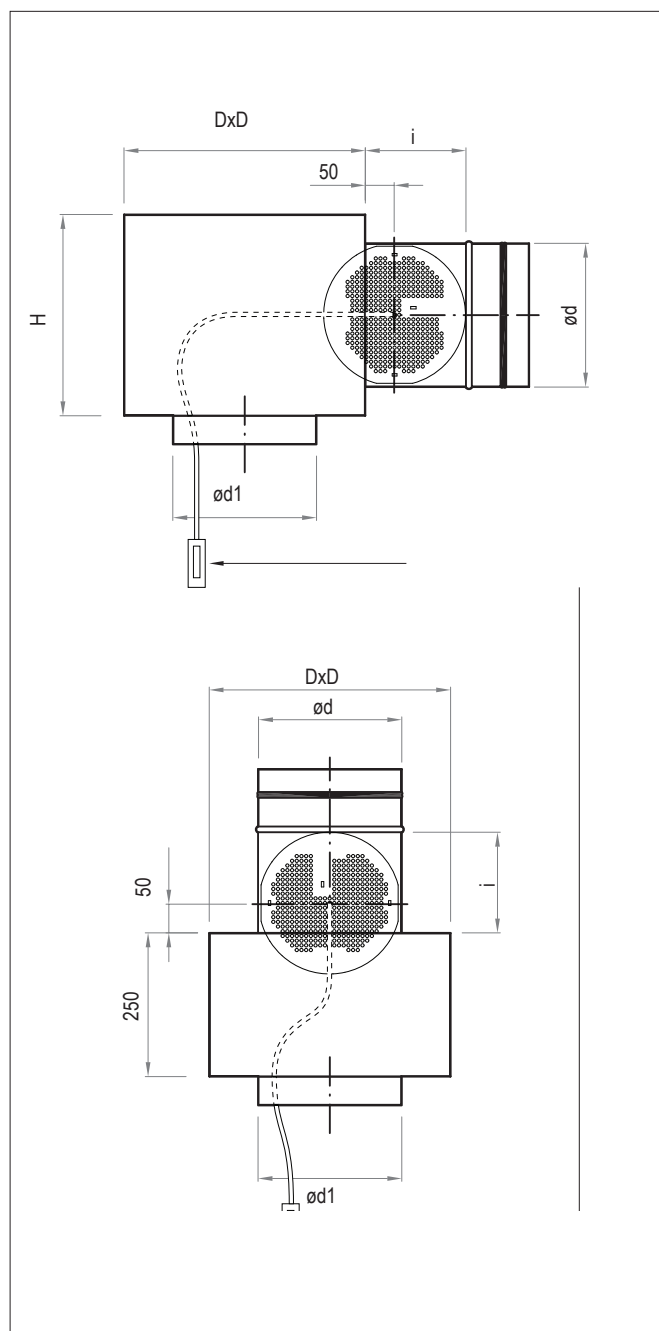
AIR EXHAUST



2.4 SR/KPKN, KPKW

expansion boxes for ceiling air grates KPKN i KPKW

2



Expansion boxes can be connected to the ventilation installation through the side or top. Boxes can be thermally and acoustically insulated from the inside by K-Flex rubber mat.

Upon customer's request we can make other types of expansion boxes accordingly to provided drawings.

ORDER REFERENCE

SR / KPKN - 250 - PZ - I - g

b side connection
g top connection

_ non-insulated
I insulated

_ no throttle
PW throttle controlled from inside.
PZ throttle controlled from outside.

size

diffuser type

STANDARD SIZES

Size	100	125	160	200	250	315	400
D [mm]	200	225	260	300	350	420	500
H [mm]	200	225	260	300	350	420	500
Ød [mm]	78	98	123	158	198	248	313
Ød1 [mm]	100	125	160	200	250	315	400
i [mm]	90	100	115	130	150	175	200

DESCRIPTION

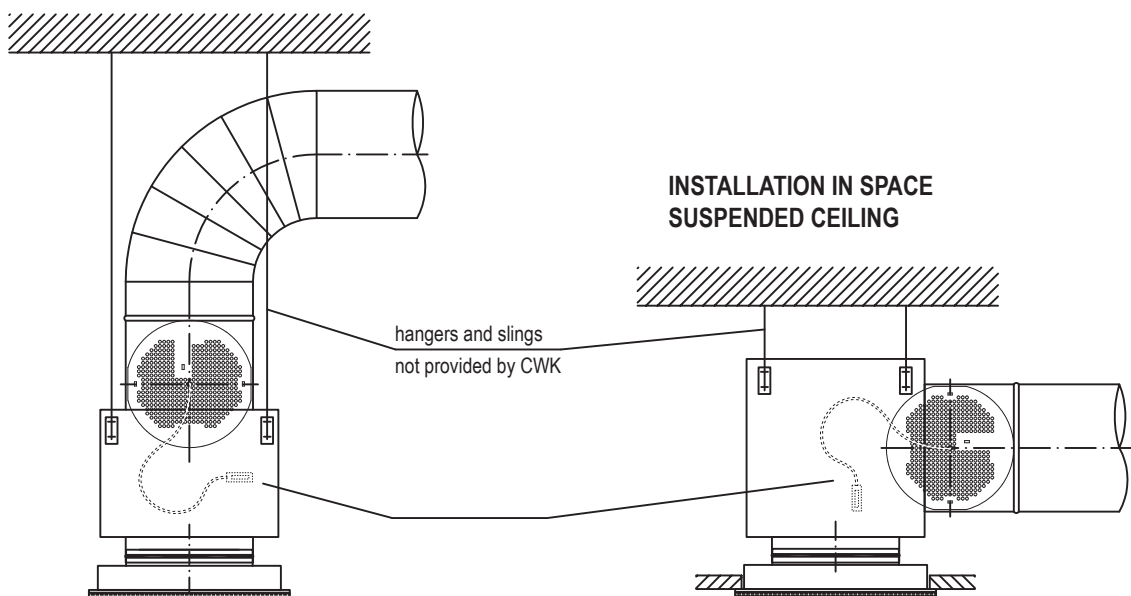
SR/KPKN are expansion boxes for ceiling air grates KPKN and KPKW. They stabilize the airflow and ensure uniform air supply to the diffuser. Expansion boxes connect air grates with ventilation installation. They are made of zinc-coated sheet, joint by non-welded Click-Clock connection. In standard expansion boxes are equipped on the ferrule with machine crimped rubber gasket.

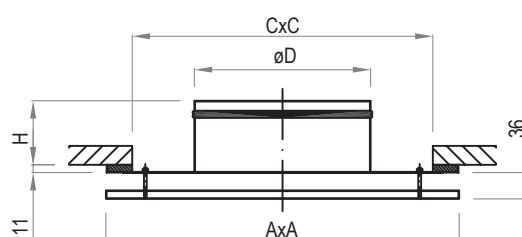
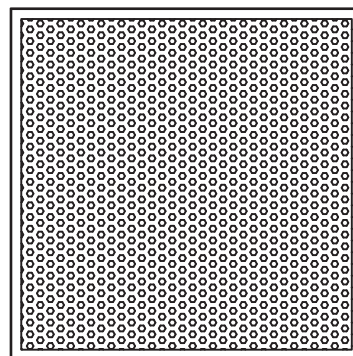
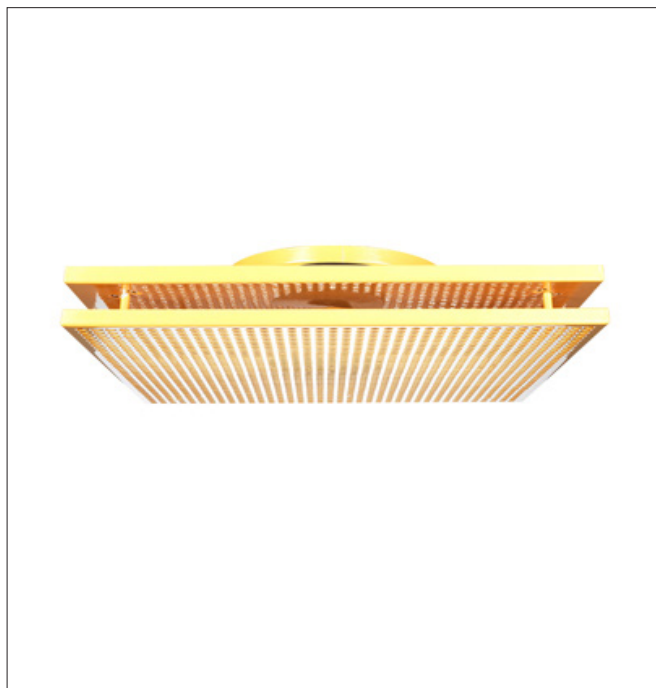
INSTALLATION

Expansion boxes SR/KPKN are designed for installation into the underslung ceiling or for free suspension under the genuine ceiling. If installing in between the ceiling and underslung ceiling, a hole should be left of a size of $l \times l$ for the chosen air grate. The air grate should be connected to the expansion box with rivets or screws. The box can be mounted on the ceiling by appropriate hangers (bars, pins...) or installation slings.

Upon customer's request, boxes can be equipped with factory slings.

INSTALLATION IN THE ROOF





DESCRIPTION

KPNS are square perforated diffusers designed for low- and medium-pressure installations. They can be used with constant and variable airflow. The air can be supplied at the temperature by 12°C than the temperature in the ventilated room. This makes them appropriate for cooling facilities with special microclimate requirements.

They can supply or exhaust air. It is recommended to install KPNS into the ceiling. Due to small size and discrete looks, KPNS diffusers can be easily incorporated into modern ceiling systems.

There is a possibility of manufacturing the KPNS diffuser with the full plate

FEATURES

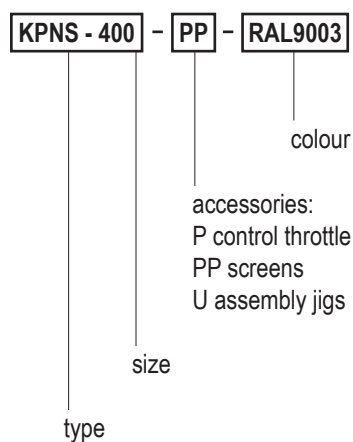
- short airflow stream
- can be installed with an expansion can SR/KPNS
- available in standard RAL 9003 colour
- upon customer's request, can be made in any colour from RAL palette

STANDARD SIZES

	125	160	200	250	315	400
ØD [mm]	123	158	198	248	313	398
A [mm]	235	295	395	495	595	595
C [mm]	200	260	360	460	560	560
H [mm]	138	148	158	158	158	158

C - installation hole size

ORDER REFERENCE

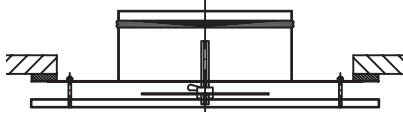


2.5 KPNS

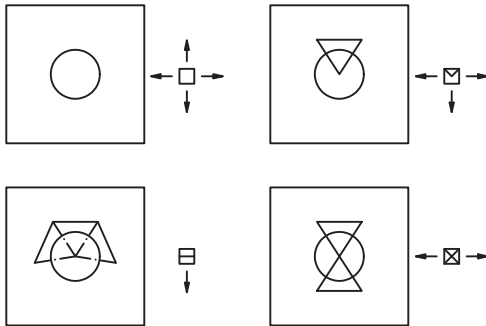
square perforated ceiling diffusers

ACCESSORIES

P - Control throttle



PP - Screens



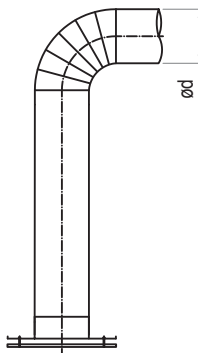
U - Assembly jigs



INSTALLATION

KPNS diffusers can be installed directly in the round ventilation duct or expansion box SR/KPNS. In both cases rivets or screws should be used for installation.

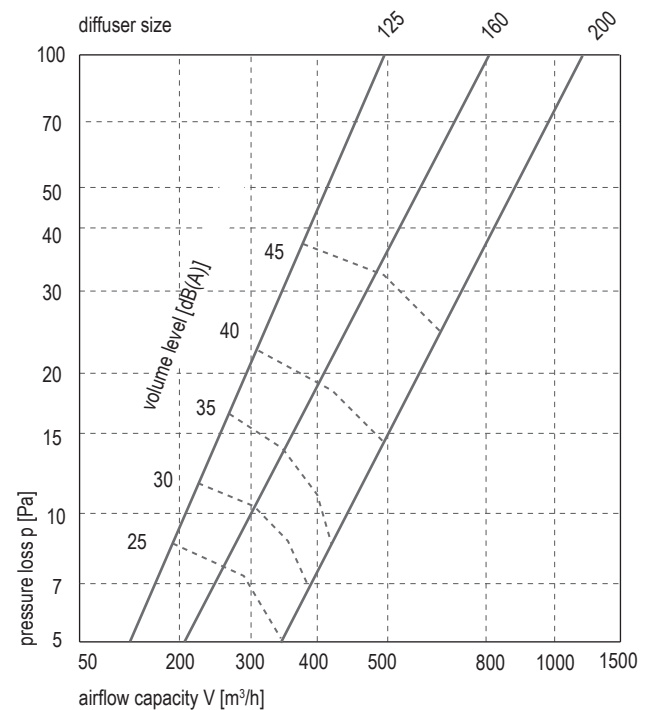
If the diffuser is installed directly to the underslung ceiling, prepare an installation hole of a size of CxC and use factory assembly jigs, type U. Seal joints between the ceiling and the diffuser.



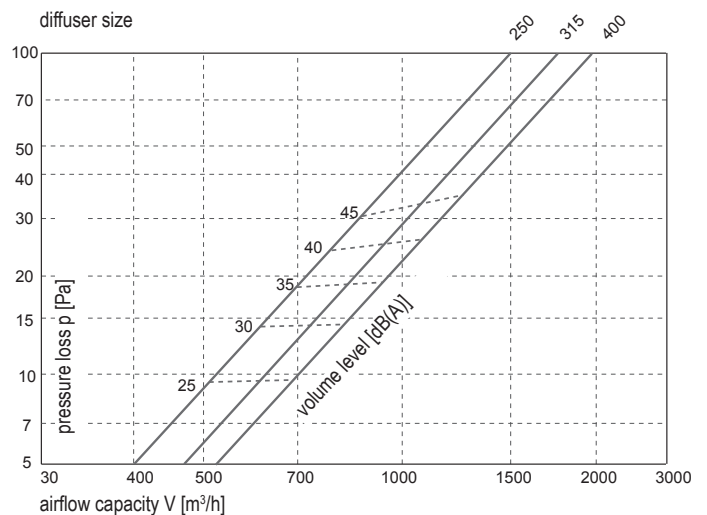
FEATURES

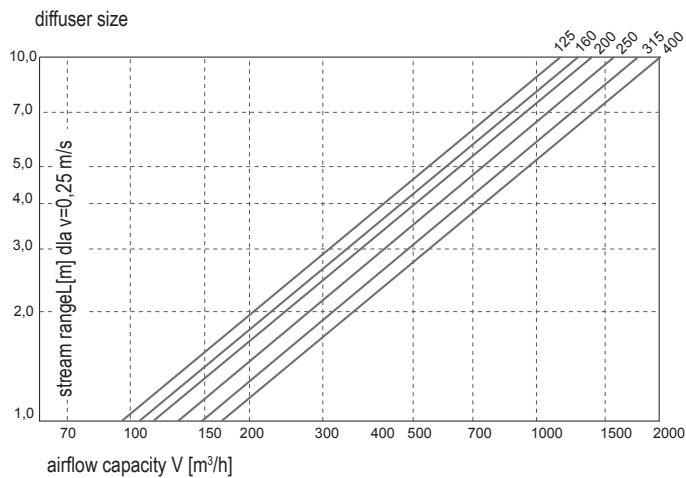
The figure shows airflow capacity V (m³/h), pressure loss p (Pa), airflow scope L (m) for end speed of 0.25 m/s, and volume level [dB(A)]. Values of the airflow scope L and air pressure loss relate to 4-duct supply. In other cases please see figures in the table below.

Airflow shape	Scope L	Pressure loss p
3-drożny	1.18	1.49
2-drożny	1.61	2.53
1-drożny	2.27	3.68



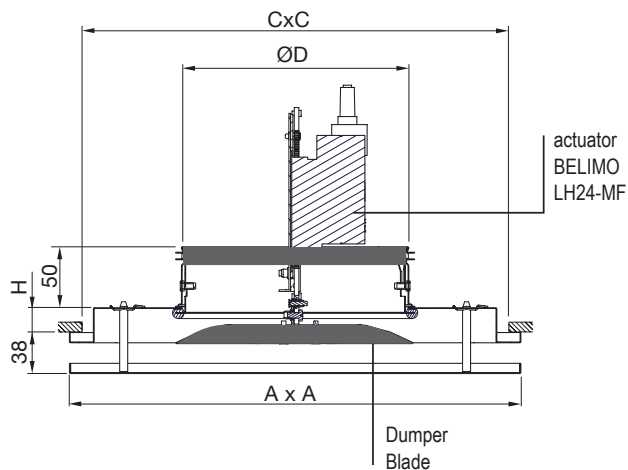
DIFFUSERS KPNS





KPNS - VAV SPECIAL VERION

KPNS-VAV is a special verion of KPNS diffuser. IT is specially design for variable air volume (VAV) This special verion of diffusers has integratet dumper with electric linear motor electric motor used in this verion is BELIMO LH24-MF 24v and analogue control control actuator should be set by a qualified service automation or Belimo srwis. all actuator data can be chcheck on BELIMO web page.



STANDARD SIZES

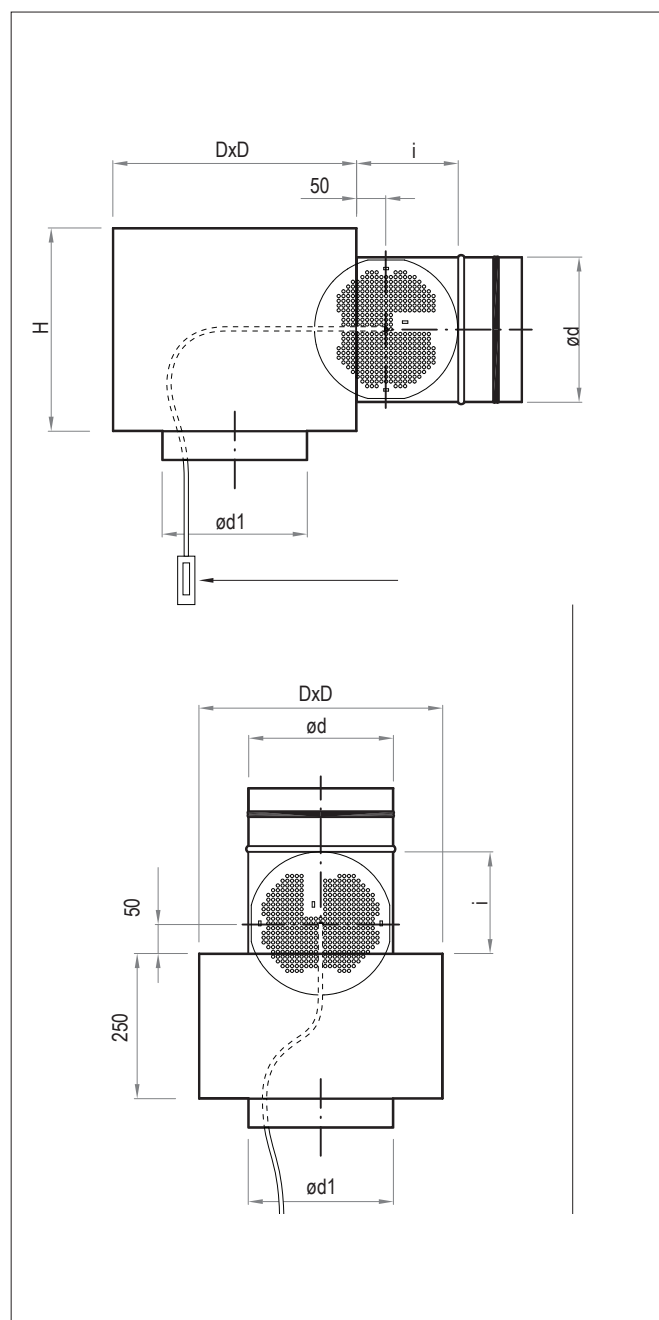
	125	160	200	250	315	400
ØD [mm]	123	158	198	248	313	398
A [mm]	235	295	395	495	595	595
C [mm]	200	260	360	460	560	560
H [mm]	138	148	158	158	158	158
weight with actuator		3,3	4,3	5,7	7,2	

C - installation hole size

2.5 SR/KPNS

expansion boxes for diffusers KPNS

2



Expansion boxes can be connected to the ventilation installation through the side or top.

Boxes can be thermally and acoustically insulated from the inside by K-Flex rubber mat.

Upon customer's request we can make other types of expansion boxes accordingly to provided drawings. .

ORDER REFERENCE

SR / KPNS - 200 - PZ - I - g						
diffuser type	size	PW	PZ	I	g	b side connection
						g top connection
						non-insulated
						I insulated
						no throttle
						throttle controlled from inside.
						throttle controlled from outside.

STANDARD SIZES

Size	125	160	200	250	315	400
D [mm]	225	260	300	350	420	500
H[mm]	225	260	300	350	420	500
Ød [mm]	98	123	158	198	248	313
Ød1 [mm]	125	160	200	250	315	400
i [mm]	115	130	150	175	200	250

DESCRIPTION

SR/KPNS are expansion boxes for diffusers KPNS. They stabilize the airflow and ensure uniform air supply to the diffuser. Expansion boxes connect air grates with ventilation installation. They are made of zinc-coated sheet, joint by non-welded Click-Clock connection.

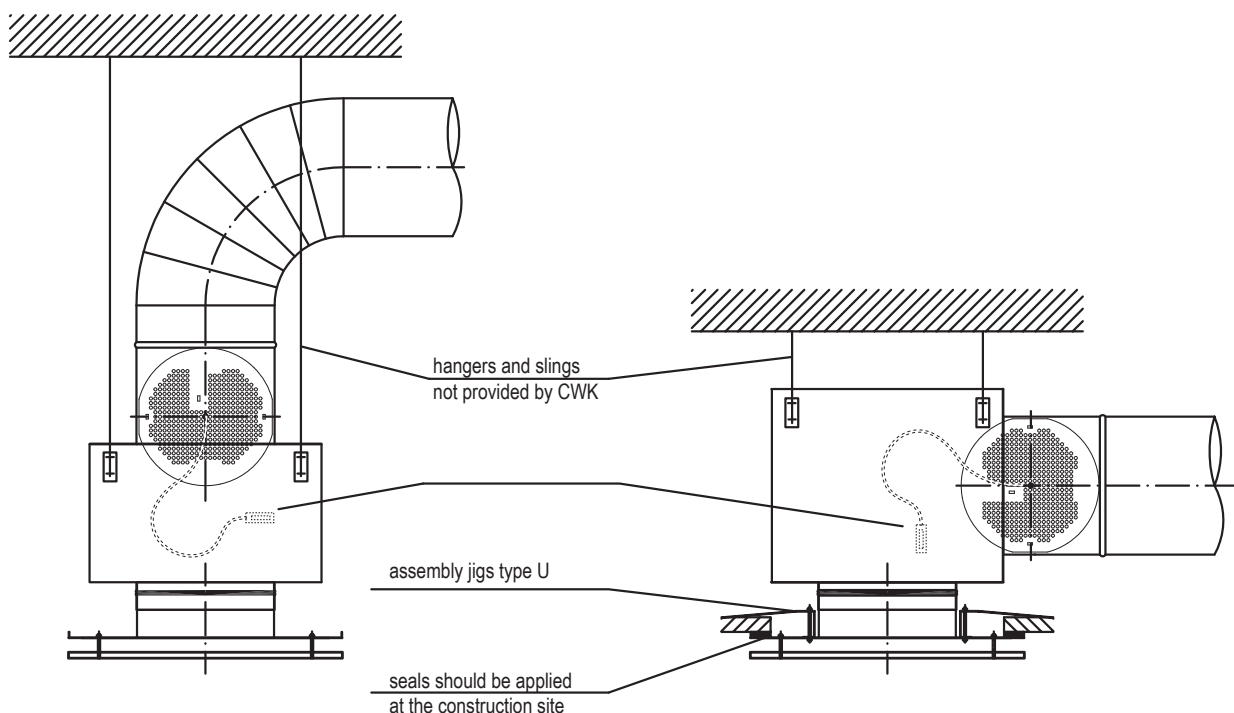
In standard expansion boxes are equipped on the ferrule with machine crimped rubber gasket.

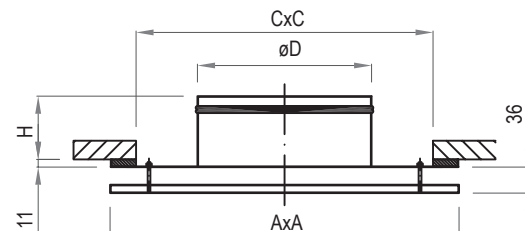
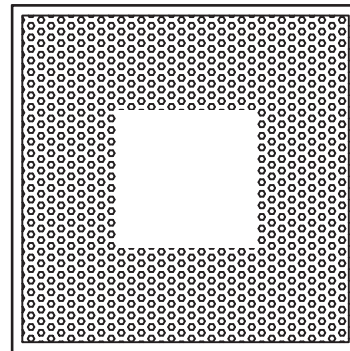
INSTALTION

Expansion boxes SR/KPNS are designed for installation into the underslung ceilings or free hanging from the ceiling. If installing in between the ceiling and underslung ceiling, a hole should be left of a size of CxC for the chosen diffuser. The box can be mounted on the ceiling by appropriate hangers (bars, pins...) and installation slings. KPNS diffusers should be fixed to the underslung ceiling with factory assembly jigs, type U.

Upon customer's request, boxes can be equipped with factory slings. .

INSTALATION IN THE ROOF





DESCRIPTION

KPNS/CP1 are rectangular, perforated air vents, to be installed in low- and mid-pressure systems. The air vent is designed to work with constant or variable air flow. The air can be supplied with temperature lower by 12°C than the temperature in the room, which makes the air vent perfect for cooling rooms which have strict microclimate requirements.

KPNS can work both in air-supply and air-exhaust systems. It is recommended to install it in the ceiling level.

Thanks to their small dimensions and unpretentious looks, the KPNS/CP1 air vents may be easily implemented in modern ceiling systems.

FEATURES

- short stream range
- possibility to install with an SR/ KPNS/CP1 plenum box
- painted with RAL9003 as standard
- can be painted any colour of the RAL palette upon special request

STANDARD SIZES

	125	160	200	250	315	400
ØD [mm]	123	158	198	248	313	398
A [mm]	235	295	395	495	595	595
C [mm]	200	260	360	460	560	560
H [mm]	138	148	158	158	158	158

C - size of the mounting hole

ORDER REFERENCE

KPNS/CP1 - 400	-	U	-	RAL9003
type		size		colour
				U U assembly jigs

2.6 KPNS/CP1

square perforated ceiling diffusers

2

ASSEMBLY JIGS

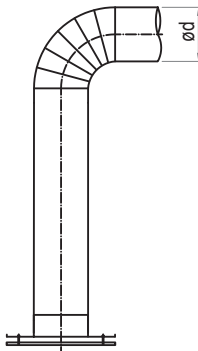


INSTALLATION

The KPNS/CP1 air vents may be mounted directly in a round ventilation shaft or in the SR/KPNS plenum box. In both cases, screws or rivets should be used for installation.

In the case of mounting the air vent directly to a false ceiling, it is necessary to make a CxC mounting hole in the ceiling and use factory supplied U-type mounting pegs.

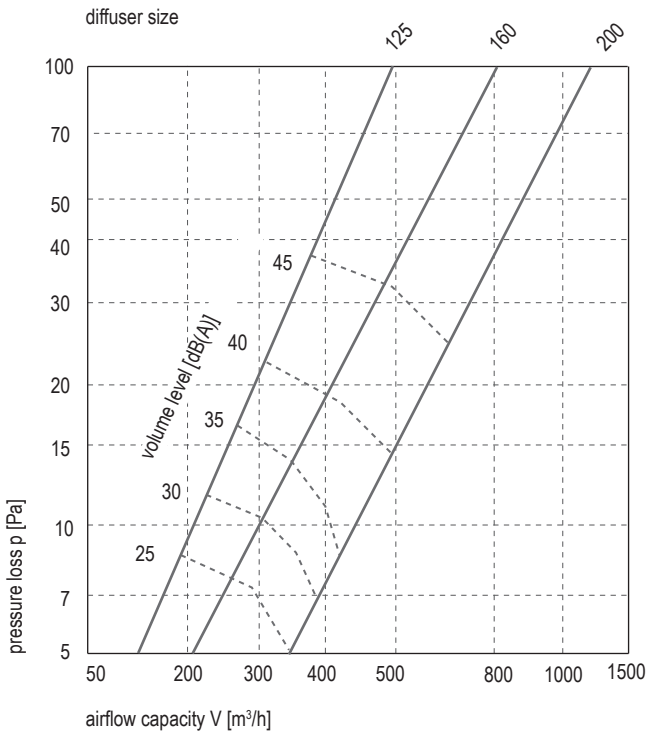
Seal the connection between the ceiling and the air vent.



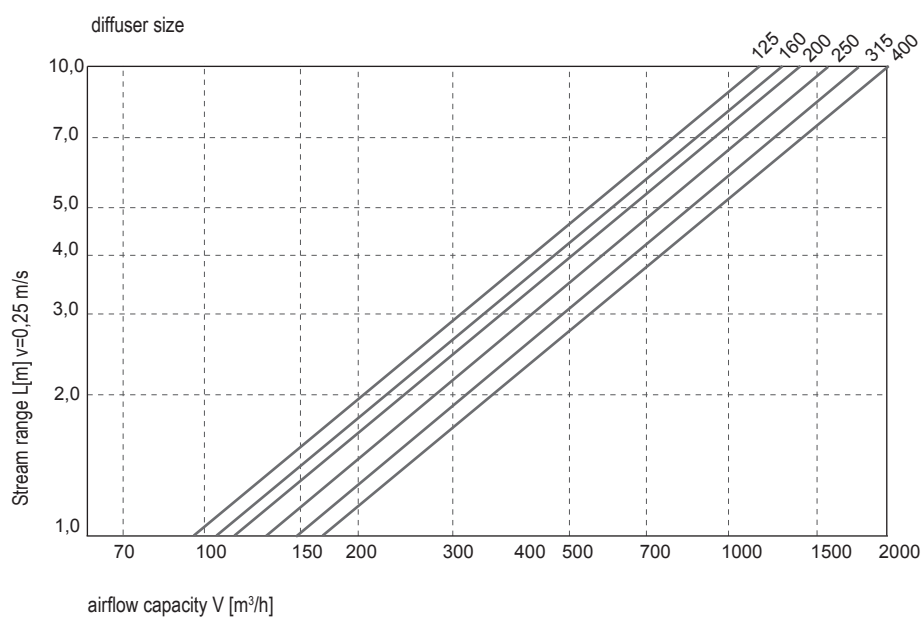
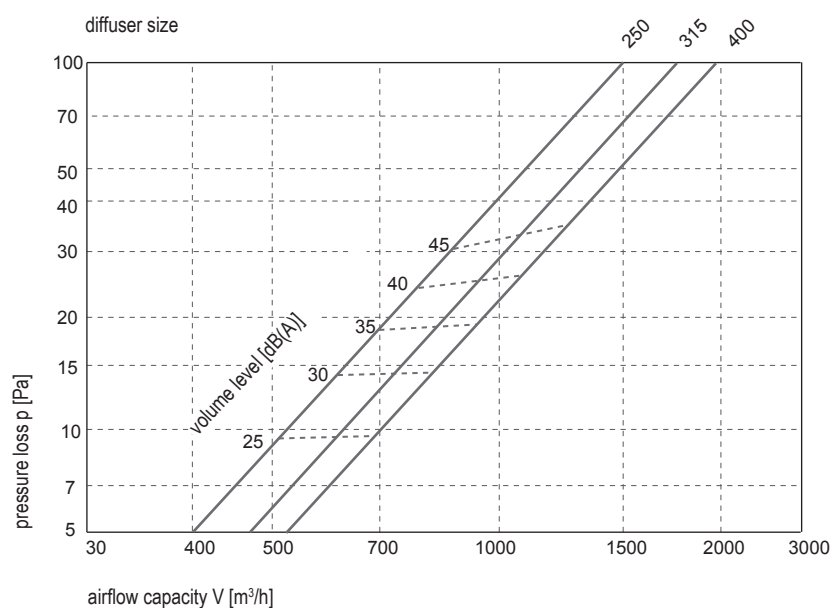
FEATURES

The diagrams present air efficiency V [m^3/h], pressure loss p (Pa), stream range L [m] for the final speed of 0.25 m/s and level of loudness [dB(A)].

Given values of stream range L and pressure loss p refer to 4-way air-exhaust from the air vent. In other cases, these values should be updated with data given in the table below.



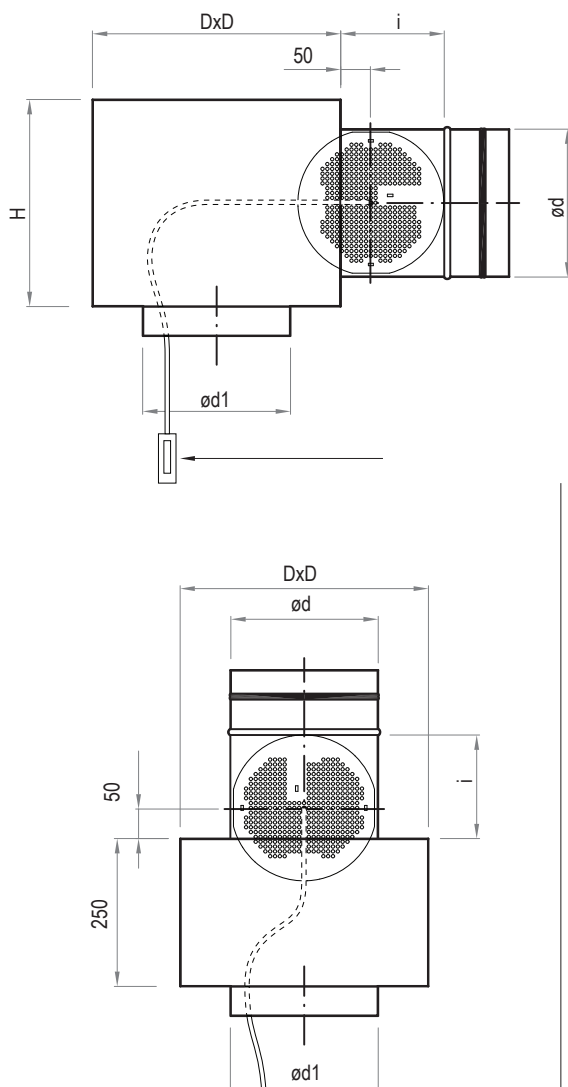
AIR VENTS KPNS/CP1



2.6 SR/KPNS/CP1

Expansion boxes for KPNS/CP1

2



Expansion boxes can be connected to the ventilation installation through the side or top.

Boxes can be thermally and acoustically insulated from the inside by K-Flex rubber mat.

Upon customer's request we can make other types of expansion boxes accordingly to provided drawings.

ORDER REFERENCE

SR / KPNS / CP1 - 200 - PZ - I - g

SR / KPNS / CP1 - diffuser type
 200 - size
 PZ - no throttle
 I - non-insulated
 g - top connection
 b - side connection

STANDARD SIZES

Size	125	160	200	250	315	400
D [mm]	225	260	300	350	420	500
H[mm]	225	260	300	350	420	500
Ød [mm]	98	123	158	198	248	313
Ød1 [mm]	125	160	200	250	315	400
i [mm]	115	130	150	175	200	250

DESCRIPTION

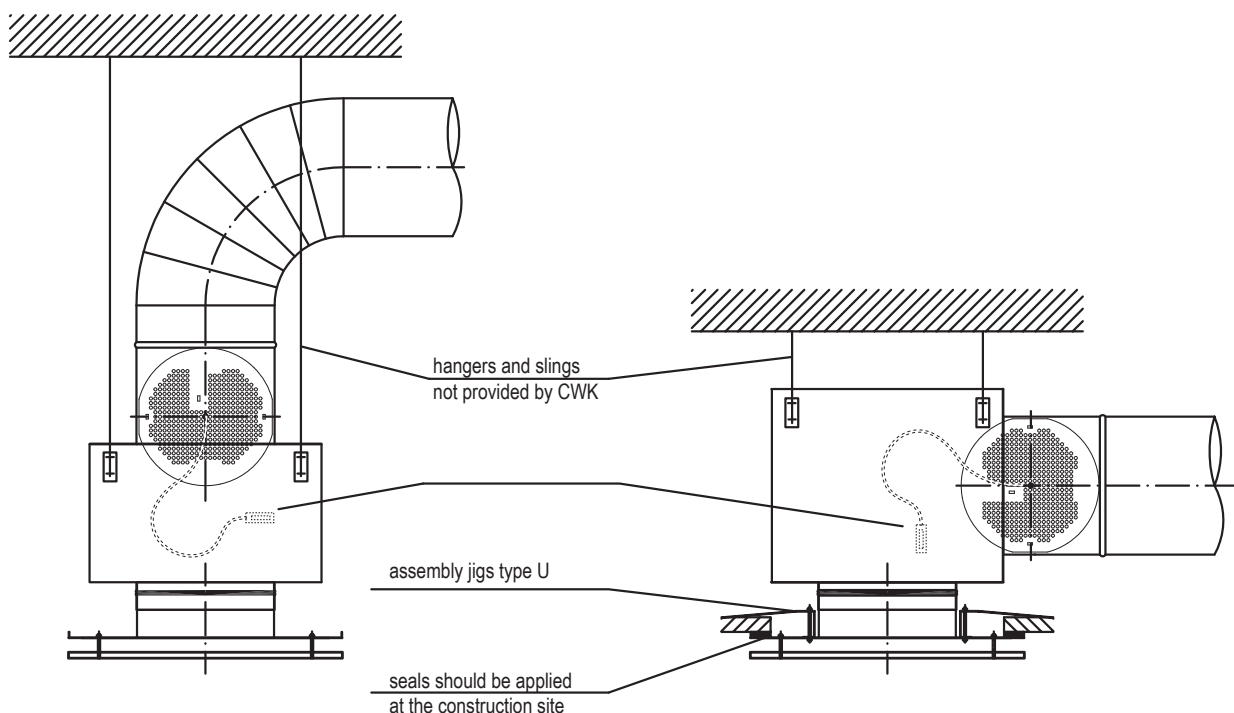
SR/KPNS/CP1 are expansion boxes for diffusers KPNS/CP1. They stabilize the airflow and ensure uniform air supply to the diffuser. Expansion boxes connect air grates with ventilation installation. They are made of zinc-coated sheet, joint by non-welded Click-Clock connection. In standard expansion boxes are equipped on the ferrule with machine crimped rubber gasket.

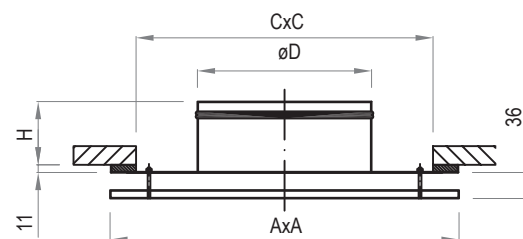
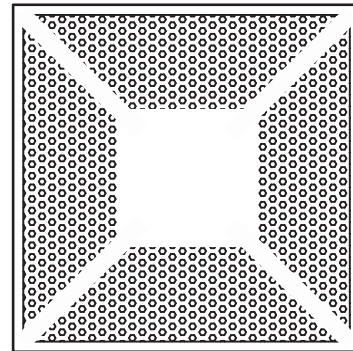
INSTALATION

Expansion boxes SR/KPNS/CP1 are designed for installation into the underslung ceilings or free hanging from the ceiling. If installing in between the ceiling and underslung ceiling, a hole should be left of a size of CxC for the chosen diffuser. The box can be mounted on the ceiling by appropriate hangers (bars, pins...) and installation slings. KPNS/CP1 diffusers should be fixed to the underslung ceiling with factory assembly jigs, type U.

Upon customer's request, boxes can be equipped with factory slings.

INSTALATION IN THE ROOF





DESCRIPTION

KPNS/CP2 are rectangular, perforated air vents, to be installed in low- and mid-pressure systems. The air vent is designed to work with constant or variable air flow. The air can be supplied with temperature lower by 12 °C than the temperature in the room, which makes the air vent perfect for cooling rooms which have strict microclimate requirements.

KPNS can work both in air-supply and air-exhaust systems. It is recommended to install it in the ceiling level.

Thanks to their small dimensions and unpretentious looks, the KPNS/CP2 air vents may be easily implemented in modern ceiling systems.

FEATURES

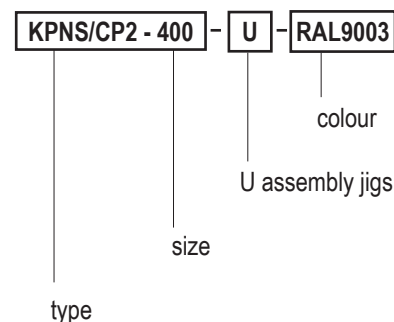
- short stream range
- possibility to install with an SR/ KPNS/CP1 plenum box
- painted with RAL9003 as standard
- can be painted any colour of the RAL palette upon special request

STANDARD SIZES

	125	160	200	250	315	400
ØD [mm]	123	158	198	248	313	398
A [mm]	235	295	395	495	595	595
C [mm]	200	260	360	460	560	560
H [mm]	138	148	158	158	158	158

C - size of the mounting hole

ORDER REFERENCE



2.7 KPNS/CP2

square perforated ceiling air vents

AKCESORIA

U ASSEMBLY JIGS

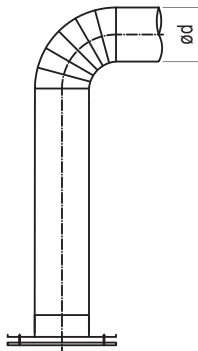


INSTALLATION

The KPNS/CP2 air vents may be mounted directly in a round ventilation shaft or in the SR/KPNS plenum box. In both cases, screws or rivets should be used for installation.

In the case of mounting the air vent directly to a false ceiling, it is necessary to make a CxC mounting hole in the ceiling and use factory supplied U-type mounting pegs.

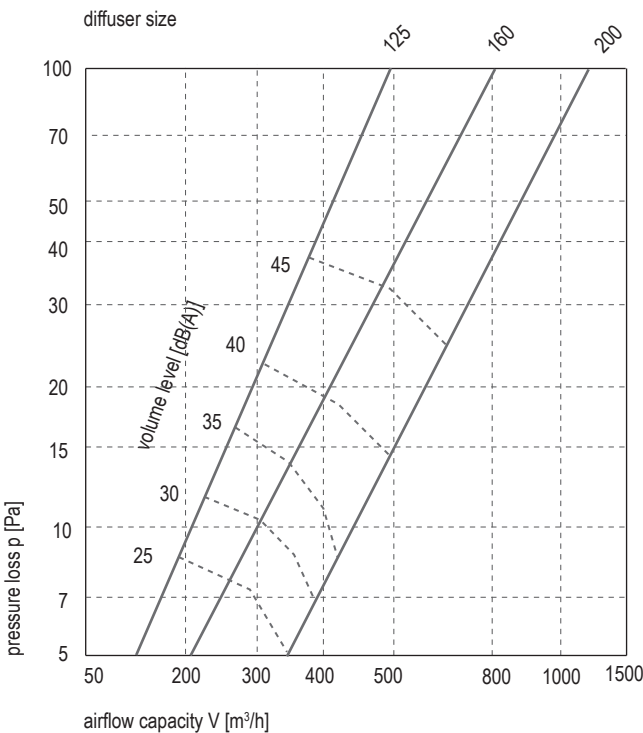
Seal the connection between the ceiling and the air vent.



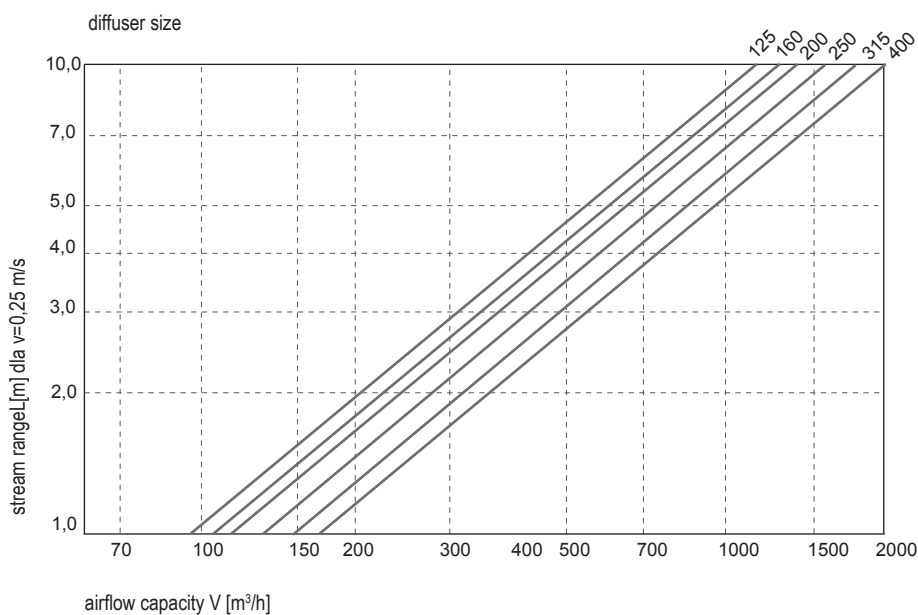
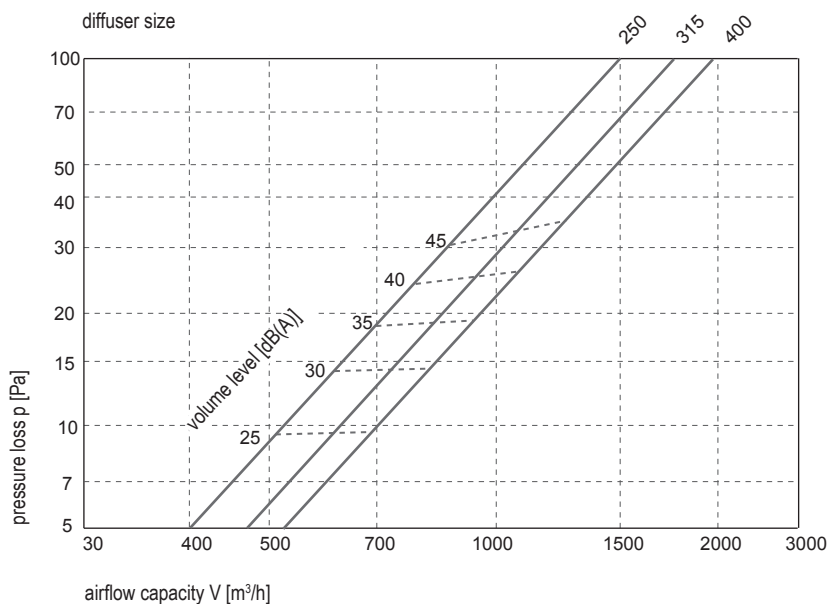
FEATURES

The diagrams present air efficiency V [m^3/h], pressure loss p (Pa), stream range L [m] for the final speed of 0.25 m/s and level of loudness [dB(A)].

Given values of stream range L and pressure loss p refer to 4-way air-exhaust from the air vent. In other cases, these values should be updated with data given in the table below.



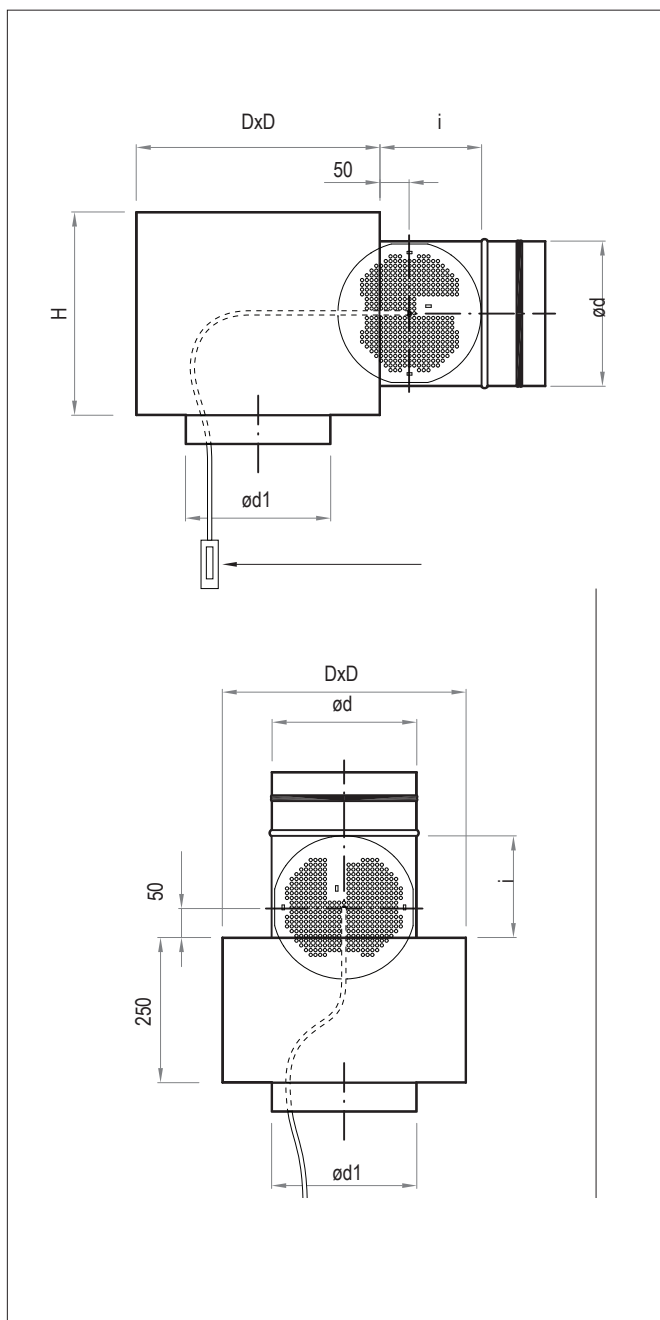
KPNS/CP2 AIR VENTS



2.7 SR/KPNS/CP2

expansion boxes for diffusers KPNS/CP2

2



Expansion boxes can be connected to the ventilation installation through the side or top.

Boxes can be thermally and acoustically insulated from the inside by K-Flex rubber mat.

Upon customer's request we can make other types of expansion boxes accordingly to provided drawings

ORDER REFERENCE

SR / KPNS / CP2 - 200 - PZ - I - g

SR / KPNS / CP2 - diffuser type
 200 - size
 PZ - no throttle
 I - throttle controlled from inside.
 g - throttle controlled from outside.
 - non-insulated
 I - insulated
 b side connection
 g top connection

STANDARD SIZES

Size	125	160	200	250	315	400
D [mm]	225	260	300	350	420	500
H[mm]	225	260	300	350	420	500
Ød [mm]	98	123	158	198	248	313
Ød1 [mm]	125	160	200	250	315	400
i [mm]	115	130	150	175	200	250

DESCRIPTION

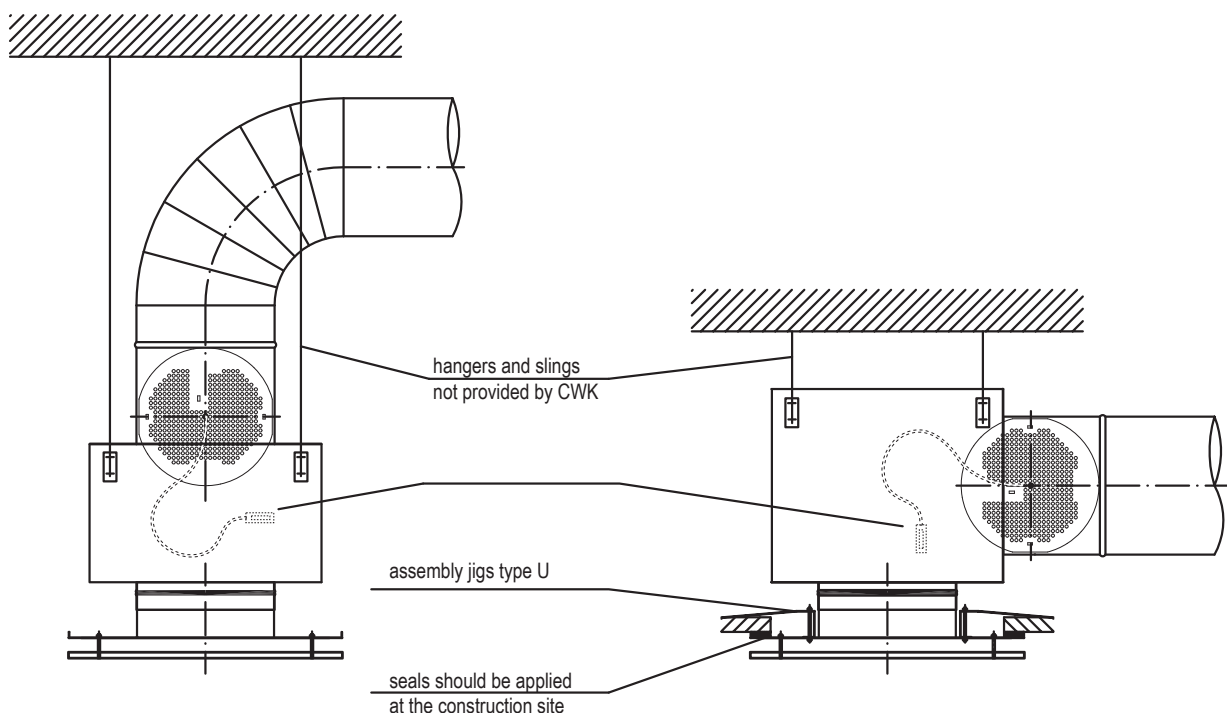
SR/KPNS/CP2 are expansion boxes for diffusers KPNS/CP2. They stabilize the airflow and ensure uniform air supply to the diffuser. Expansion boxes connect air grates with ventilation installation. They are made of zinc-coated sheet, joint by non-welded Click-Clock connection. In standard expansion boxes are equipped on the ferrule with machine crimped rubber gasket.

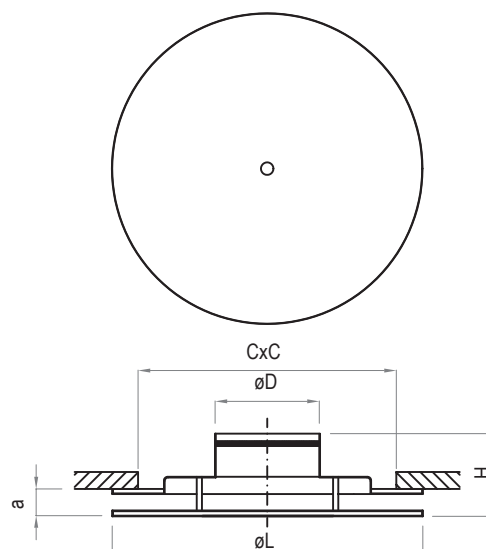
INSTALLATION

Expansion boxes SR/KPNS/CP2 are designed for installation into the underslung ceilings or free hanging from the ceiling. If installing in between the ceiling and underslung ceiling, a hole should be left of a size of CxC for the chosen diffuser. The box can be mounted on the ceiling by appropriate hangers (bars, pins...) and installation slings. KPNS diffusers should be fixed to the underslung ceiling with factory assembly jigs, type U.

Upon customer's request, boxes can be equipped with factory slings.

INSTALLATION IN THE ROOF





DESCRIPTION

NSO are round, non-perforated diffusers with full plane for supplying or exhausting air. They are designed for low- and medium-pressure installations and can be used with constant and variable airflow. The air can be supplied at the temperature by 12°C than the temperature in the ventilated room.

This makes them appropriate for cooling facilities with special microclimate requirements. Due to small size and discrete looks, NSO diffusers can be easily incorporated into modern ceiling systems. It is recommended to install into the ceiling plane.

FEATURES

- short airflow stream
- can be installed with an expansion can SR/NS
- available in standard RAL 9003 colour
- upon customer's request, can be made in any colour from RAL palette

ORDER REFERENCE

NSO - 400	-	U	-	RAL9003
typ		size		colour
				accessories: U Assembly jigs

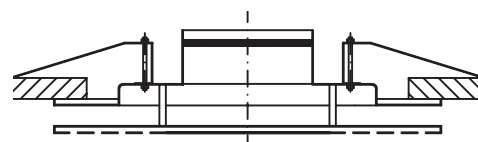
STANDARD SIZES

	125	160	200	250	315	400
Ød [mm]	123	158	198	248	313	398
ØL [mm]	240	300	360	460	540	540
H [mm]	148	158	168	168	168	168
ØC [mm]	200	260	320	420	500	500
a [mm]	36					

ØC - size of the mounting hole

ACCESSORIES:

U ASSEMBLY JIGS



2.8 NSO

round ceiling diffusers

INSTALLATION

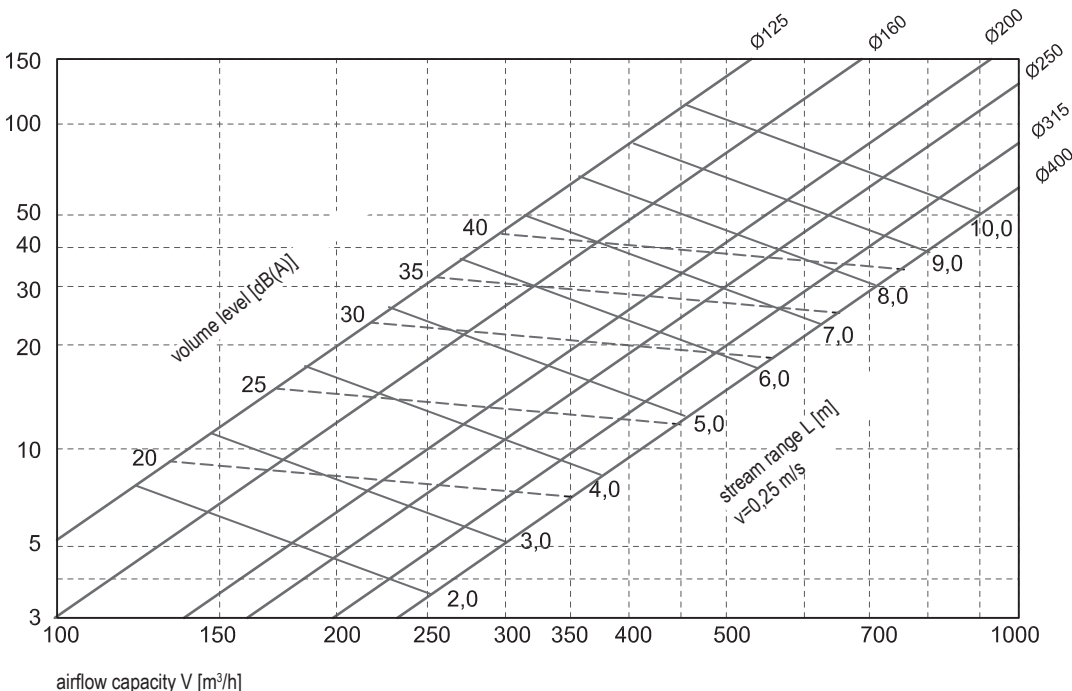
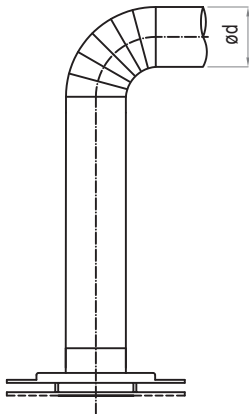
NSO diffusers can be installed directly in the round ventilation duct or expansion box SR/NSO. In both cases rivets or screws should be used for installation.

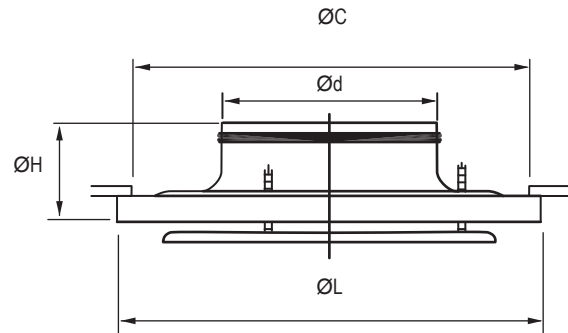
If the diffuser is installed directly to the underslung ceiling, prepare an installation hole of a size of $\varnothing C$ and use factory assembly jigs, type U. Seal joints between the ceiling and the diffuser.

FEATURES

The figure shows airflow capacity V (m³/h), pressure loss p (Pa), airflow scope L (m) for end speed of 0.25 m/s, and volume level [db(A)].

The airflow scope L relates to isothermal air supply.





STANDARD SIZES

	125	160	200	250	315	400
Ød [mm]	123	158	198	248	313	398
ØL [mm]	240	300	360	460	540	540
H [mm]	148	158	168	168	168	168
ØC [mm]	200	260	320	420	500	500

ØC - size of the mounting hole

DESCRIPTION

NSO/R is a round air vent for supplying and exhausting air. It has a front panel of adjustable height, which allows for both horizontal and vertical directing of an airstream. The air vent is discreet, which makes it easy to fit into any surroundings. The change of direction of the airstream from horizontal to vertical can be easily achieved by adjusting the front panel and it does not require any tools.

FEATURES

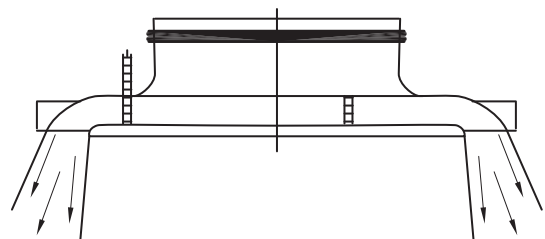
- air vent made of galvanized steel
- can be used with a damper
- default colour: RAL 9003
- on special request, it can be manufactured in any size and RAL colour
- airstream adjustment feature

ORDER REFERENCE

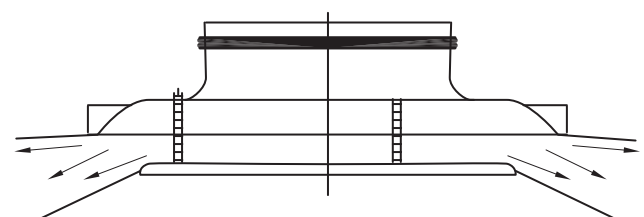
NSO/R - 400	- U	- P	- RAL9003
typ	size	P - throttle U Assembly jigs	colour

AIRSTREAM SHAPE

By default, NSO/R is supplied with a vertical air supply module. The direction of the supplied air stream can be changed to horizontal by moving the front panel.



Vertical direction of the supplied air stream – the front panel in lower position



Horizontal direction of the supplied air stream – the front panel in upper position

round air vents with airstream control

PARAMETERS

Volumetric flow q (l/s lub $m^3/h.$), total pressure loss P_t (PA), air-stream range l_{02} (m) and sound pressure level L_A (dB(A)) are described in diagrams. The diagrams provide data for the horizontal and vertical air supply, as well as for air exhaust.

RANGE

Range l_{02} for the end speed of 0.2 m/s and isothermal air supply (vertical or horizontal stream) can be read from the diagrams.

PRESSURE LOSS, P_t

The diagrams specify P_t (Pa) pressure loss, with an MBT-1 plenum system for air supply and with an MBF plenum system for air exhaust. Total pressure loss is defined as total P_t (Pa) pressure loss.

SOUND PRESSURE LEVEL, L_A

Sound pressure levels L_A (dB(A)) from the catalogue refer to the room absorption values of 4dB, which is equal to absorption level in room resonance zone (absorption ration of 10 m² SABINE).

SOUND LEVEL, L_W

Sound level $L_W = L_A + K_{ok}$
 K_{ok} – see the table 1

TABLE 1

Average frequency (Hz)							
Size	125	250	500	1000	2000	4000	8000
125	14	8	2	0	-6	-12	-14
160	14	8	3	-1	-8	-11	-13
200	15	0	1	-2	-8	-12	-13
250	16	9	1	-2	-5	-10	-12
315	15	9	-4	-7	-14	-16	-17
400	15	9	-3	-7	-15	-17	-20

SOUND ATTENUATION, ΔL

Sound attenuation ΔL of an air vent, including reverberation inside the vent – see Table 2.

TABLE 2

Average frequency (Hz)								
Without SR/NSO/R	Size	125	250	500	1000	2000	4000	8000
	125	17	10	8	2	2	3	5
	160	14	9	7	3	1	3	6
	200	12	9	2	3	2	5	5
	250	11	9	5	1	2	5	4
	315	9	6	3	2	2	5	4
with SR/NSO/R	400	6	6	0	1	2	4	3
	125	8	2	12	7	18	19	22
	160	18	11	9	9	17	18	20
	200	15	11	17	14	17	17	18
	250	13	13	11	13	17	17	18
	315	10	10	13	10	15	16	19
	400	10	10	5	10	13	16	17

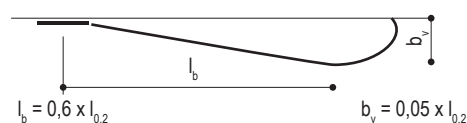
AIRSTREAM SHAPE

l_b = Distance from the air vent to the point of the maximum air-stream width

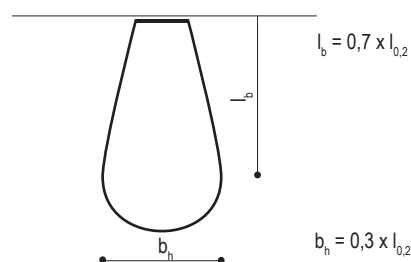
b_v = Vertical width of the airstream

b_h = Horizontal width of the airstream

Horizontal shape of the airstream



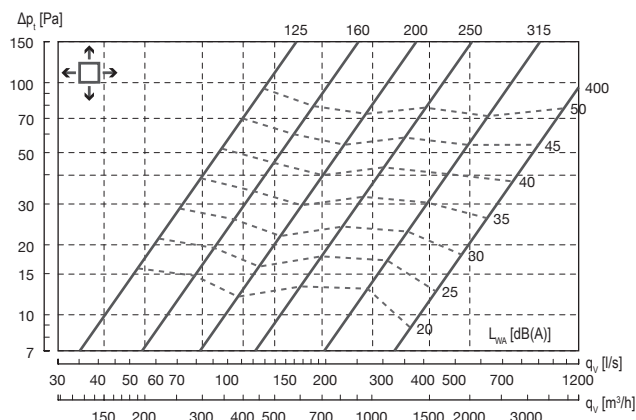
Vertical shape of the airstream



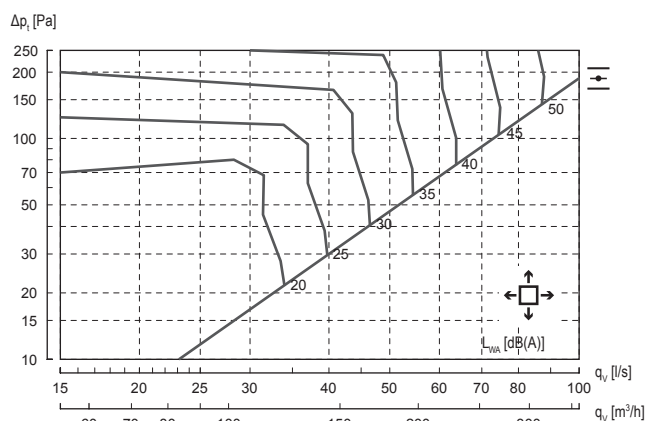
FEATURES

NSO/R WITHOUT A PLENUM BOX – AIR SUPPLY

VERTICAL AIR SUPPLY

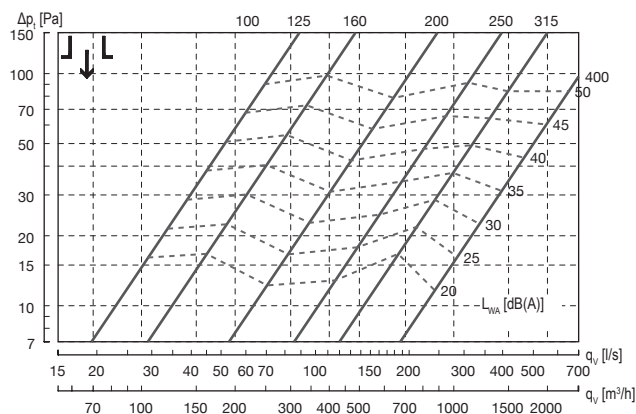


NSO/R 125 + SR/NSO/R – AIR SUPPLY

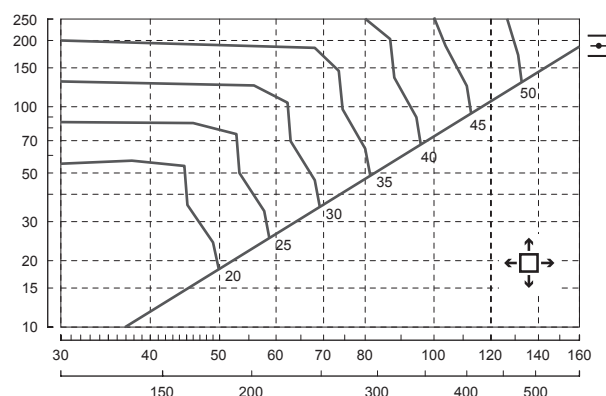


Hz	63	125	250	500	1K	2K	4K	8K
K_{sk}	11	9	3	-5	-6	-14	-20	-24

VERTICAL AIR SUPPLY

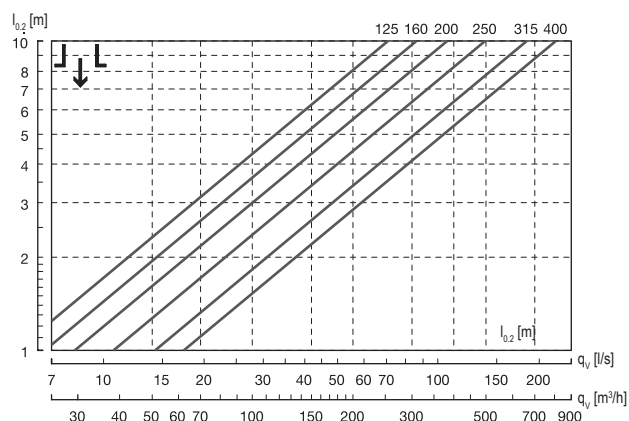


NSO/R 160 + SR/NSO/R - AIR SUPPLY



Hz	63	125	250	500	1K	2K	4K	8K
K_{sk}	11	12	3	-7	-7	-15	-20	-23

ISOTHERMAL AIR SUPPLY

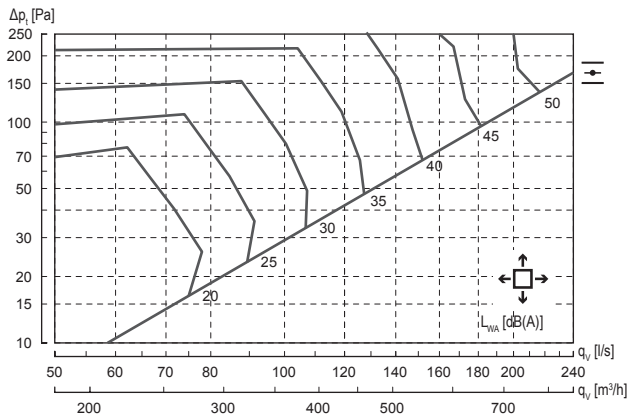


2.9 NSO/R

round air vents with airstream control

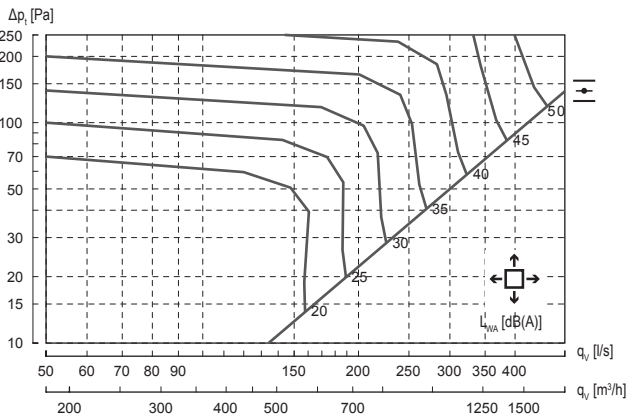
2

NSO/R 200 + SR/NSO/R - AIR SUPPLY



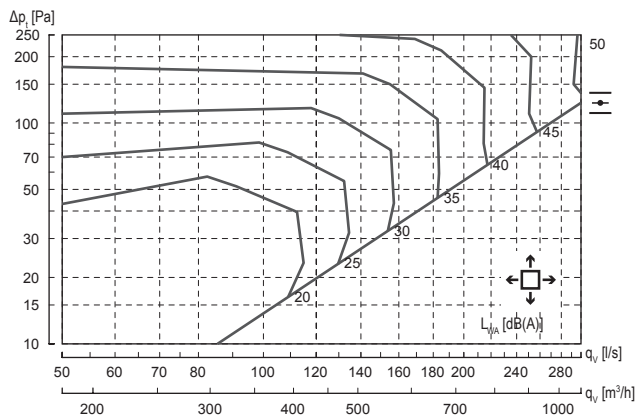
Hz	63	125	250	500	1K	2K	4K	8K
K _{ok}	12	11	1	-3	-7	-15	-20	-24

NSO/R 315 + SR/NSO/R - AIR SUPPLY



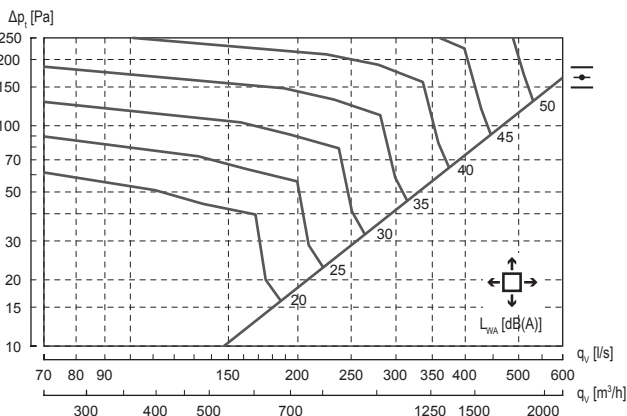
Hz	63	125	250	500	1K	2K	4K	8K
K _{ok}	15	4	1	-2	-6	-13	-17	-16

NSO/R 250 + SR/NSO/R - AIR SUPPLY



Hz	63	125	250	500	1K	2K	4K	8K
K _{ok}	15	7	0	-2	-6	-12	-16	-21

NSO/R 400 + SR/NSO/R - AIR SUPPLY



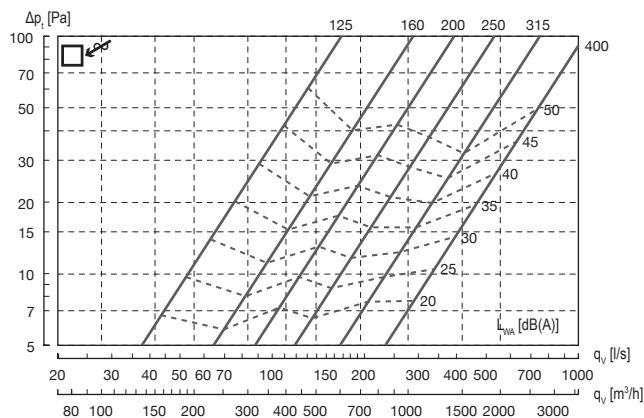
Hz	63	125	250	500	1K	2K	4K	8K
K _{ok}	11	3	0	-3	-5	-10	-14	-23

NSO/R 315 + SR/NSO/R - Air supply

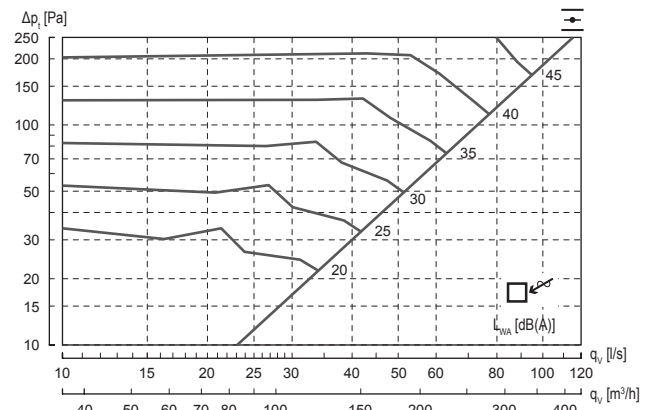
Correction of the vertical air supply. Sound intensity level (LWA) and pressure drop (Δp_t)

NSO/R + SR/NSO/R		Correction coefficient	
KANAŁ	NSO/R + SR/NSO/R		
Size $\varnothing$	Size $\varnothing$	L_{WA}	Δp_t
125	125	+1	x1
125	160	+8	x1,2
125	200	+1	x1
160 160	160	+10	x1,5
160	200	+3	x1,1
160	250	+0	x1
200	200	+7	x1,3
200	250	+0	x1
200	315	+1	x1
250	250	+2	x1
250	315	+0	x1
250	400	+0	x1,1
315	315	+2	x1,1
315	400	+3	x1,2

NSO/R WITHOUT A PLENUM BOX – AIR EXHAUST

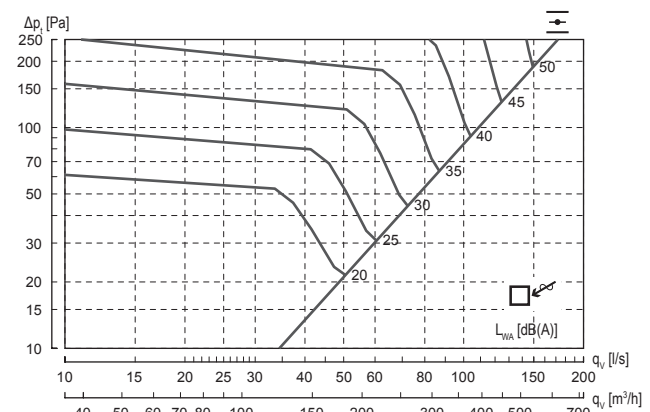


NSO/R 125 + SR/NSO/R – AIR SUPPLY



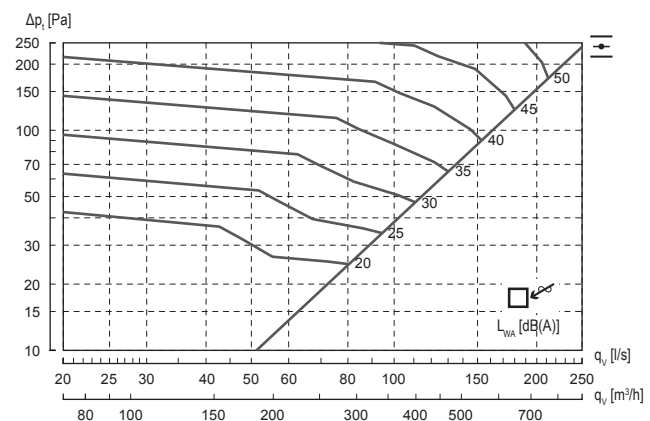
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	5	-1	-3	-4	-12	-15	-21

NSO/R 160 + SR/NSO/R - AIR EXHAUST



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	4	-1	-4	-4	-10	-16	-24

NSO/R 200 + SR/NSO/R - AIR EXHAUST



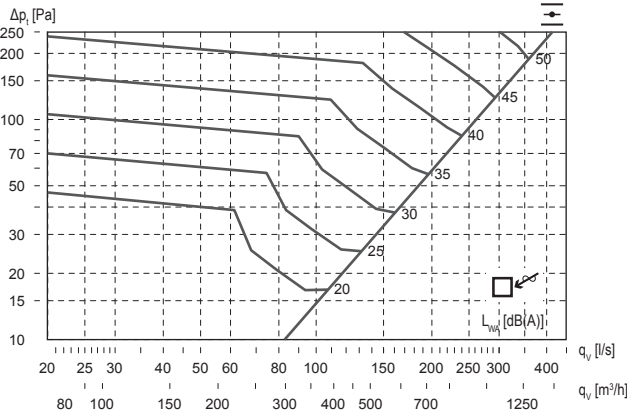
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	15	5	-1	-3	-6	-9	-16	-25

2.9 NSO/R

round air vents with airstream control

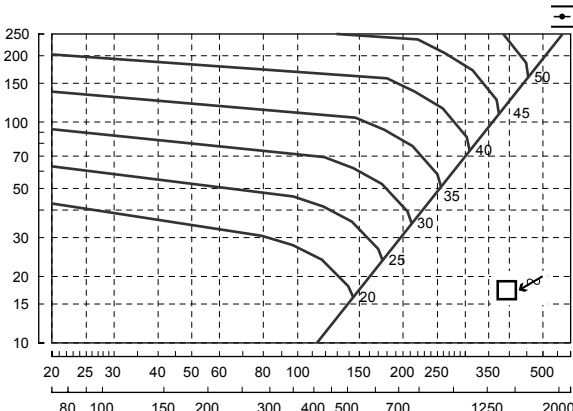
2

NSO/R 250 + SR/NSO/R - AIR EXHAUST



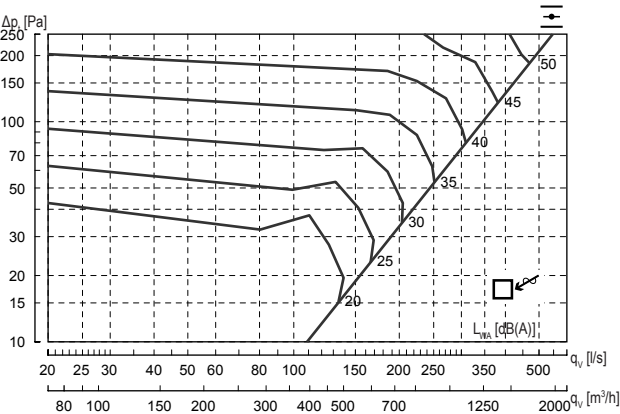
Hz	63	125	250	500	1K	2K	4K	8K
K _{ok}	11	6	2	-2	-7	-11	-15	-24

NSO/R 400 + SR/NSO/R - AIR EXHAUST

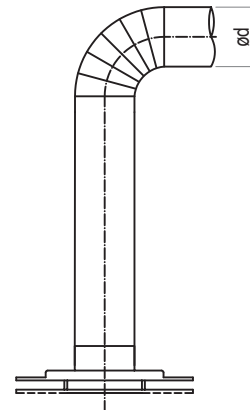


Hz	63	125	250	500	1K	2K	4K	8K
K _{ok}	11	5	2	-2	-7	-11	-15	-25

NSO/R 315 + SR/NSO/R - AIR EXHAUST



Hz	63	125	250	500	1K	2K	4K	8K
K _{ok}	13	5	2	-3	-6	-10	-15	-25



DESCRIPTION

NSO/P and NSO/CP are round, perforated (P) or partially perforated (CP) diffusers with full plane for supplying or exhausting air. They are designed for low- and medium-pressure installations and can be used with constant and variable airflow. The air can be supplied at the temperature by 12°C than the temperature in the ventilated room.

This makes them appropriate for cooling facilities with special microclimate requirements. Due to small size and discrete looks, NSO diffusers can be easily incorporated into modern ceiling systems. It is recommended to install into the ceiling plane.

FEATURES

- short airflow stream
- can be installed with an expansion can SR/NSO
- available in standard RAL 9003 colour
- upon customer's request, can be made in any colour from RAL palette

INSTALLATION

NSO/P and NSO/CP diffusers can be installed directly in the round ventilation duct or expansion box SR/NSO. In both cases rivets or screws should be used for installation.

If the diffuser is installed directly to the underslung ceiling, prepare an installation hole of a size of ØC and use factory assembly jigs, type U. Seal joints between the ceiling and the diffuser.

ORDER REFERENCE

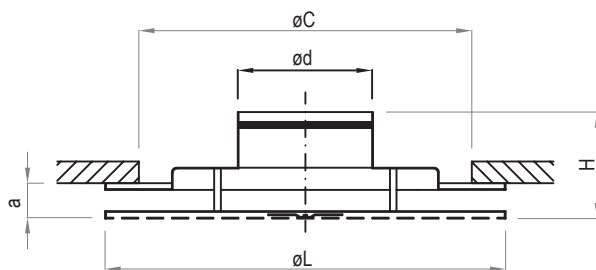
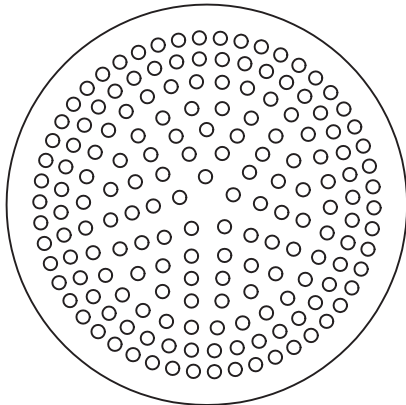
NSO / P - 400	- U -	RAL9003
type	size	colour
		accessories: P control throttle PP screens U assembly jigs

2.10 NSO/P,NSO/CP

fully and partially perforated round ceiling diffusers

DIFFUSERS NSO/P

2



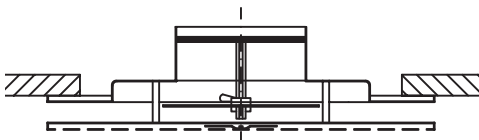
STANDARD SIZES

	125	160	200	250	315	400
Ød [mm]	123	158	198	248	313	398
ØL [mm]	240	300	360	460	540	540
H [mm]	148	158	168	168	168	168
ØC [mm]	200	260	320	420	500	500
a [mm]	36					

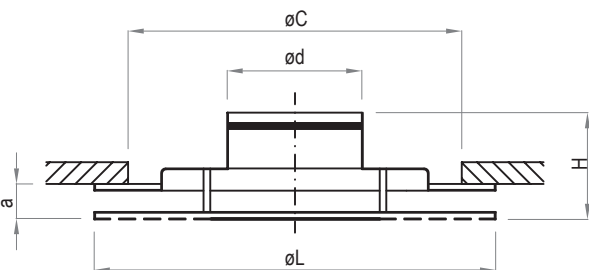
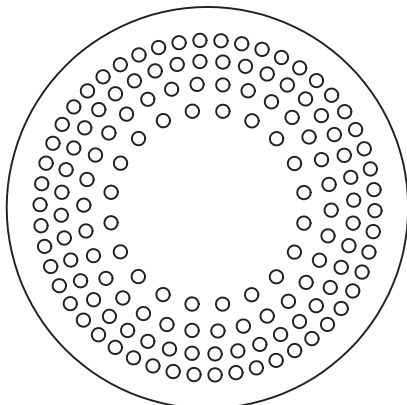
ØC - installation hole size

ACCESSORIES

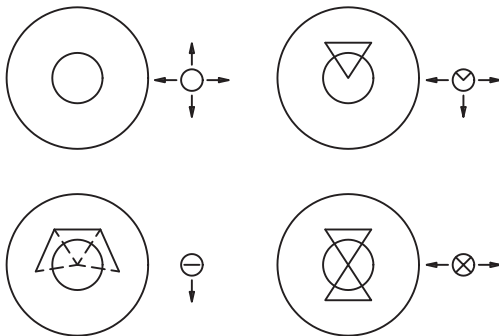
P - CONTROL THROTTLE



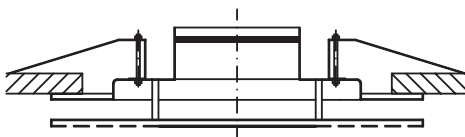
DIFFUSERS NSO/CP



PP - SCREENS



U - ASSEMBLY JIGS

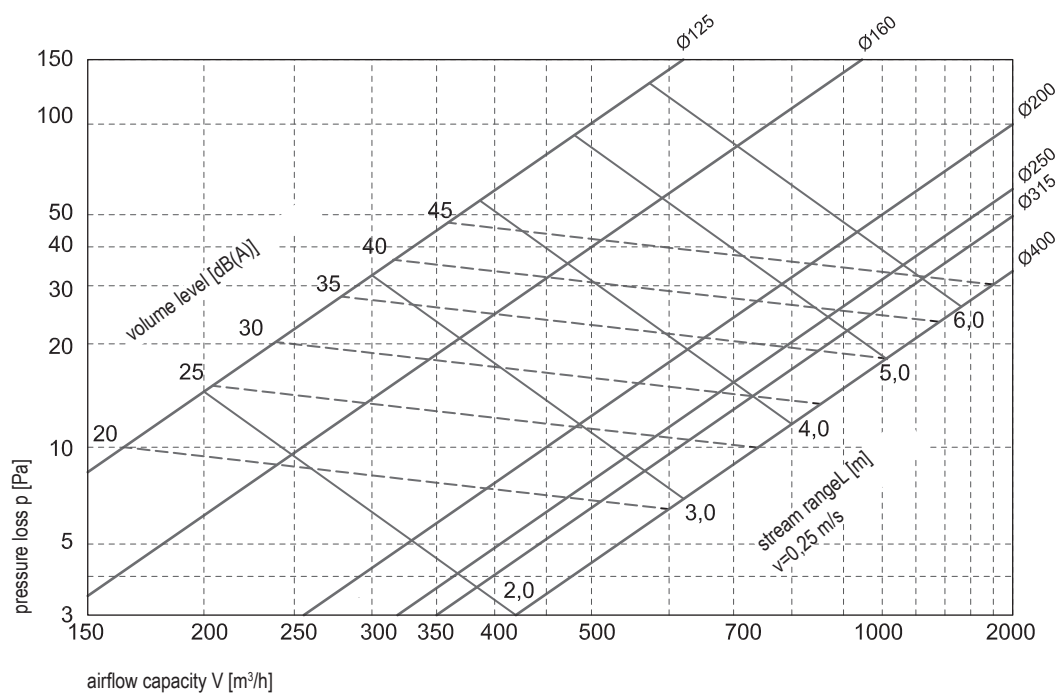


FEATURES

The figure shows airflow capacity V (m³/h), pressure loss p (Pa), air-flow scope L (m) for end speed of 0.25 m/s, and volume level [db(A)]. Values of the airflow scope L and air pressure loss relate to 4-duct supply. In other cases please see figures in the table below.

Airflow shape	Scope L	Pressure loss p
3-duct	1.18	1.49
2-duct	1.61	2.53
1-duct	2.27	3.68

DIFFUSERS NSO/P

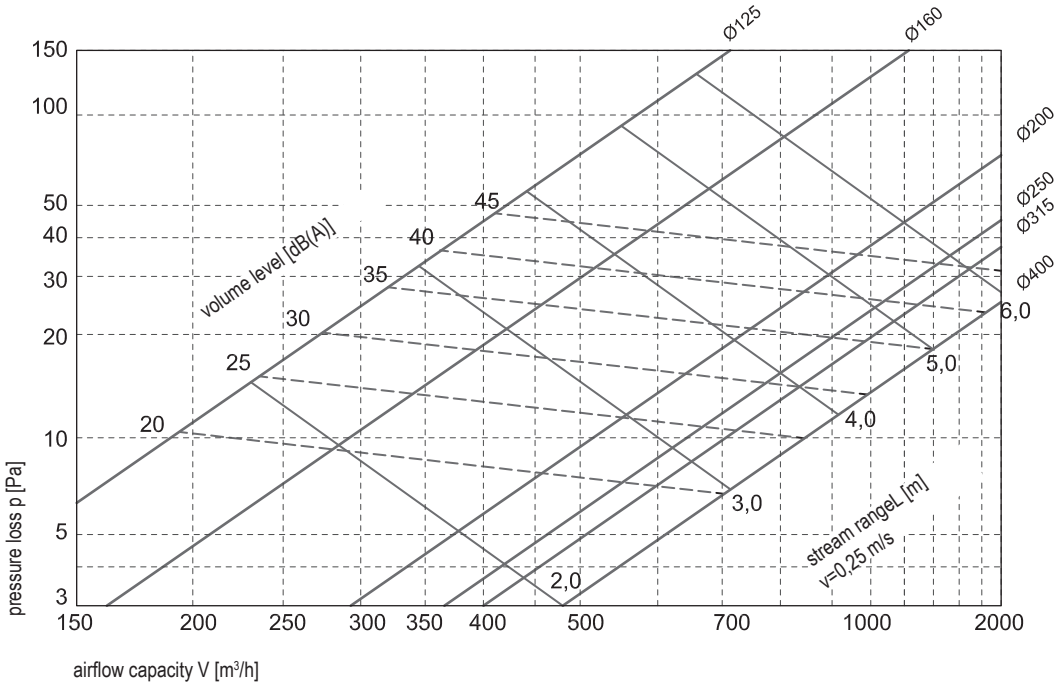


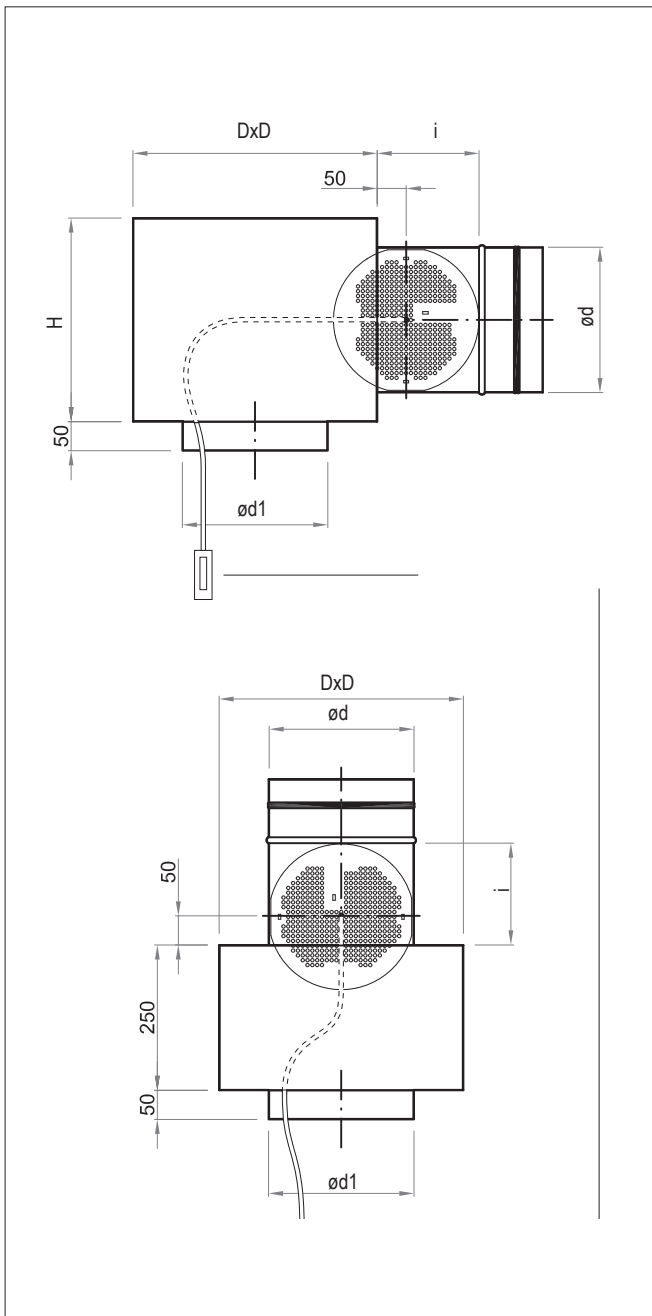
2.10 NSO/P,NSO/CP

fully and partially perforated round ceiling diffusers

DIFFUSERS NSO/CP

2





Expansion boxes can be connected to the ventilation installation through the side or top.

Boxes can be thermally and acoustically insulated from the inside by K-Flex rubber mat.

Upon customer's request we can make other types of expansion boxes accordingly to provided drawings.

ORDER REFERENCE

SR / NSO - 200 - PZ - I - g

b side connection
g top connection

- non-insulated
I insulated

- no throttle
PW throttle controlled from inside.
PZ throttle controlled from outside.

size

diffuser type

STANDARD SIZES

Size	125	160	200	250	315	400
D [mm]	225	260	300	350	420	500
H[mm]	225	260	300	350	420	500
Ød [mm]	98	123	158	198	248	313
Ød1 [mm]	125	160	200	250	315	400
i [mm]	115	130	150	175	210	250

DESCRIPTION

SR/NSO are expansion boxes for diffusers NSO, NSO/P, NSO/CP. They stabilize the airflow and ensure uniform air supply to the diffuser. Expansion boxes connect air grates with ventilation installation. They are made of zinc-coated sheet, joint by non-welded Click-Clock connection.

In standard expansion boxes are equipped on the ferrule with machine crimped rubber gasket.

2.10 SR/NSO/P,NSO/CP

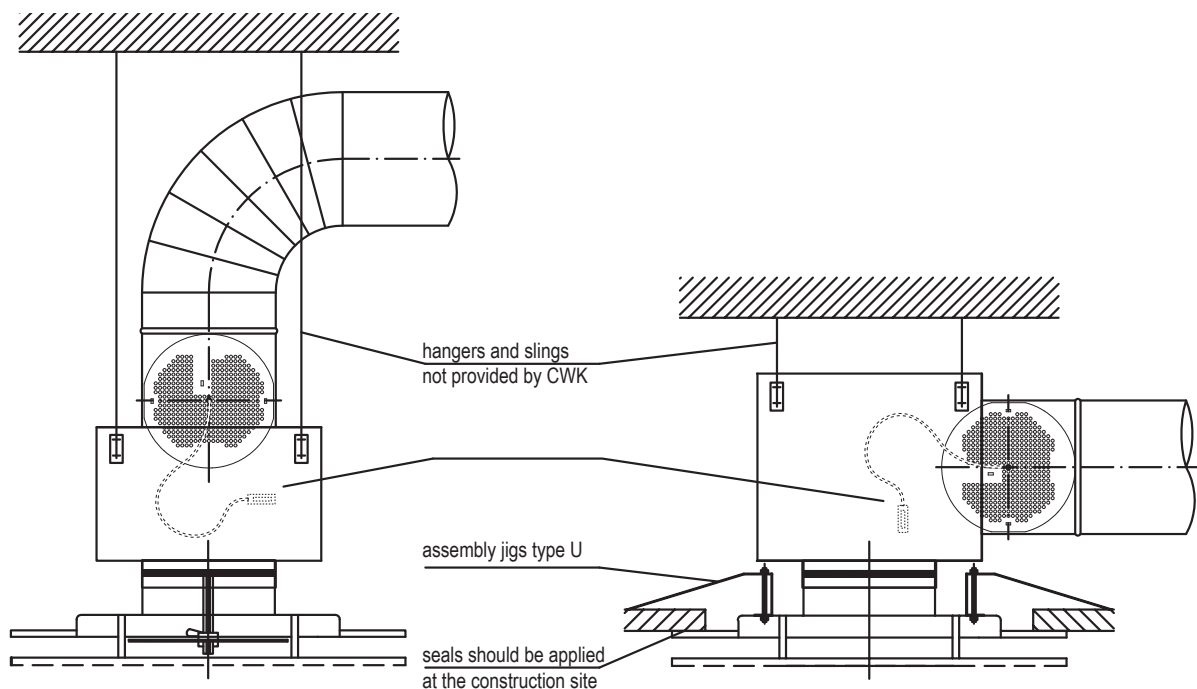
expansion boxes for diffusers NSO, NSO/P, NSO/CP

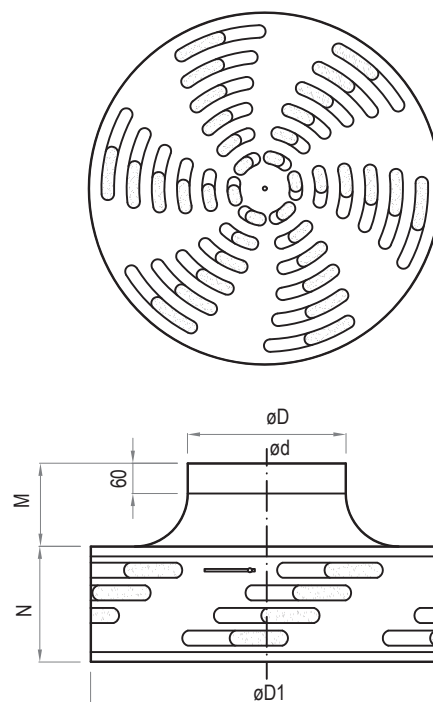
INSTALLATION

2

Expansion boxes SR/NSO are designed for installation in between the ceiling and the underslung ceiling or free hanging from the ceiling. If installing in between the ceiling and underslung ceiling, a hole should be left of a size of $\varnothing C$ for the chosen diffuser. The box can be mounted on the ceiling by appropriate hangers (bars, pins...) and installation slings. NSO, NSO/P and NSO/CP diffusers should be fixed to the underslung ceiling with factory assembly jigs, type U. Upon customer's request, boxes can be equipped with factory slings.

INSTALATION IN THE ROOF





DESCRIPTION

NZG is a variable geometry air vent for air-conditioning and heating systems in high buildings, e.g. shopping centres, sports halls, auditoriums and warehouses. At the same time, it is adjusted for operation in industrial buildings. The variable geometry function makes it possible to adjust the direction and range of the stream of air which is supplied to rooms of different height.

FEATURES

- air vents made of galvanised sheet metal;
- standard painted in RAL 9003;
- customized items can be painted in any colour from the RAL palette;
- air vents also available with electrical or wax servos

STANDARD SIZES

Size	Ø D [mm]	Ø D1 [mm]	M [mm]	N [mm]	Mass [kg]
200	198	450	130	170	5,9
250	248	560	145	200	8,5
315	313	700	165	230	10,3
400	398	900	190	290	12,4
450	448	900	200	320	15,0
500	498	980	220	380	17,5
630	628	1200	250	440	21,5

ORDER REFERENCE

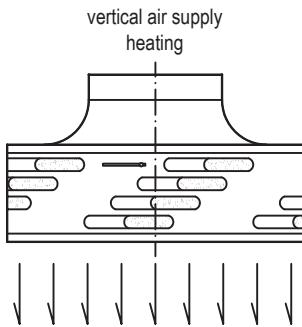
NZG - 400	-	E	-	RAL9003
size		type		colour
				W – wax servo; E – electrical servo - manual adjustment

variable geometry air vents

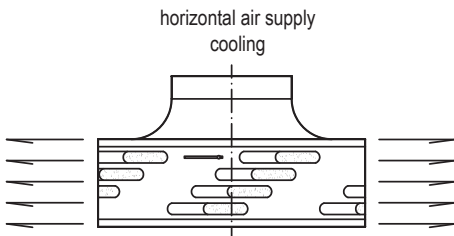
METHOD OF PROVIDING AIR-SUPPLY

2

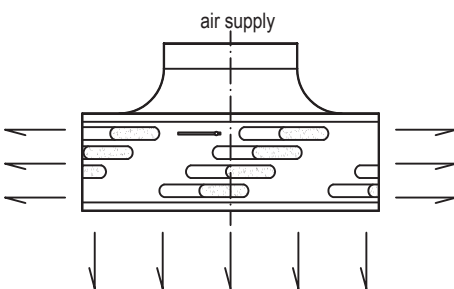
HEATING – as the supplied warm air tends to rise since its density is smaller than the density of the air in the room, it is necessary to supply it vertically down. In this way, it reaches the zones where people are present.



COOLING – as the supplied cold air tends to fall since its density is greater than the density of the air in the room, it is necessary to supply it horizontally. In this way, the stream of cold air reduces its speed before reaching the zones where people are present and reaches as much space of the cooled room as possible.



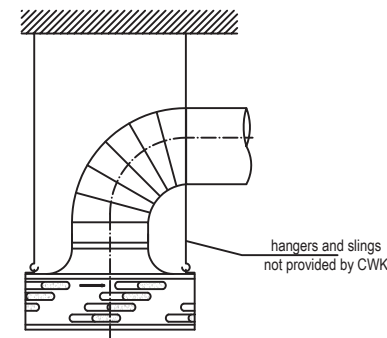
VENTILATION – in case the air-supply has the same temperature as the air in the room, a mixed air-supply must be utilised. In this way, the air is supplied horizontally and vertically, which enables it to reach as much space of the room as possible.



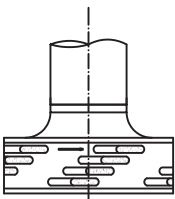
INSTALLATION

NZG air vents may be mounted on ceilings by means of standard slings or directly on the circular section ventilation duct.

INSTALLATION IN THE ROOF



ASSAMBLY TO CHANNEL CIRCULAR CROSS-SECTION



FEATURES

The charts show air efficiency V (m³/h), pressure losses p (Pa), stream range L (m) for final speed equal to 0.25 m/s and noise level [dB(A)].

The given value of stream reach L regards the isothermal vertical and horizontal air-supply. In other cases, the stream range value must be corrected with the coefficients given in the below tables.

HEATING

correction coefficient for the vertical range

ΔT (K)	5	10	15	20
a	0.8	0.6	0.5	0.4

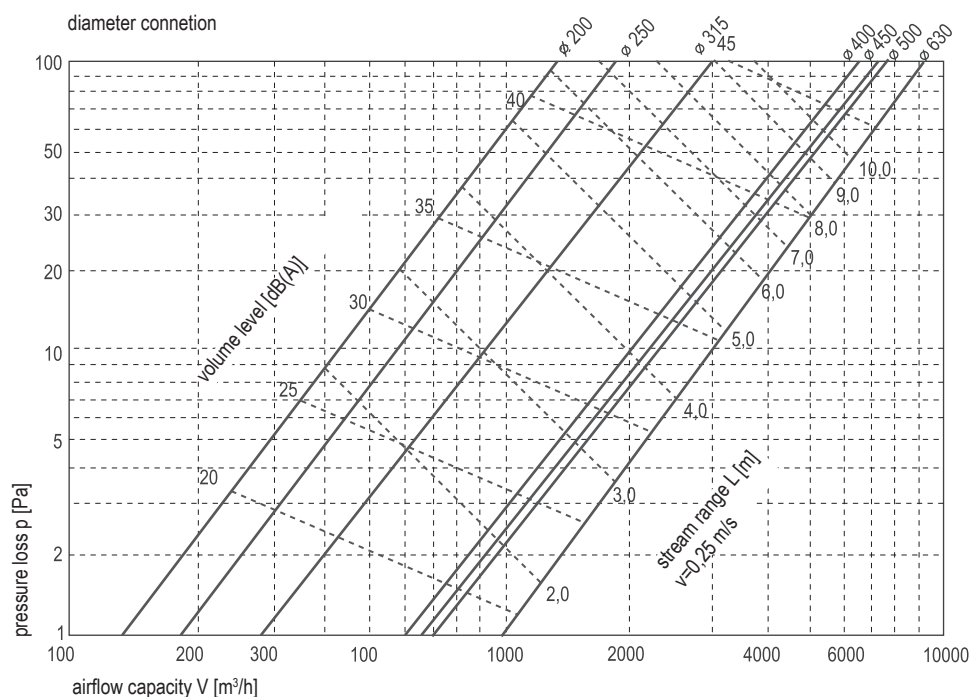
COOLING

falling stream range

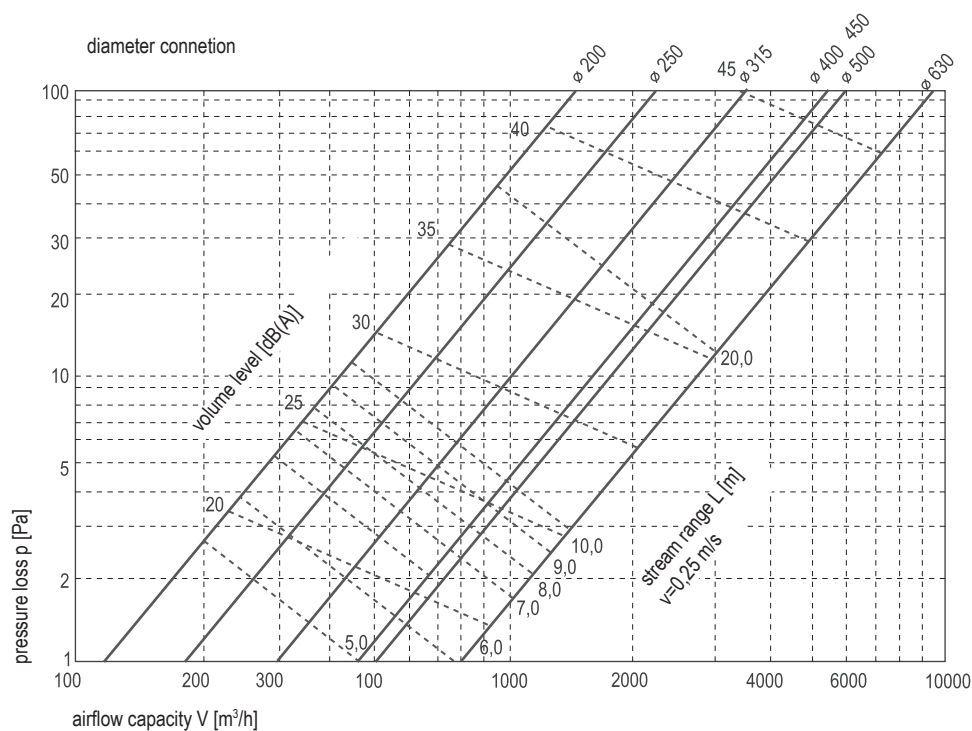
ΔT (K)		2	5	10	15	20
horizontal range [m]	4	<1.0	1.0	2.3	3.5	4.5
	5	1.0	2.5	4.2	7.0	10.0
	6	1.6	3.8	8.0	12.0	-
	7	2.5	7.0	12.0	-	-
	8	3.5	8.0	-	-	-
	9	5.5	12.0	-	-	-

FEATURES

HORIZONTAL AIR-SUPPLY (ISOTHERMAL)



VERTICAL AIR-SUPPLY (ISOTHERMAL)



2.11 NZGK

variable geometry air vents

2



DESCRIPTION

In order to ensure cooling and heating for high rooms it is necessary to provide manually-operated air vents or air vents operated by a servo. In order to ensure the cooling operation, the biggest volume of air is supplied horizontally in order to eliminate draughts. For the heating function to be effective, it is necessary to provide a large vertical range, which decreases the heating time. The NZGK air vent optimally fulfils both the above functions providing effective heating and cooling.

The air vent includes the inflow element and an internal and external basket. The basket has side openings (horizontal air-supply) and bottom openings (vertical air-supply). In order to activate the heating function, the basket must be manually or mechanically turned in order to close the side air-supply openings and open the bottom air-supply openings so that the whole amount of air flows vertically. This creates a very compact stream ensuring its deep range, which, as a result, ensures fast room heating.

In order to activate the cooling function, side air-supply openings are opened and bottom air-supply openings are closed. The division of the air stream into several individual streams ensures high induction and guarantees fast reduction of air speed and temperature differences during the cooling process. The dimensions of the openings on the air vent perimeter and bottom ensure that the air flow direction changes do not cause any changes in resistance or acoustic power values.

By adjusting the damper You can easily and accurately set the desired flow to the diffuser. Diffusers are also available with the electric actuator. Internal basket is fixed by the adjust screw.

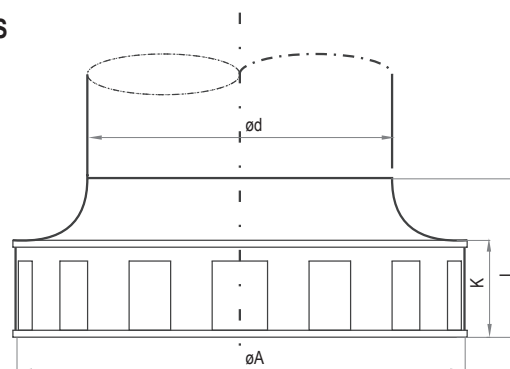
DIFFUSER

- housing and ventilation basket made of steel sheet varnished to white (RAL 9003);
- varnished steel sheet in other RAL colours is available for extra charge

AIR VENT SELECTION

Size		300	400	500	600	800
Vmin	(m³/h)	170	280	605	830	1680
	[l/s]	47	78	168	231	467
Vmax	(m³/h)	810	1380	2330	3080	5450
	[l/s]	225	383	647	856	1514
V with 40	(m³/h)	450	640	1075	1440	2590
dB(A)	[l/s]	125	178	299	400	719

SIZES



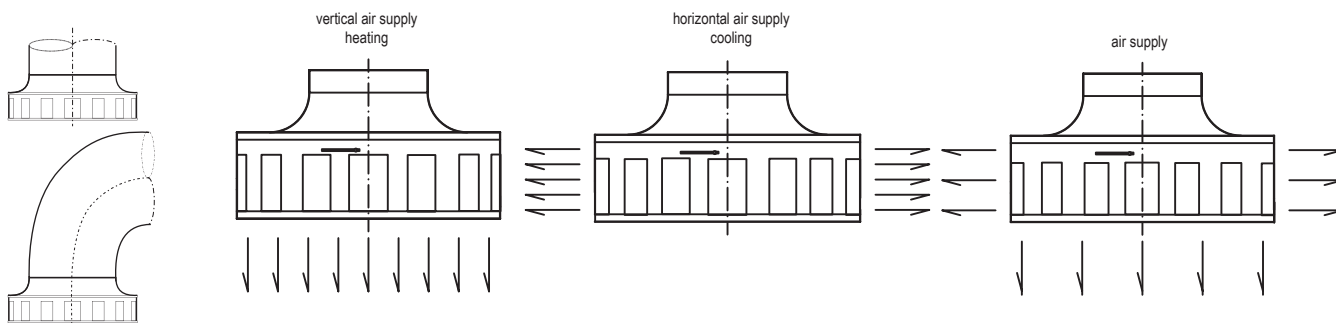
SIZES

Size	øA	ød	K	L
300	300	175	79	144
400	400	245	98	175
500	500	310	120	200
600	600	395	136	221
800	800	495	185	310

ORDER REFERENCE

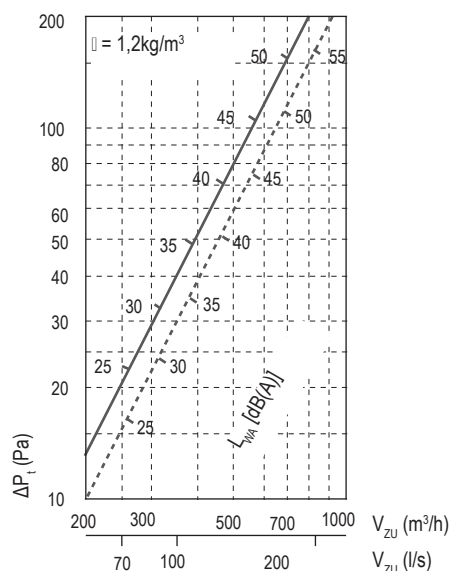
NZG - 400	-	E	-	RAL9003
size		typ		colour
				E - siłownik elektryczny - regulacja ręczna

TECHNICAL DATA

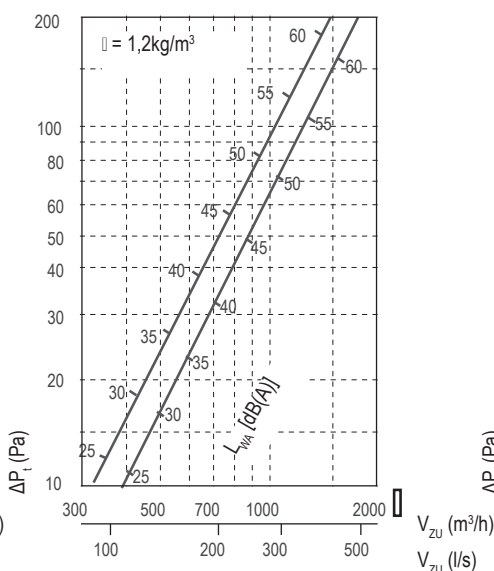


2

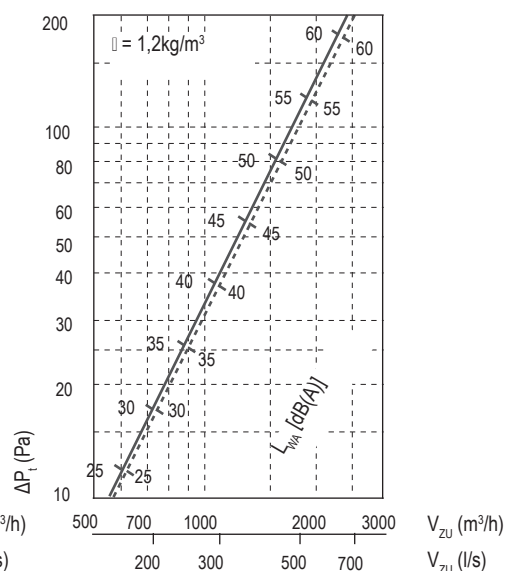
NZGK 300



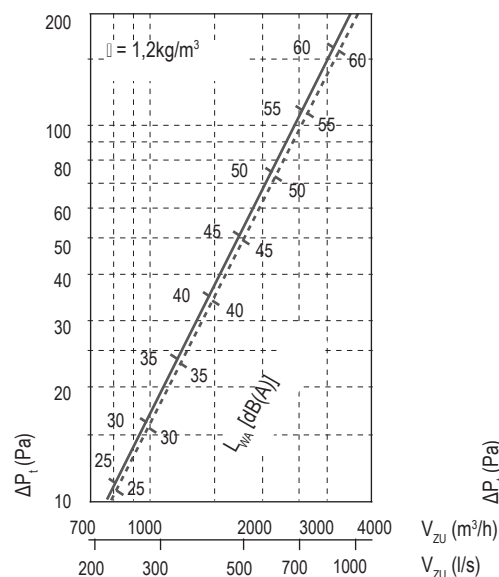
NZGK 400



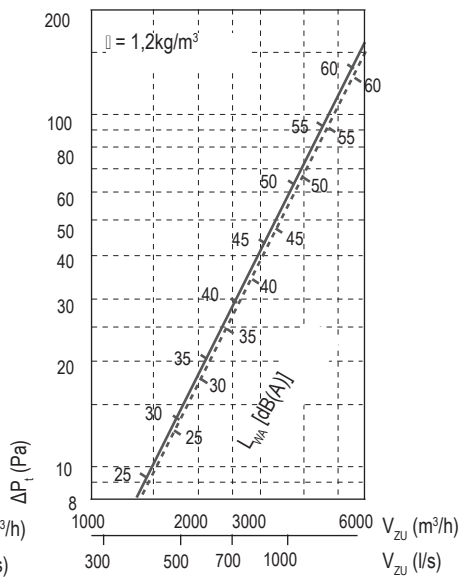
NZGK 500



NZGK 600



NZGK 800



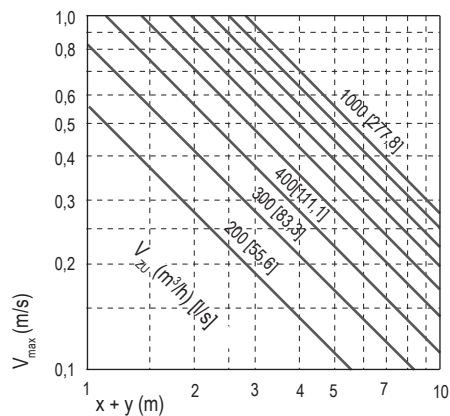
2.11 NZGK

variable geometry air vents

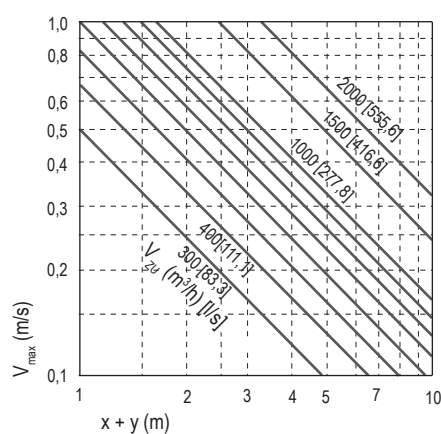
MAXIMUM AIR STREAM SPEED WITHOUT INFLUENCE ON THE CEILING

2

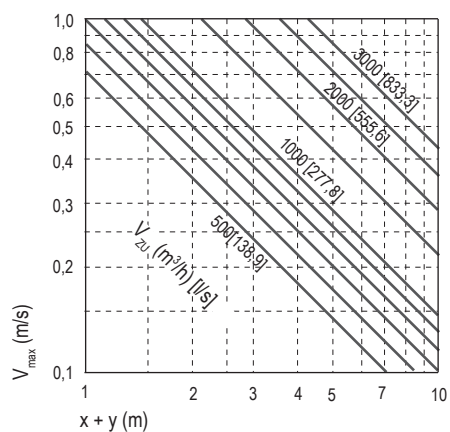
NZGK 300



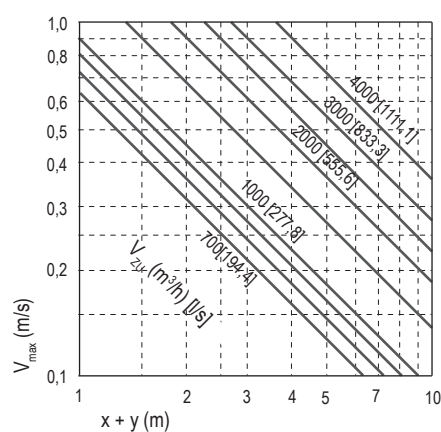
NZGK 400



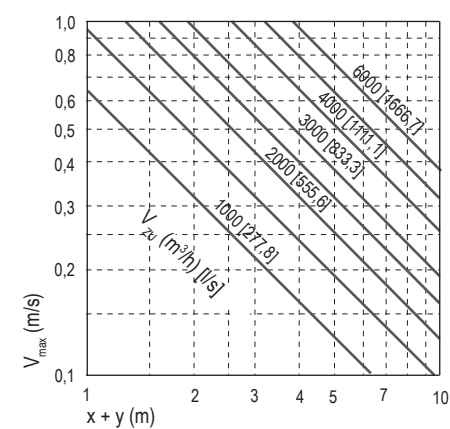
NZGK 500



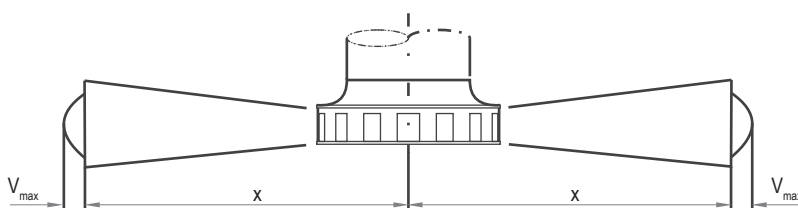
NZGK 600



NZGK 800

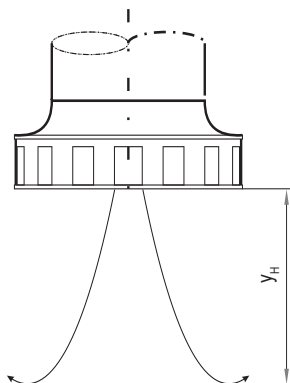


with ceiling influence $V_{max} \times 1.4$

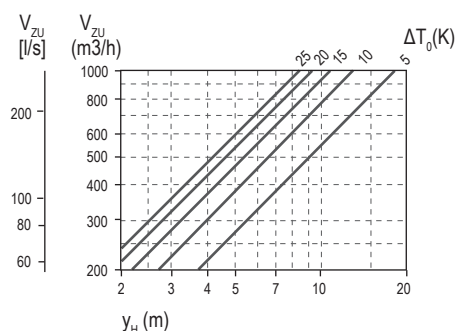


MAXIMUM AIR VENT AIR-SUPPLY

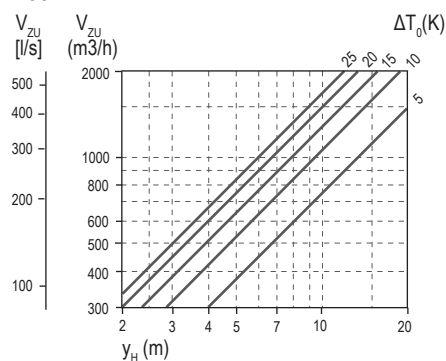
FOR HEATING



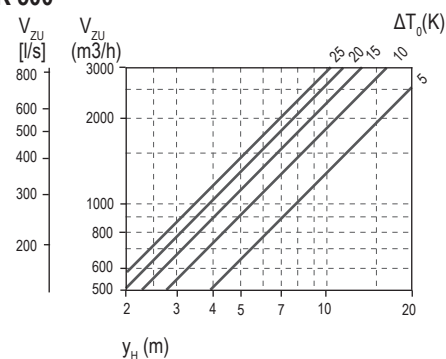
NZGK 300



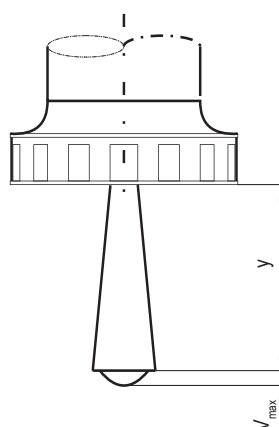
NZGK 400



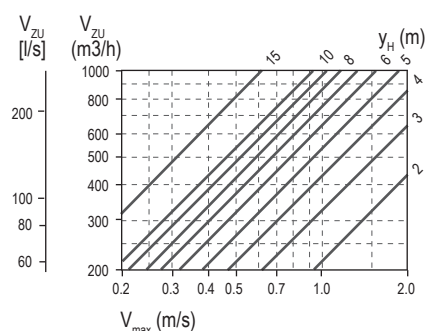
NZGK 500



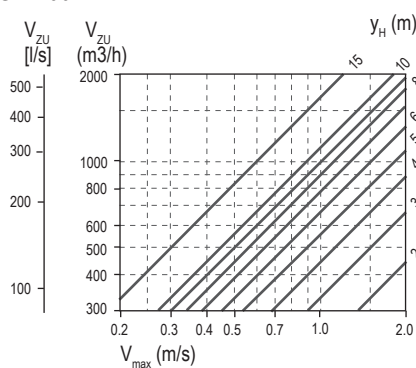
ISOTHERMAL AIR-SUPPLY



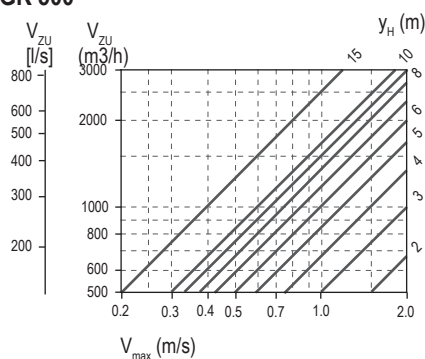
NZGK 300



NZGK 400



NZGK 500



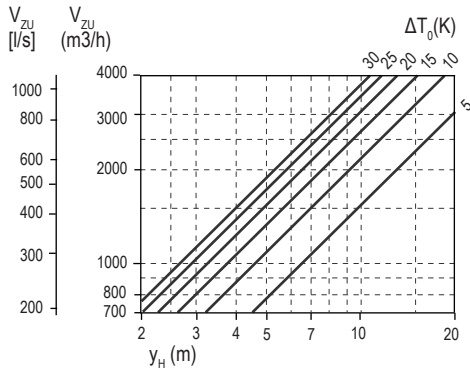
2.11 NZGK

variable geometry air vents

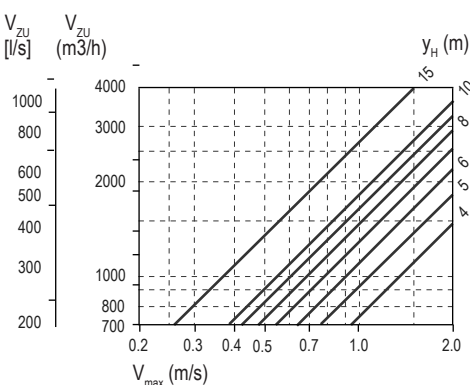
MAXIMUM AIR VENT AIR-SUPPLY

2

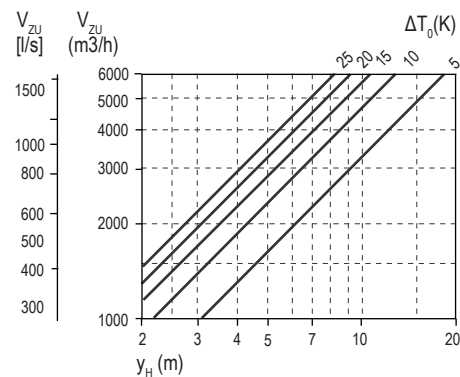
NZGK 600



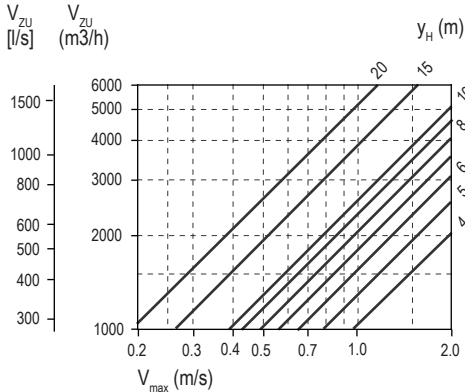
NZGK 600



NZGK 800

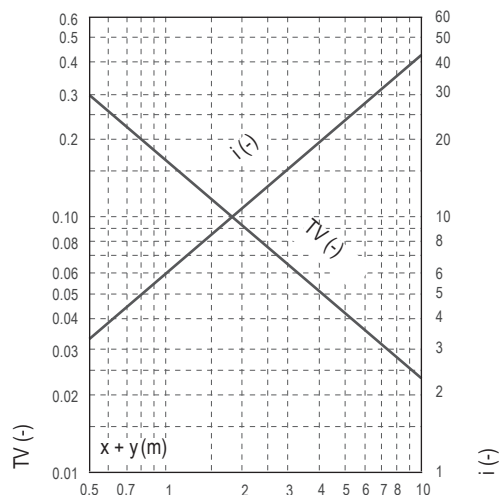


NZGK 800

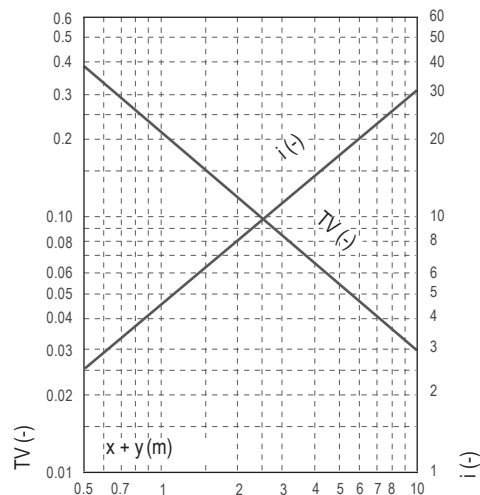


THE COEFFICIENT OF REDUCTION OF TEMPERATURE AND INDUCTION DIFFERENCES

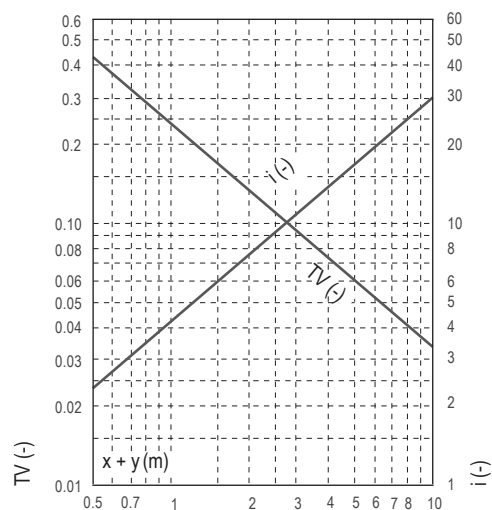
NZGK 300



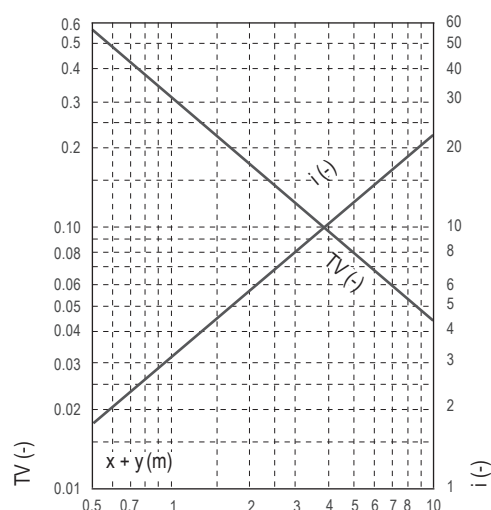
NZGK 400



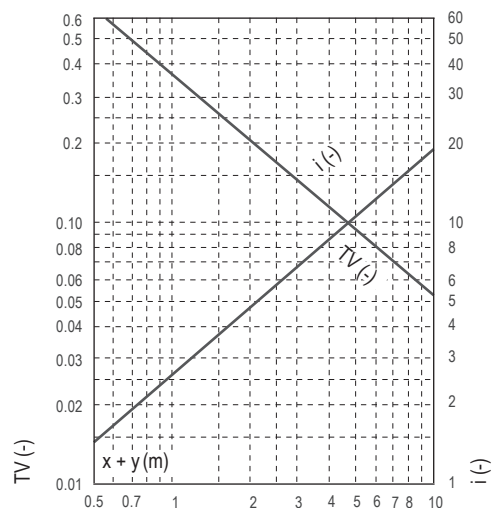
NZGK 500



NZGK 600



NZGK 800



variable geometry air vents

2

Vzu (m³/h) volume of supplied air

Vzu [l/s] volume of supplied air

yH (m) maximum air range during heating operation

DTΔ (K) różnica temperatur pomiędzy powietrzem nawiewanym a

LW (dB/Okt] temperatury

tZU (C) supplied air temperature

tR (C) room temperature

LWA [dB(A)] acoustic power level in scale A

fm (Hz) - average frequency in octaves

Vmax (m/s) maximum air stream speed

x (m) horizontal stream

y (m) vertical stream

TV (-) difference reduction coefficient

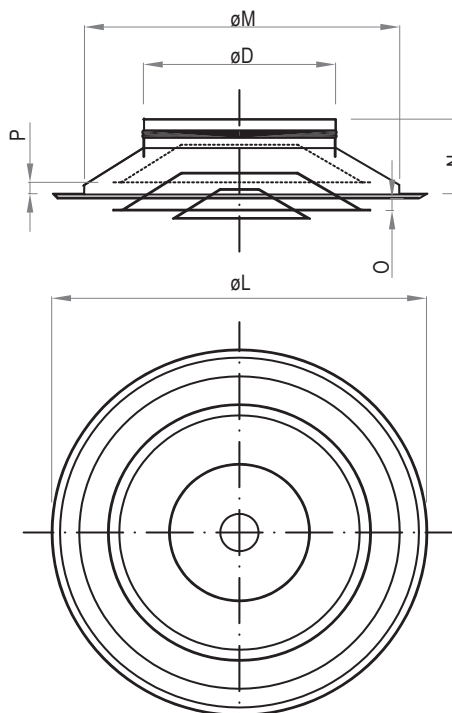
i (-) temperaturą pomieszczenia

i (-) induction coefficient

Dpt (PA) pressure loss

(kg/,3) - density

NW (mm) size



DESCRIPTION

OAN are round supply diffusers, designed for low- and medium-pressure installations. They can be used with constant and variable airflow. Air can be supplied vertically or horizontally therefore those diffusers can be used for both – cooling and heating houses and industrial facilities. Supply diffusers can supply large quantities of air. It is recommended to install them in ceiling plane.

FEATURES

- large airflow stream
- air can be supplied vertically or horizontally (heating or cooling)
- made of zinc-coated sheet and available in standard RAL 9003 colour
- can be installed with an expansion can SR/OAN or directly into the ventilation duct
- upon customer's request, can be made in any colour from RAL palette

STANDARD SIZES

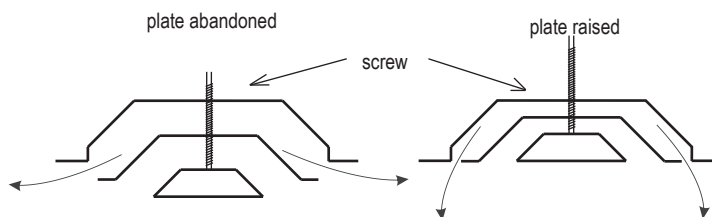
Size	Ø L [mm]	Ø D [mm]	Ø M [mm]	N [mm]	O [mm]	P [mm]	Mass [kg]
125	305	124	270	82	9,5	10	1,0
160	305	159	270	82	13	10	1,0
200	378	199	330	84	14	13	1,5
250	477	249	420	99	17	16	2,2
315	591	314	530	116	20	20	3,4
400	600	398	540	128	24	24	5,1

Ø M - installation hole size

ORDER REFERENCE

OAN - 250 – **RAL9003**

typ
size
colour



2.12 OAN

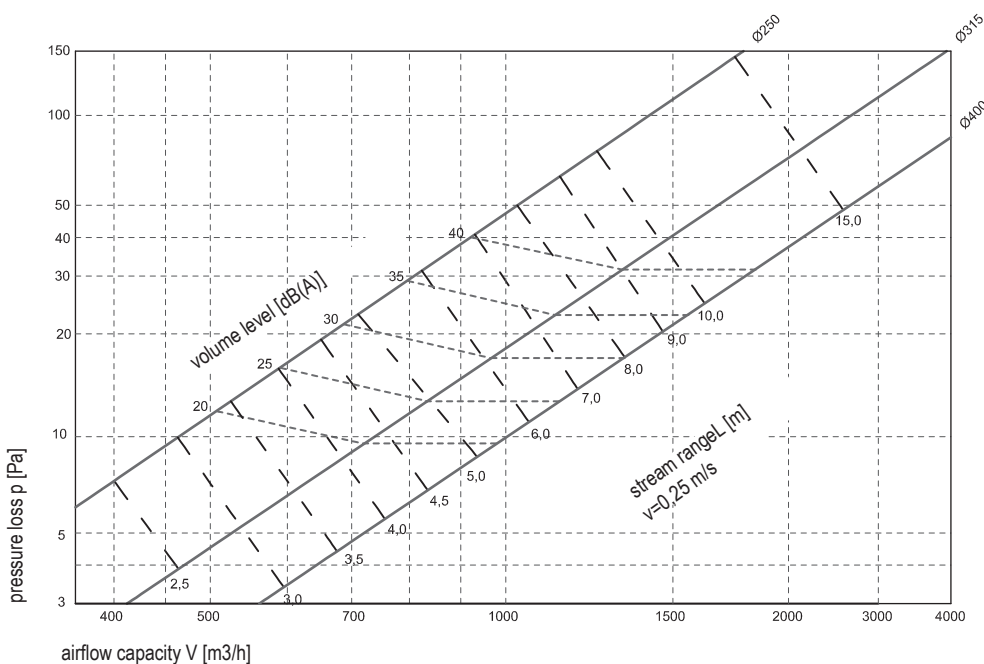
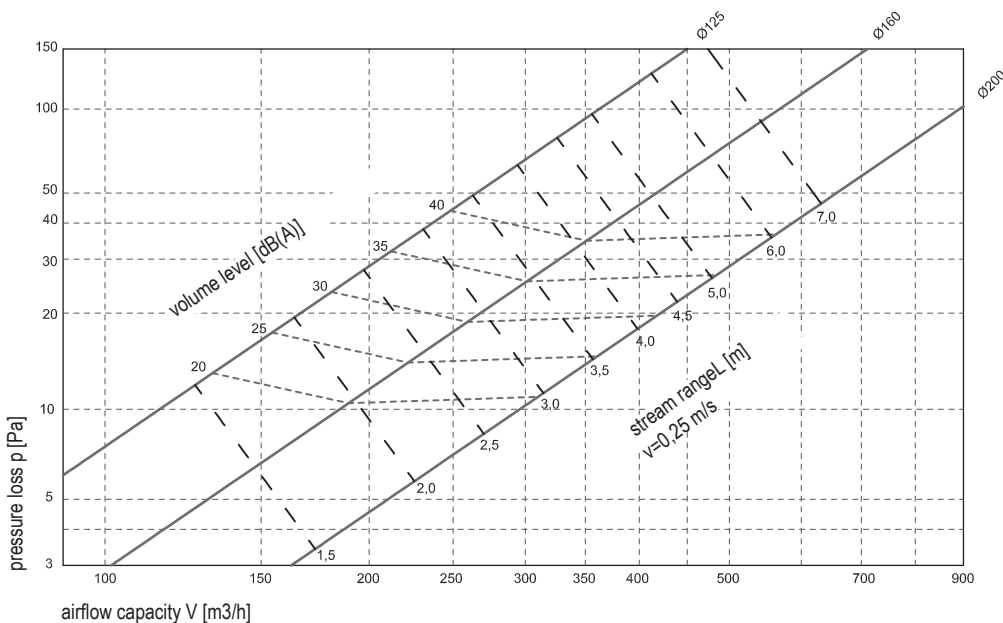
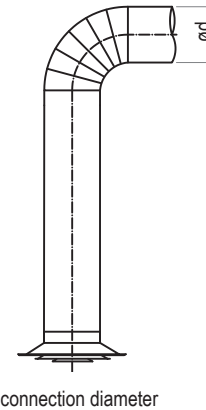
round supply diffusers

INSTALLATION

OAN diffusers can be installed directly in the round ventilation duct or expansion box SR/OAN. In both cases rivets or screws should be used for installation.

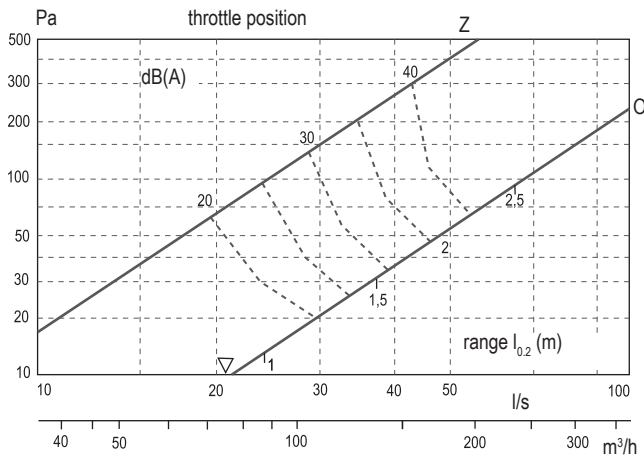
FEATURES

The figure shows airflow capacity V (m³/h), pressure loss p (Pa), air-flow scope L (m) for end speed of 0.25 m/s, and volume level [dB(A)]. The airflow scope L relates to isothermal air supply.

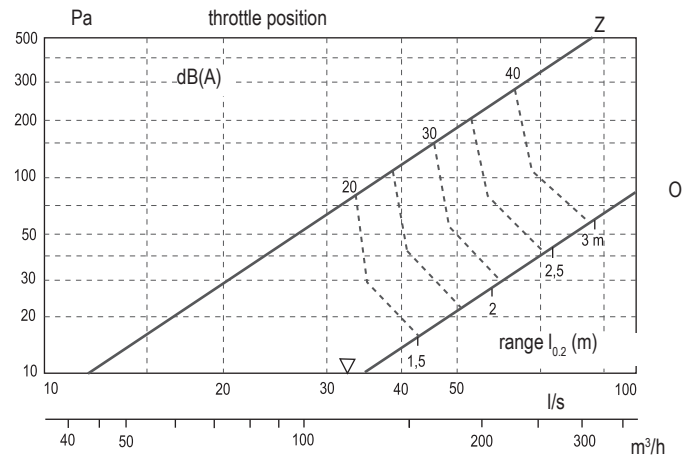


FLOW - PRESSURE DROP - SOUND LEVEL - RANGE

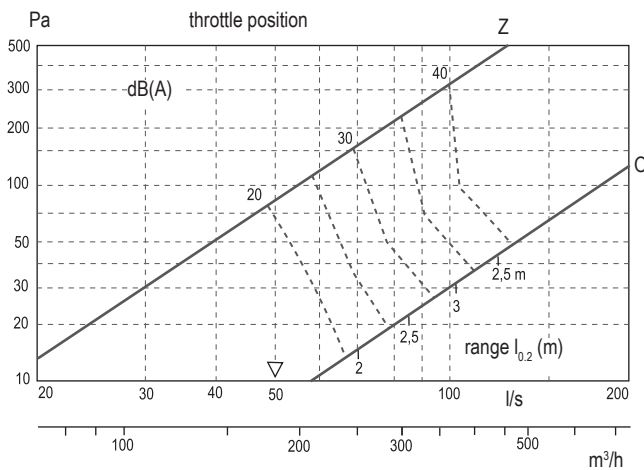
OAN 125 + SR/OAN HORIZONTAL OUTFLOW



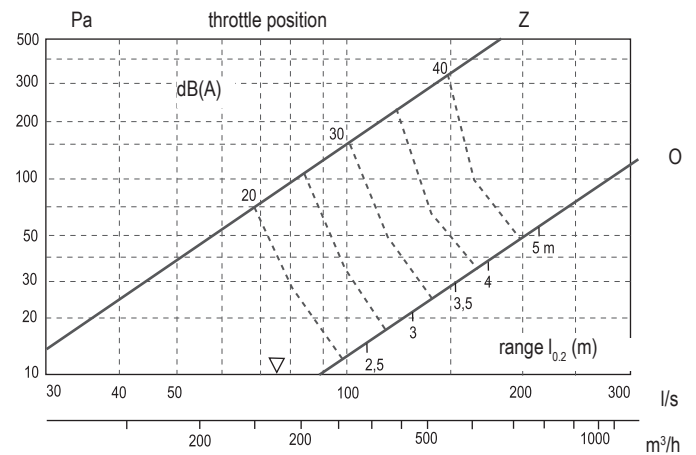
OAN 160 + SR/OAN HORIZONTAL OUTFLOW



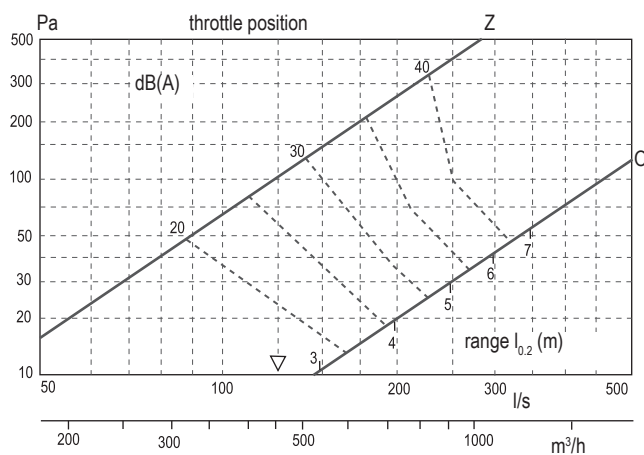
OAN 200 + SR/OAN HORIZONTAL OUTFLOW



OAN 250 + SR/OAN HORIZONTAL OUTFLOW



OAN 315 + SR/OAN HORIZONTAL OUTFLOW



Characteristics can not be used for adjustment.

▽ - Adjustable minimum flow

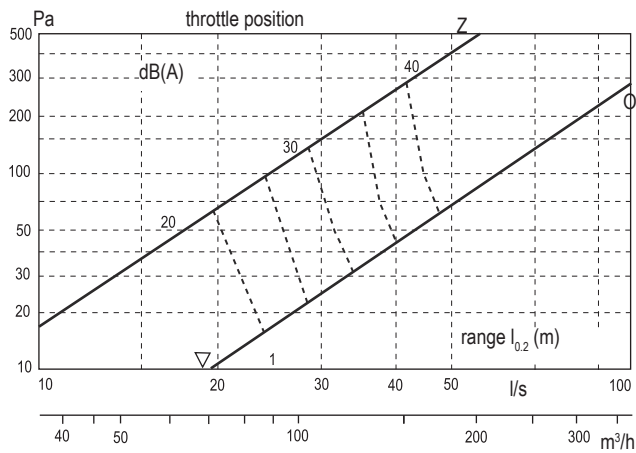
2.12 OAN

round supply diffusers

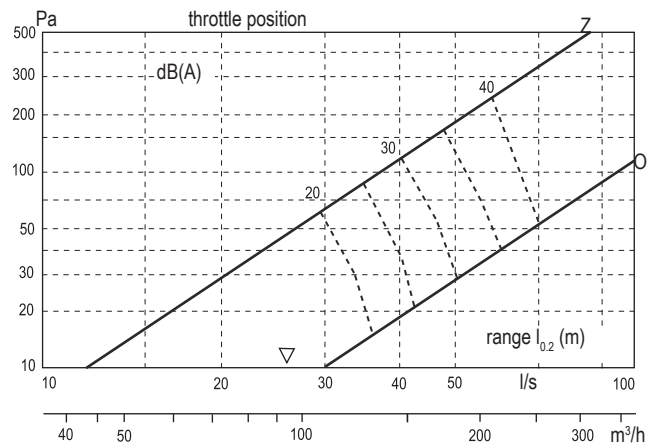
FLOW - PRESSURE DROP - SOUND LEVEL

2

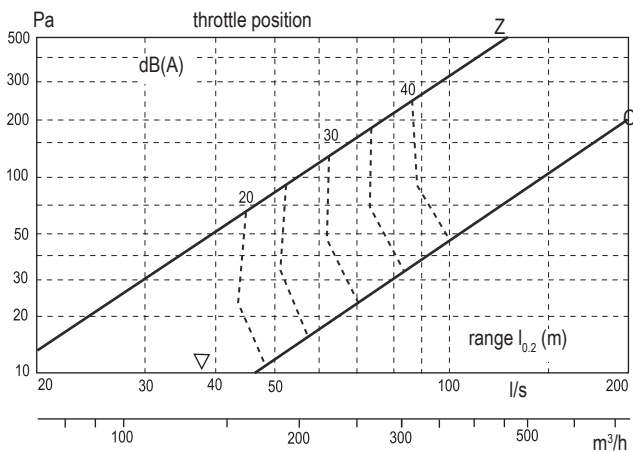
OAN 125 + SR/OAN VERTICAL OUTFLOW



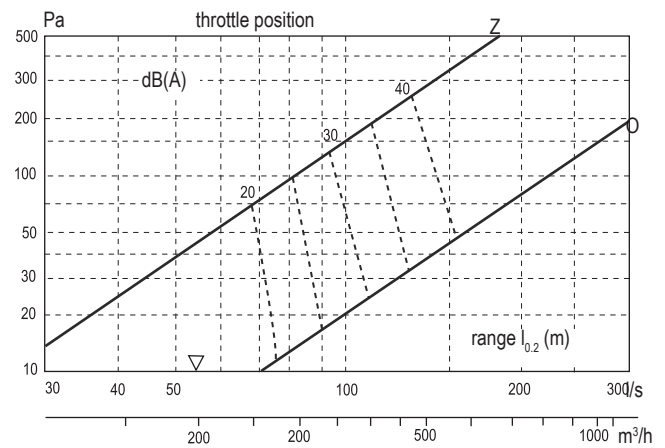
OAN 160 + SR/OAN VERTICAL OUTFLOW



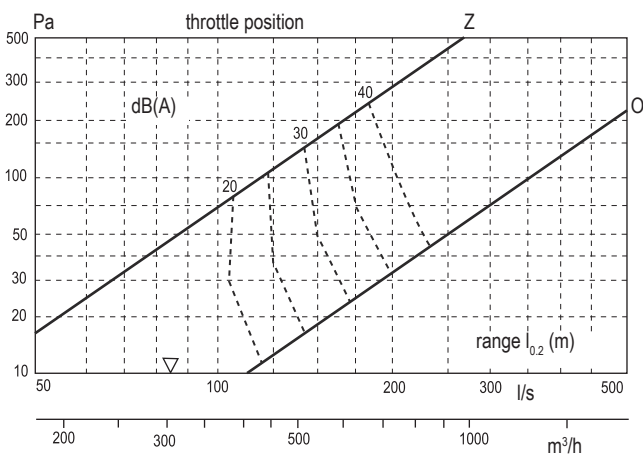
OAN 200 + SR/OAN VERTICAL OUTFLOW



OAN 250 + SR/OAN VERTICAL OUTFLOW

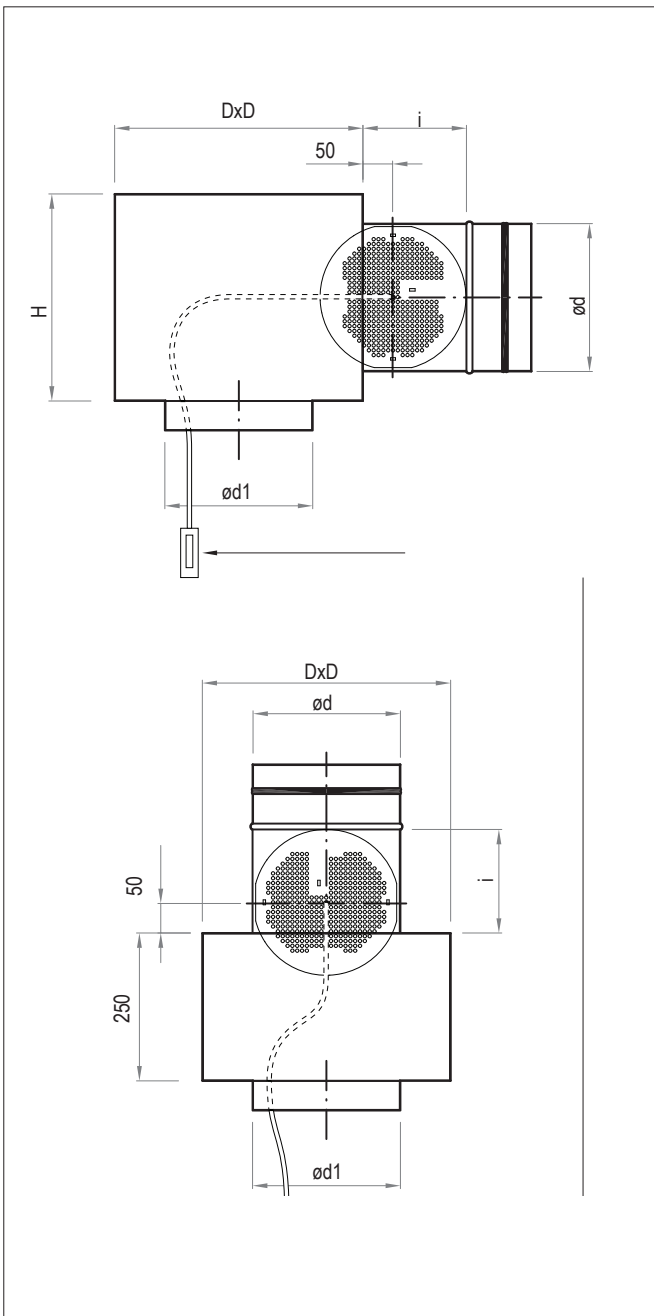


OAN 315 + SR/OAN VERTICAL OUTFLOW



Characteristics can not be used for adjustment.

▽ - Adjustable minimum flow



Expansion boxes can be connected to the ventilation installation through the side or top. Boxes can be thermally and acoustically insulated from the inside by K-Flex rubber mat. Upon customer's request we can make other types of expansion boxes accordingly to provided drawings.

ORDER REFERENCE

SR / OAN - 200 - PZ - I - g

SR / OAN - 200 - PZ - I - g
 size
 diffuser type
 PZ throttle controlled from outside.
 PW throttle controlled from inside.
 no throttle
 I non-insulated
 - insulated
 g top connection
 b side connection

STANDARD SIZES

Size	125	160	200	250	315	400
D [mm]	225	260	300	350	420	500
H[mm]	225	260	300	350	420	500
Ød [mm]	98	123	158	198	248	313
Ød1 [mm]	125	160	200	250	315	400
i [mm]	115	130	150	175	210	250

DESCRIPTION

SR/OAN are expansion boxes for OAN diffusers. They stabilize the airflow and ensure uniform air supply to the diffuser. Expansion boxes connect diffusers with ventilation installation. They are made of zinc-coated sheet, joint by non-welded Click-Clock connection. In standard expansion boxes are equipped on the ferrule with machine crimped rubber gasket.

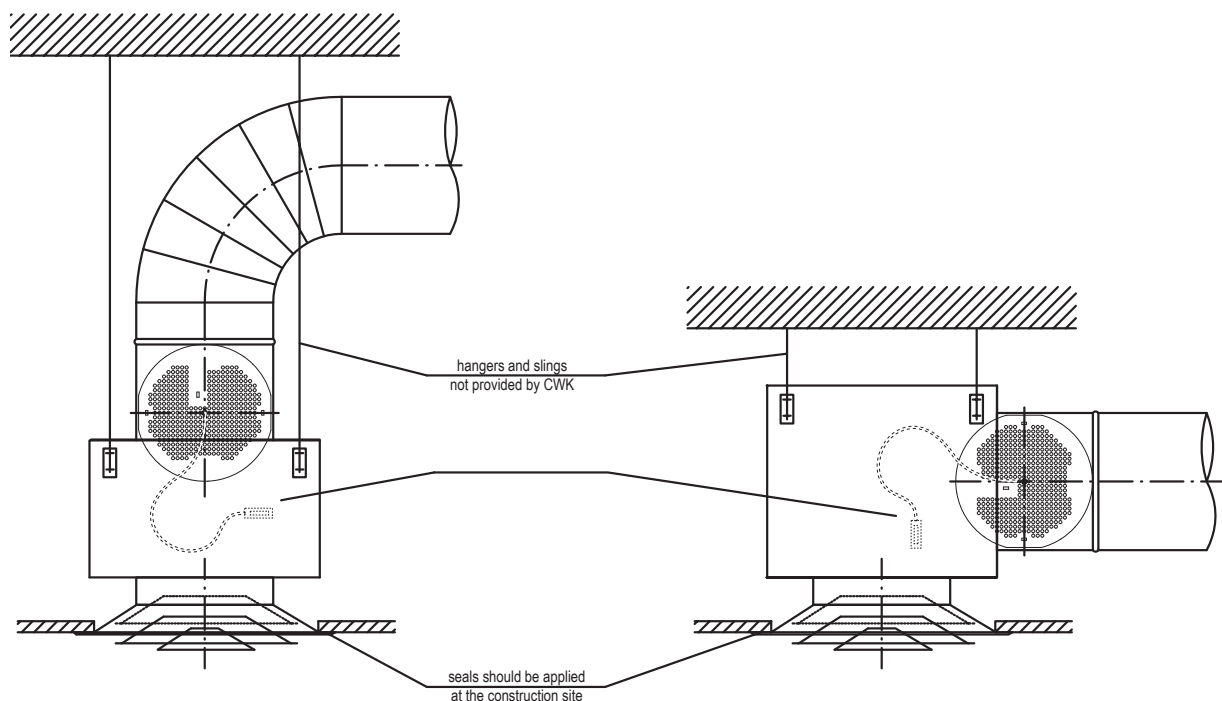
expansion boxes for diffusers OAN

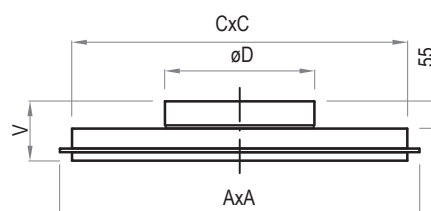
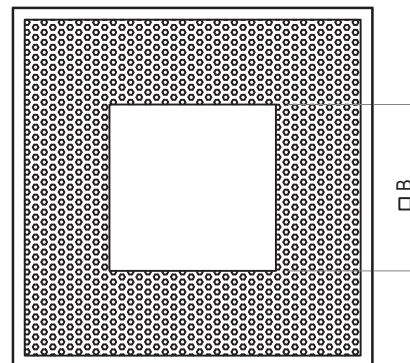
MONTAŻ

2

Expansion boxes SR/OAN are designed for installation in between the ceiling and the underslung ceiling or free hanging from the ceiling. If installing in between the ceiling and underslung ceiling, a hole should be left of a size of ØM for the chosen diffuser. The box can be mounted on the ceiling by appropriate hangers (bars, pins...) and installation slings. Upon customer's request, boxes can be equipped with factory slings.

INSTALATION IN THE ROOF





DESCRIPTION

PSKN are square perforated air grates designed for low- and medium-pressure installations. They can be used with constant and variable airflow. The air can be supplied at the temperature by 12°C than the temperature in the ventilated room. It is recommended to install PSKN into the ceiling.

FEATURES

- short airflow stream
- can be installed with an expansion can SR/KPNS
- available in standard RAL 9003 colour
- upon customer's request, can be made in any colour from RAL palette

INSTALLATION

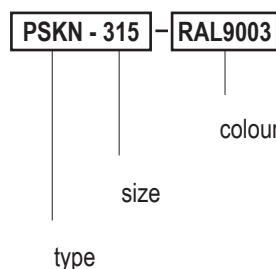
PSKN diffusers can be installed directly in the round ventilation duct or expansion box SR/ PSKN. In both cases rivets or screws should be used for installation.

Both sizes of PSKN air grate are adjusted to the standard ceiling system 600x600 mm and can be installed directly on the frame of T profile.

STANDARD SIZES

	250	315
ØD [mm]	248	313
A [mm]	595	595
B [mm]	270	270
C [mm]	550	550
V [mm]	175	175

ORDER REFERENCE



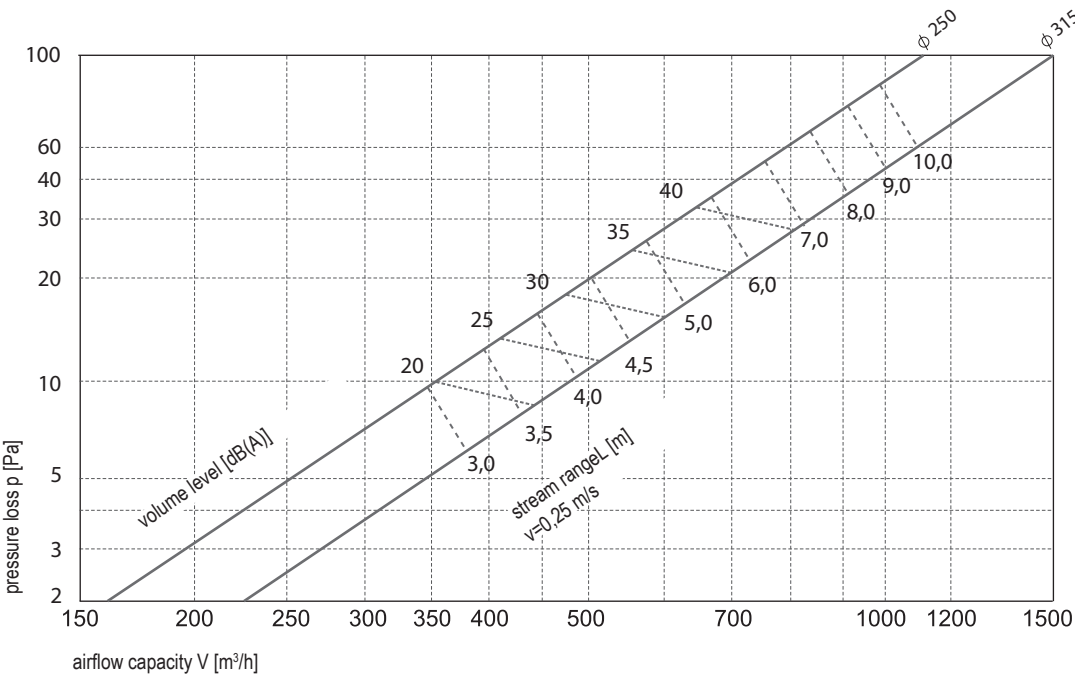
2.13 PSKN

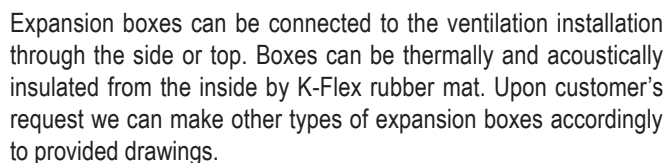
perforated ceiling air grates

FEATURES

The figure shows airflow capacity V (m^3/h), pressure loss p (Pa), airflow scope L (m) for end speed of 0.25 m/s, and volume level [db(A)].

Values of the airflow scope L relate to isothermal air supply.





SR / PSKN - 250 - PZ - I - g

size
diffuser type

Size	250	315
D [mm]	500	500
H[mm]	350	420
Ød [mm]	198	248
Ød1 [mm]	250	315
i [mm]	175	200

SR/PSKN are expansion boxes for PSKN air grates. They stabilize the airflow and ensure uniform air supply to the diffuser. Expansion boxes connect diffusers with ventilation installation. They are made of zinc-coated sheet, joint by non-welded Click-Clock connection. In standard expansion boxes are equipped on the ferrule with machine crimped rubber gasket.

2.13 SR/PSKN

extension box for air grates PSKN

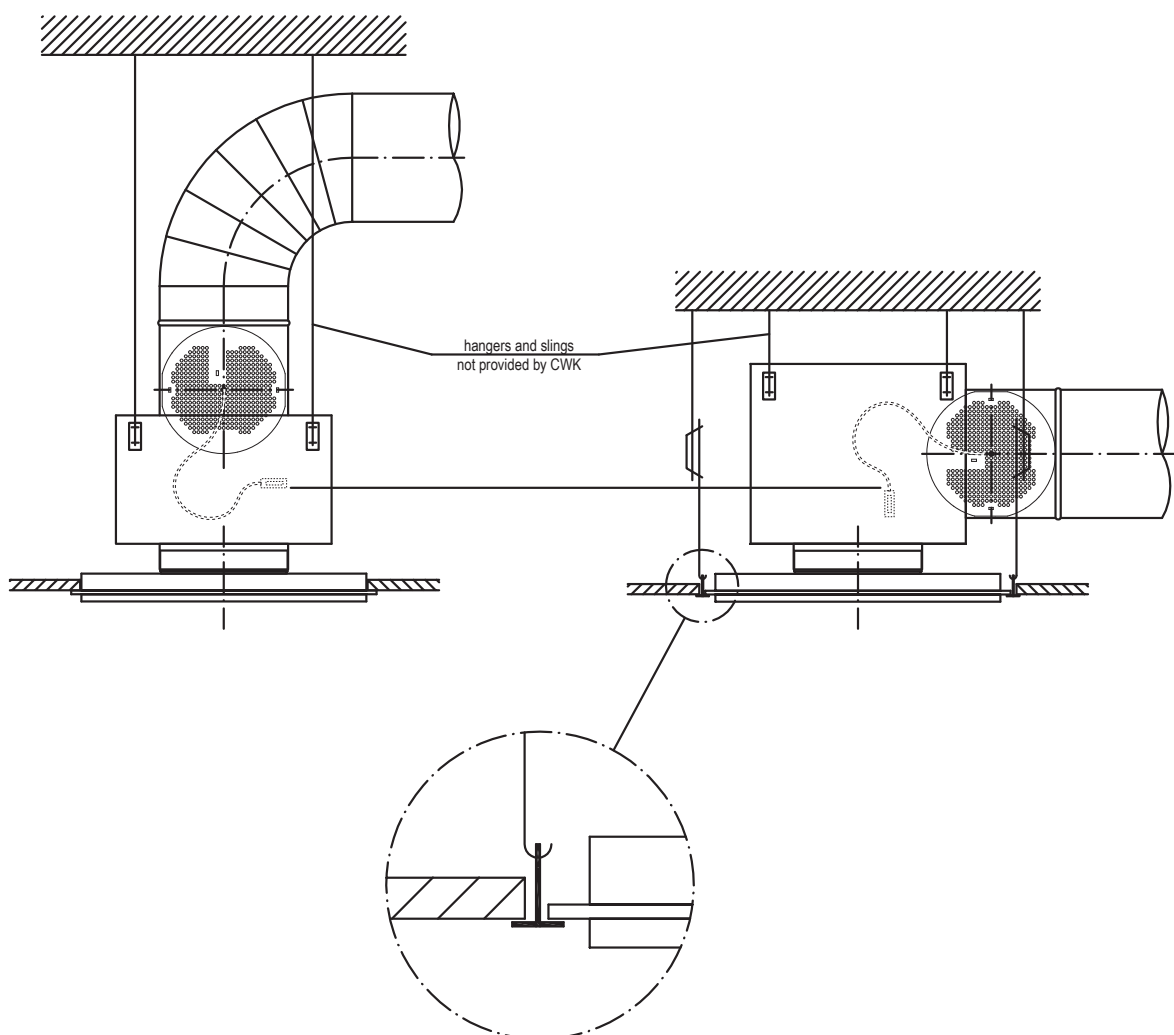
INSTALLATION

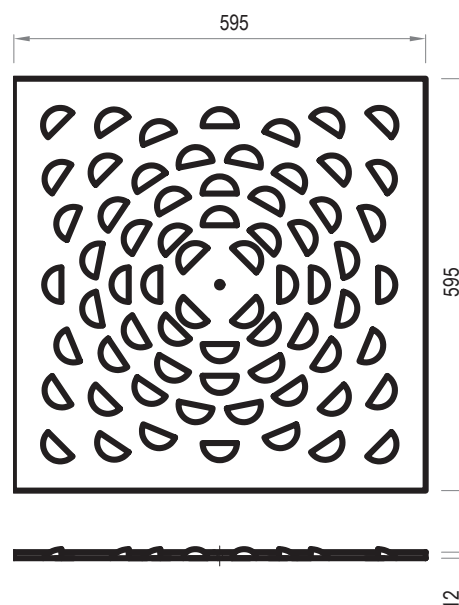
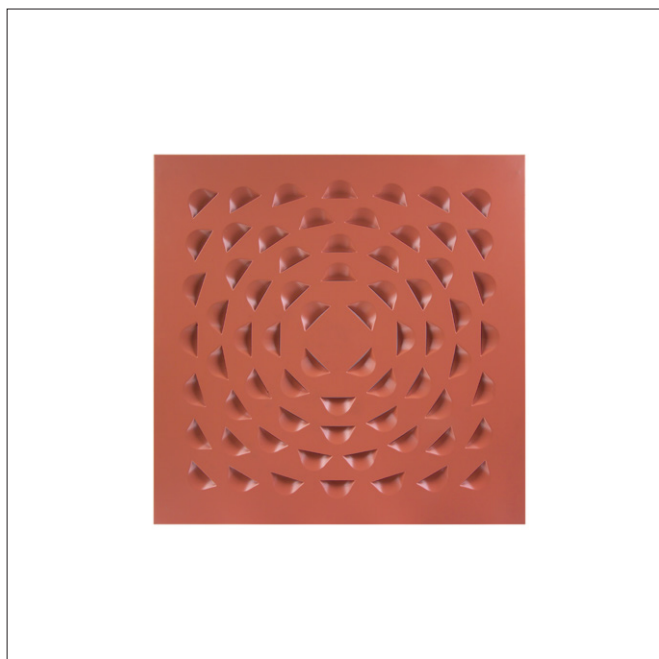
2

Expansion boxes SR/PSKN are designed for installation between the ceiling and underslung ceiling. Prepare an installation hole of a size of 595x595 mm or leave out standard underslung ceiling module. The box can be mounted on the ceiling by appropriate hangers (bars, pins...) and installation slings.

Upon customer's request, boxes can be equipped with factory slings.

INSTALLATION IN THE ROOF





DESCRIPTION

RL are square, highly inductive diffusers designed for low- and medium-pressure installations. They can be used with constant and variable airflow for rooms as high as 2.4 – 4.4 m. The air can be supplied at the temperature lower or higher than the temperature in the ventilated room. Therefore those diffusers can be used for both – heating and cooling. It is recommended to install RL diffusers in the ceiling.

Diffusers RL are perfect for public buildings like offices, hotels, restaurants, conference halls and everywhere, where comfortable temperature conditions are required. diffuser sizes are compatible with underslung ceilings panels.

FEATURES

- made of steel sheet and available in standard RAL 9003 colour
- can be installed with an expansion can SR/RL
- front panel of standard size – 595x595
- upon customer's request, can be made in any colour from RAL palette
- highly resistant
- can be of any size on special order
- redrawing a single performance at 50 Pa - 8 m³/h

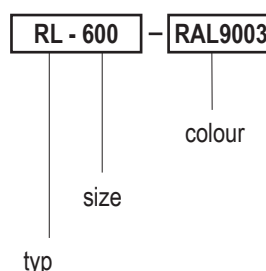
INSTALLATION

RL are designed for installation with the expansion box SR/RL.

INSTALLATION IN THE FULL UNDERSLUNG CEILING: prepare an installation hole in the ceiling of a size of the expansion box. Put the expansion box in so that edges stick out by approx. 12 mm from the ceiling panel. Fix it with steel screws. Remember to seal joints.

INSTALLATION IN PANEL CEILING: diffuser together with the expansion box should be installed above the ceiling level so that the front panel of the diffuser sticks evenly to the ceiling panel.

ORDER REFERENCE



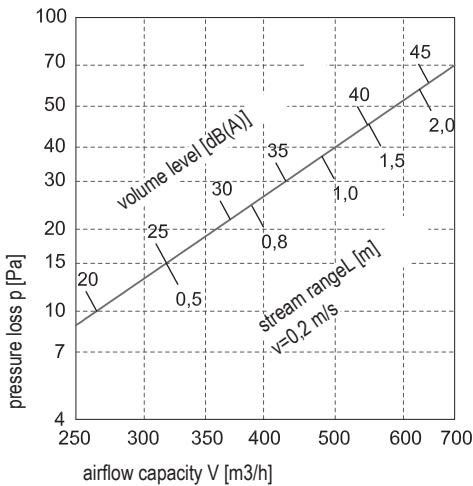
ceiling diffusers

FEATURES

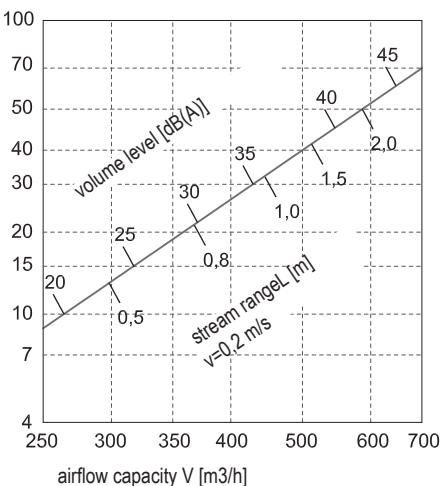
The figure shows airflow capacity V (m³/h), pressure loss p (Pa), air-flow scope L (m) for end speed of 0.2 m/s, and volume level [dB(A)].

2

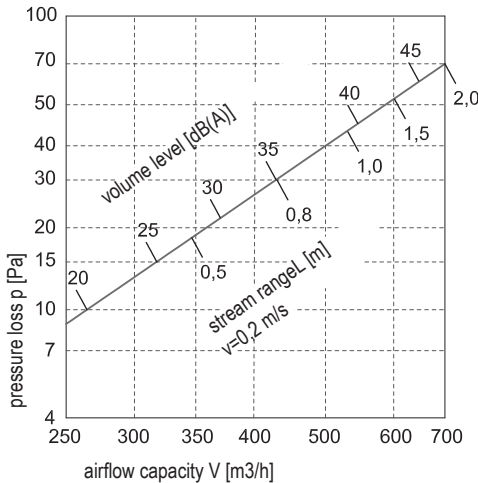
ISOTHERMAL VENTILATION

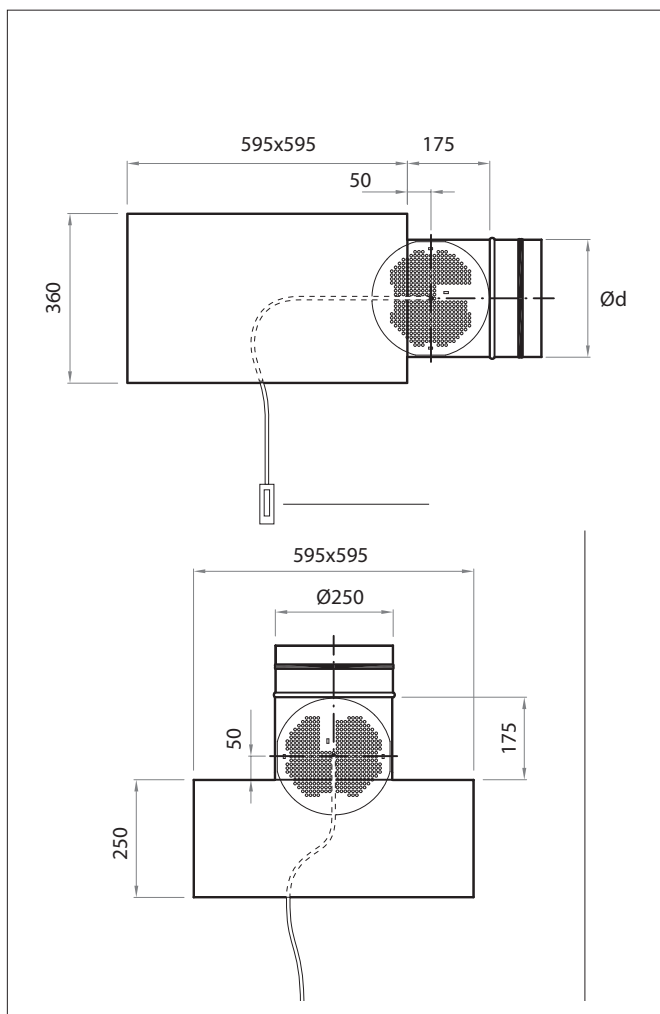


HEATING



COOLING





DESCRIPTION

SR/RL are expansion boxes for RL diffusers. They stabilize the air flow and ensure uniform air supply to the diffuser. Expansion boxes connect diffusers with ventilation installation. They are made of zinc-coated sheet, joint by non-welded Click-Clock connection. Expansion boxes can be connected to the ventilation installation through the side or top. Boxes can be thermally and acoustically insulated from the inside by K-Flex rubber mat. Upon customer's request we can make other types of expansion boxes accordingly to provided drawings. In standard expansion boxes are equipped on the ferrule with machine crimped rubber gasket. The expansion box may be provided with a mounting bar, which allows the diffuser assembly with a single bolt through the hole placed in the central part of the diffuser.

ORDER REFERENCE

SR / RL - 600 - PZ - I - g - p

Additional accessories
P - mounting crossbar

b side connection
g top connection

- non-insulated
I insulated

- no throttle
PW throttle controlled from inside.
PZ throttle controlled from outside.

size

diffuser type

SR expansion box
PS spiro transition

PS - SPIRO TRANSITION



ADDITIONAL ACCESSORIES

P - mounting crossbar

expansion boxes for diffusers RL

INSTALLATION

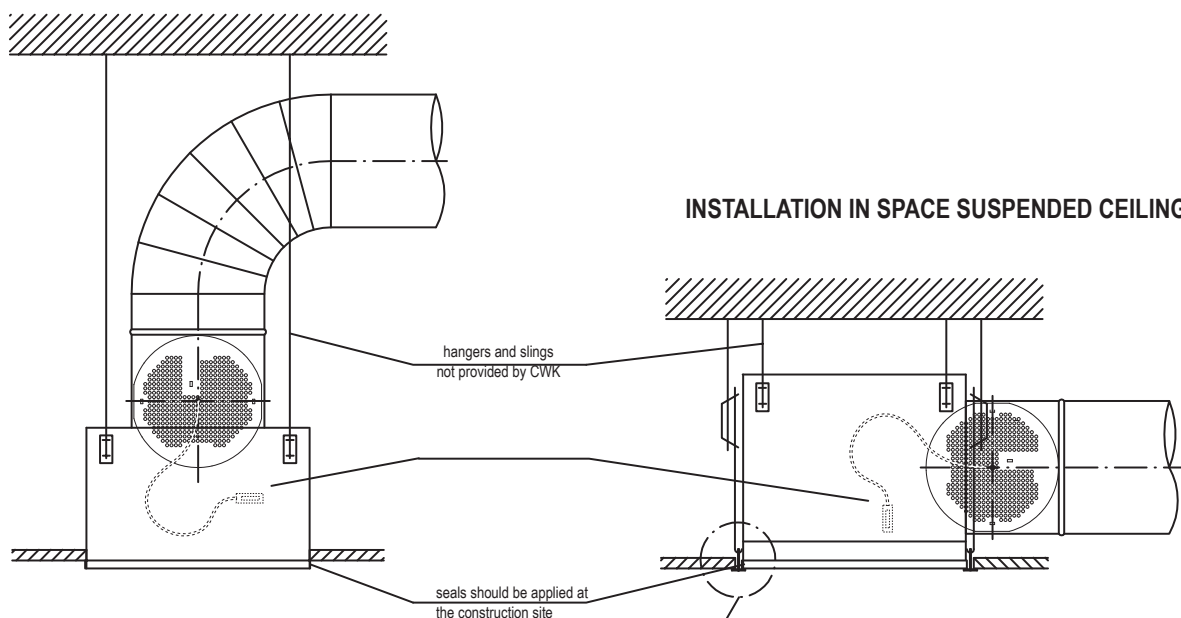
2

Expansion boxes SR/RL are designed for installation between the ceiling and underslung ceiling,. Prepare an installation hole of a size of 595x595 mm. The box can be mounted onto the ceiling by appropriate hangers (bars, pins...) and installation slings or fixed directly to the underslung ceiling.

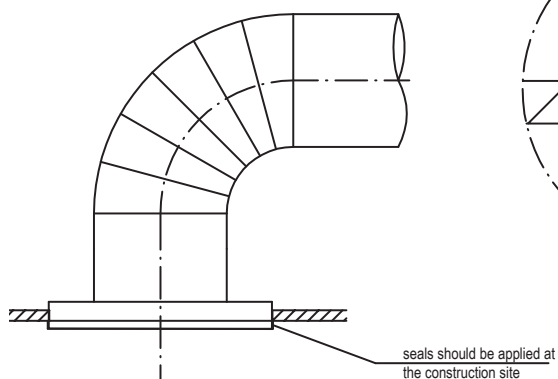
Upon customer's request, boxes can be equipped with

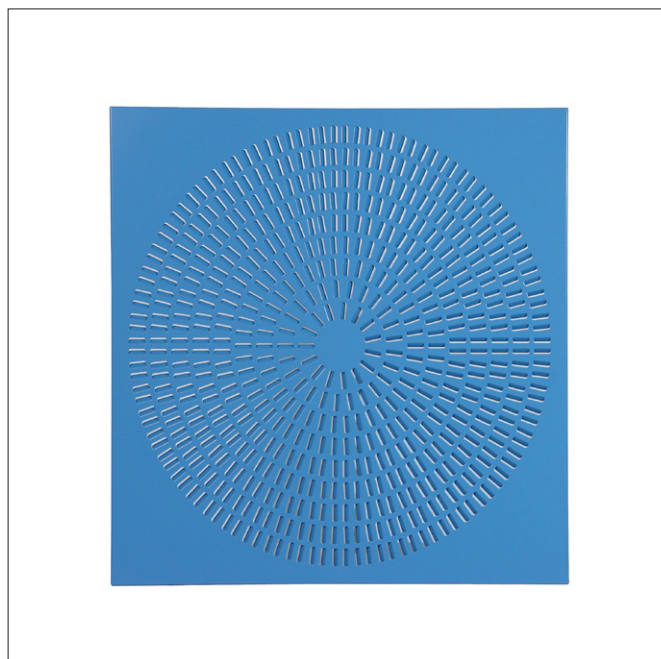
1. factory slings
2. a crossbar that allows for installation of the front panel with one central screw

INSTALLATION IN THE ROOF

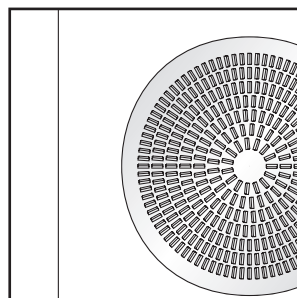


INSTALLATION WITH SPIRO TRANSITION





SKNW



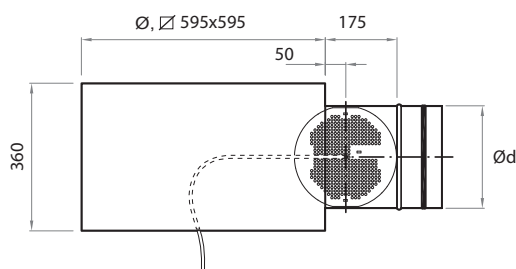
Ø, ØA

DIMENSIONS AND WEIGHT

SKNW

Size	ØA	Ød	kg
400	400	159	4.9
500	500	199	6.9
600	600	314	15.9
700	700	399	22.7

SKNW + SR/SKNW



DESCRIPTION

SKNW is a round or rectangle air vent, designed to be installed in a ceiling. The air vent can also work as an exhaust vent. It can work with a steady or variable airflow. Special design of the perforation assures low noise at high airflow rate.

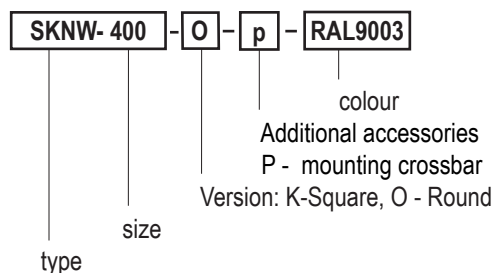
FEATURES

- high efficiency
- air-stream swirl feature
- high induction coefficient
- it can be used with an SR/SKNW adjustment box
- vents are made of galvanized steel sheet; default colour: RAL 9003
- on special request, it can be manufactured in any size and RAL colour

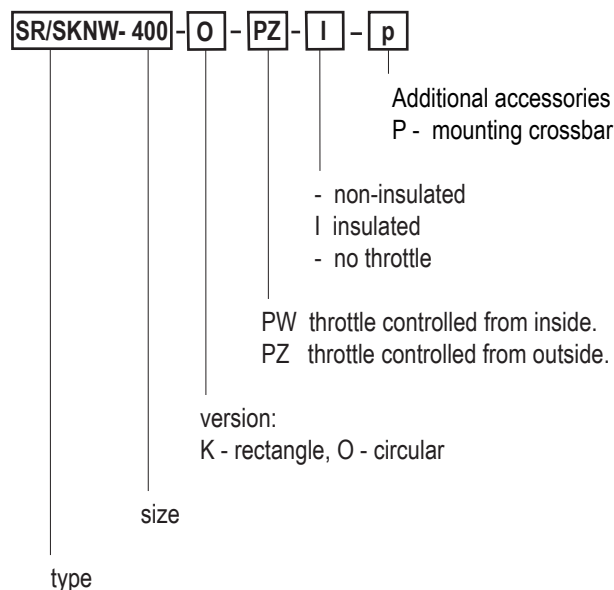
CONSTRUCTION

SKNW is an air vent designed to be installed in a ceiling. The air vent consists of a perforated front panel. It can also work as an exhaust vent. In standard expansion boxes are equipped on the ferrule with machine crimped rubber gasket. The expansion box may be provided with a mounting bar, which allows the diffuser assembly with a single bolt through the hole placed in the central part of the diffuser.

ORDER REFERENCE



ADDITIONAL EQUIPMENT:



2.15 SKNW

ceiling supply-exhaust air vent with swirl perforation

2

AIRFLOW – SOUND LEVEL				
SKNW Size		25 dB (A)	m ³ /h 30 dB (A)	35 dB (A)
400		180	220	250
500		270	310	350
600		540	630	740
700		760	880	1000

SKNW Size	SR Size	25 dB (A)	m ³ /h 30 dB (A)	35 dB (A)
400	400	110	140	170
500	500	170	220	260
600	600	380	450	530
700	700	490	630	810

The data refers to SKNW air vents with an SR/SKNW box or without it (upper part of table). If an air vent is installed together with the SR/SKNW box, the data refers to a total pressure drop of 50Pa. The data is presented in reference to three different levels of loudness.

ADDITIONAL EQUIPMENT

The SR/SKNW box is made of galvanized metal sheet. The box contains an adjustable damper.

SOUND DATA – SKNW – AIR SUPPLY

Sound power level L_w (dB)
 K_{OK} coefficient

Size SKNW	Middle frequency range Hz							
	63	125	250	500	1000	2000	4000	8000
160	-3	-2	0	1	2	-7	-20	-21
200	-5	0	0	0	2	-9	-24	-27
250	-3	0	1	1	2	-9	-2	-20
315	-4	-2	4	2	0	-10	-19	-20
400	0	-2	4	3	0	-12	-20	-19

Size SKNW SR/SKNW	Middle frequency range Hz							
	63	125	250	500	1000	2000	4000	8000
160	0	6	6	1	-1	-8	-15	-15
200	3	5	5	0	-1	-8	-14	-15
250	1	6	3	0	0	-8	-15	-15
315	0	5	3	2	0	-10	-16	-17
400	3	5	2	2	1	-11	-17	-18
Tol.	2	2	2	2	2	2	2	2

Size SKNW	Middle frequency range Hz							
	63	125	250	500	1000	2000	4000	8000
160	19	14	9	4	3	5	5	4
200	19	14	8	3	3	4	5	5
250	16	11	5	4	2	3	4	4
315	14	9	4	2	2	2	3	3
400	13	8	4	1	0	0	0	0

Size SKNW SR/SKNW	Middle frequency range Hz							
	63	125	250	500	1000	2000	4000	8000
160	19	14	10	17	19	12	10	12
200	16	11	8	16	18	12	11	11
250	13	8	8	16	17	12	12	3
315	11	6	7	19	14	10	10	13
400	10	5	8	14	11	10	11	12
Tol.	2	2	2	2	2	2	2	2

SOUND DATA – SKNW – AIR EXHAUST

Sound power level L_w (dB)
 K_{OK} coefficient

Size SKNW	Middle frequency range Hz							
	63	125	250	500	1000	2000	4000	8000
160	-4	4	0	-1	1	-5	-14	-18
200	4	8	2	0	0	-5	-14	-18
250	1	3	3	1	0	-4	-13	-17
315	-3	-1	2	2	0	-6	-15	-18
400	2	2	3	3	0	-7	-16	-18

Size SKNW SR/SKNW	Middle frequency range Hz							
	63	125	250	500	1000	2000	4000	8000
160	-2	9	7	0	-6	-7	-13	-18
200	3	9	7	-	-5	-7	-13	-15
250	1	12	5	-2	-3	-8	-14	-17
315	4	10	3	-2	-2	-7	-16	-17
400	10	11	5	1	-1	-8	-14	-17
Tol.	2	2	2	2	2	2	2	

sound attenuation ΔL (dB)
factor ΔL

Size SKNW	Middle frequency range Hz							
	63	125	250	500	1000	2000	4000	8000
160	19	14	9	4	3	5	5	4
200	19	14	8	3	3	4	5	5
250	16	11	5	4	2	3	4	4
315	14	9	4	2	2	2	3	3
400	13	8	4	1	0	0	0	0

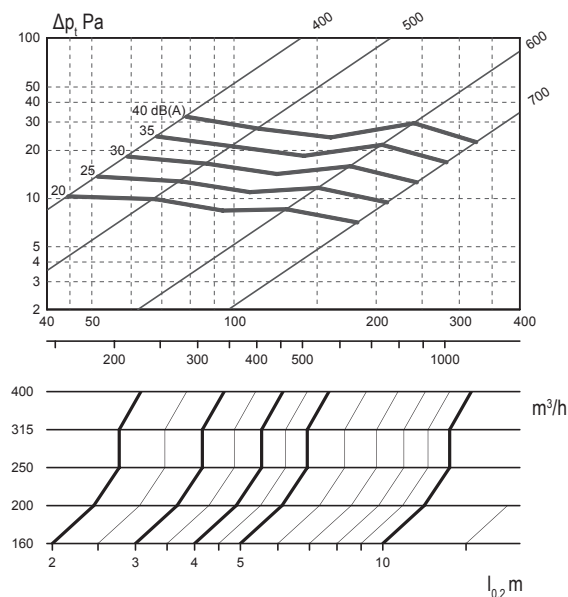
Size SKNW SR/SKNW	Middle frequency range Hz							
	63	125	250	500	1000	2000	4000	8000
160	19	14	10	17	19	12	10	12
200	16	11	8	16	18	12	11	11
250	13	8	8	16	17	12	12	13
315	11	6	7	19	14	10	10	13
400	10	5	8	14	11	10	11	12
Tol.	2	2	2	2	2	2	2	2

CHARACTERISTICS – SKNW – AIR SUPPLY

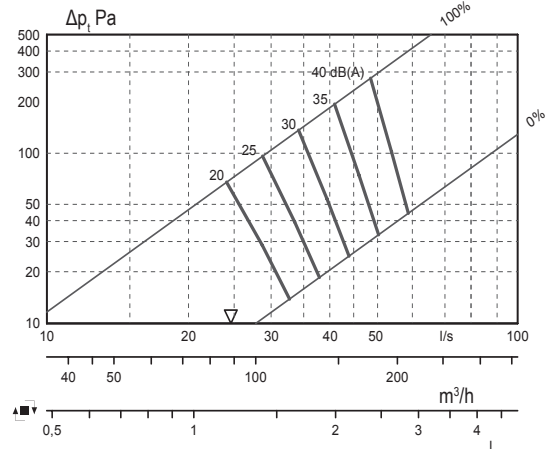
Airflow – Pressure drop – Sound level

- Data for a ceiling-mounted SKNW
- These characteristics cannot be used for adjustment of air vents
- The dB(A) value refers to rooms with the acoustic absorption of 4 dB and cubature of 30 m³.
- dB(C) is generally higher by 6-9 dB than the dB(A) value.

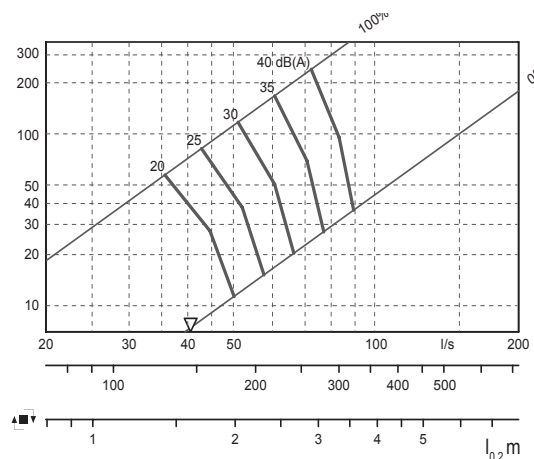
SKNW - 400, 500, 600, 700



SKNW 400 + SR/SKNW 400



SKNW 400 + SR/SKNW 400



2.15 SKNW

ceiling supply-exhaust air vent with swirl perforation

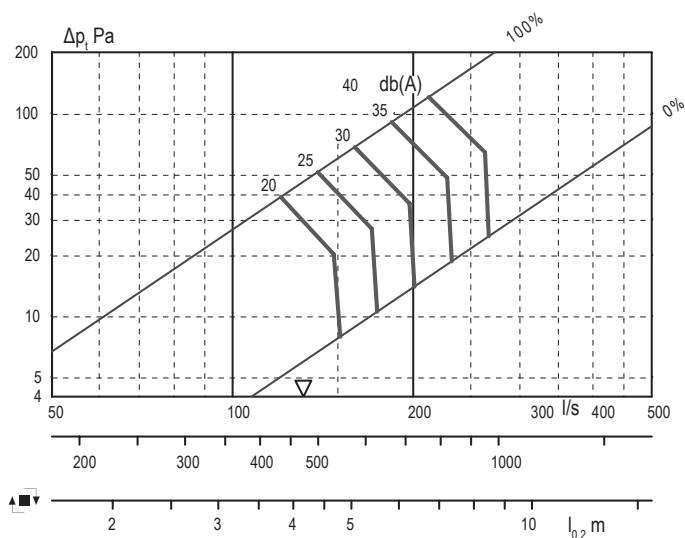
CHARACTERISTICS – SKNW – AIR SUPPLY

2

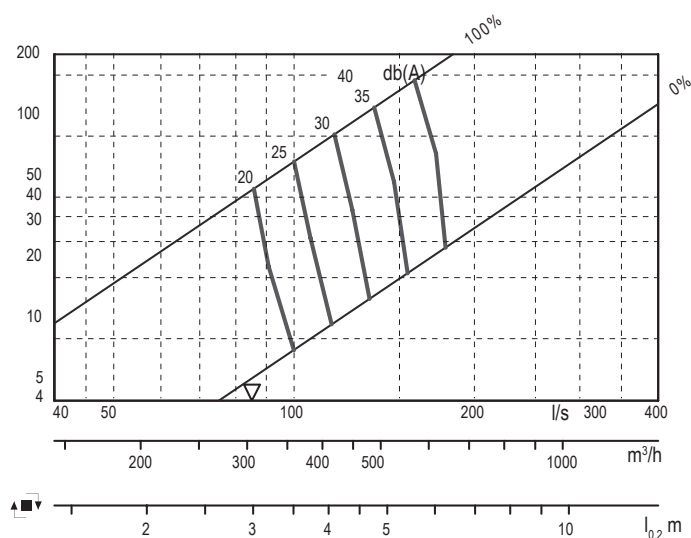
Airflow – Pressure drop – Sound level

- Data for a ceiling-mounted SKNW
- These characteristics cannot be used for adjustment of air vents
- The dB(A) value refers to rooms with the acoustic absorption of 4 dB and cubature of 30 m³.
- dB(C) is generally higher by 6-9 dB than the dB(A) value.

SKNW 500 + SR/SKNW 500



SKNW 700 + SR/SKNW 700

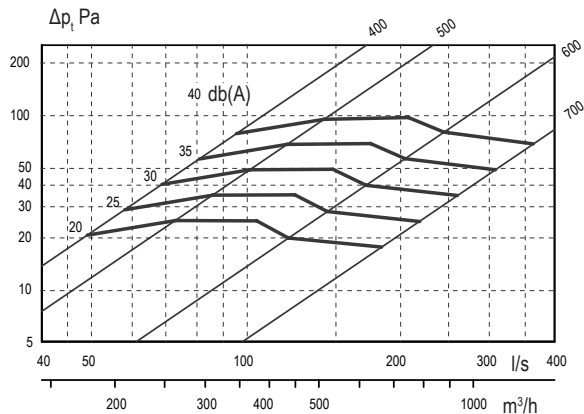


Characteristic - SKNW with box SR/SKNW - extract flow - pressure loss - sound level - range

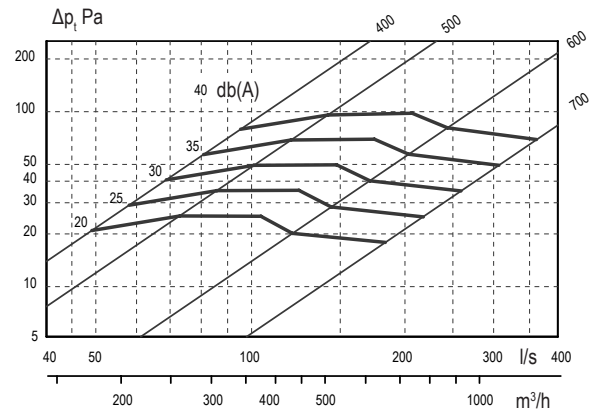
- Data for SKNW mounted in the ceiling
- Δ - Minimum flow for adjusting
- Value dB(A) for rooms with normal acoustic 4 dB and volume 30m³

- Value dB(C) is generally higher 6-9 dB than Value dB(A)
- 100% is a closed damper box ALSc, 0% means an open damper box ALSc

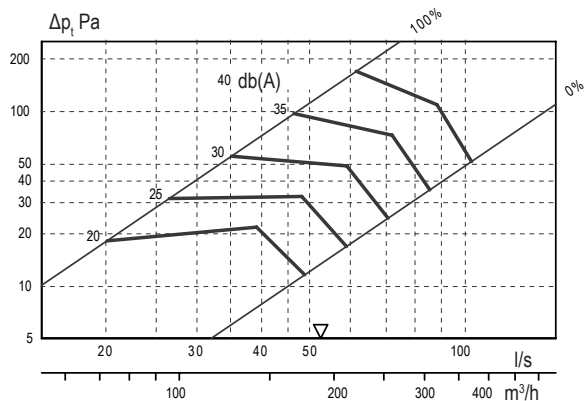
SKNW - 400, 500, 600, 700



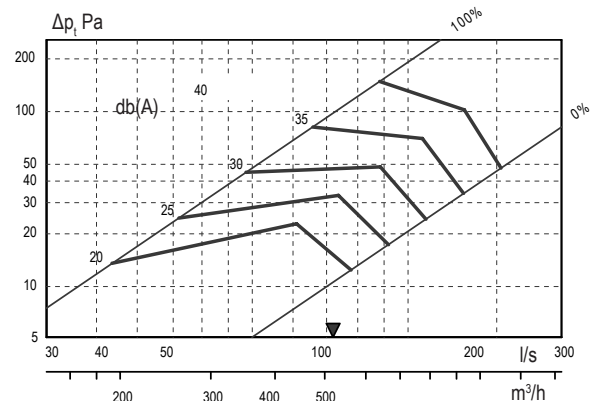
SKNW 400 + SR/SKNW 400



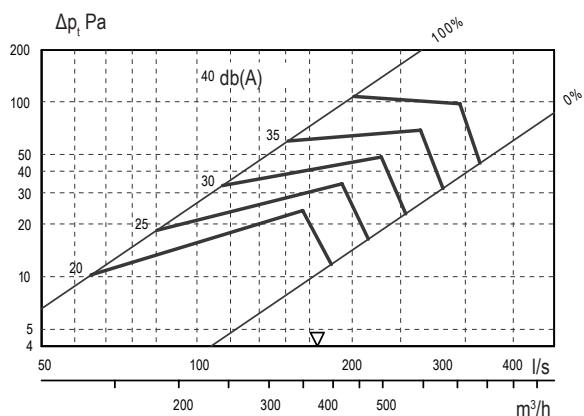
SKNW 500 + SR/SKNW 500

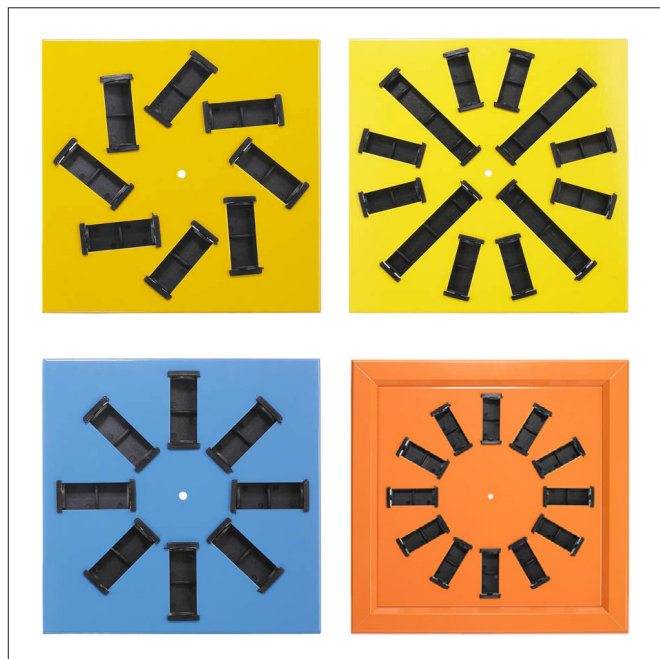


SKNW 600 + SR/SKNW 600



SKNW 700 + SR/SKNW 700





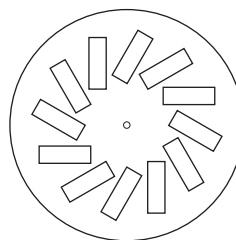
DESCRIPTION

ANW-M are rectangular air-supply/air-exhaust diffusers, used in low- and mid-pressure systems. Their outlet vents are characterised by a considerable swirl, which results in strong mixing of the air delivered and air present in the room. They are adapted to work with constant and variable flow of air. It is recommended to install them in the ceiling level.

ORDER REFERENCE

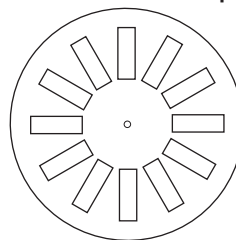
ANW - M - K - 200 / 8p - c	-	R	-	RAL9003
				colour
				R frame (only K version)
				colour of lamellas: b – white; c – black
				size
				version: K - square, O - Round
				type: ANW AWW

ANW-M-O 250/12w

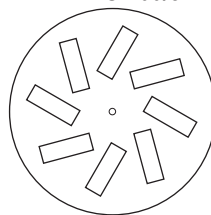


perf. 150 m³/h at 50 Pa

ANW-M-O 250/12p

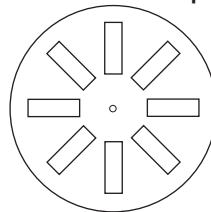


ANW-M-O 200/8w

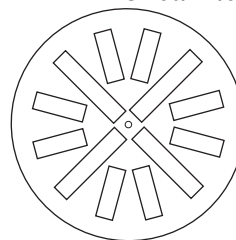


perf. 100 m³/h at 50 Pa

ANW-M-O 200/8p



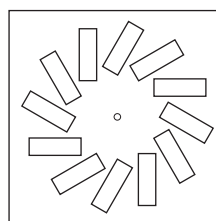
ANW-M-O 250/4M/8w



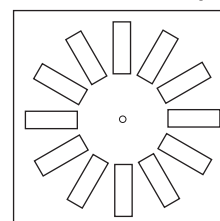
perf. 200 m³/h at 50 Pa

perf. 100 m³/h at 50 Pa

ANW-M-K 200/12w

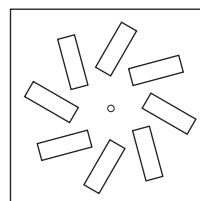


ANW-M-K 250/12p



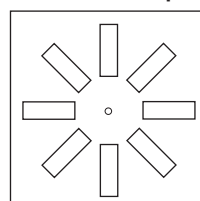
perf. 150 m³/h at 50 Pa

ANW-M-K 200/8w



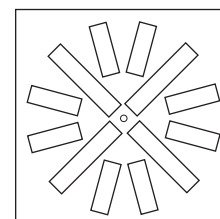
perf. 100 m³/h at 50 Pa

ANW-M-K 200/8p



perf. 100 m³/h at 50 Pa

ANW-M-K 250/4M/8m

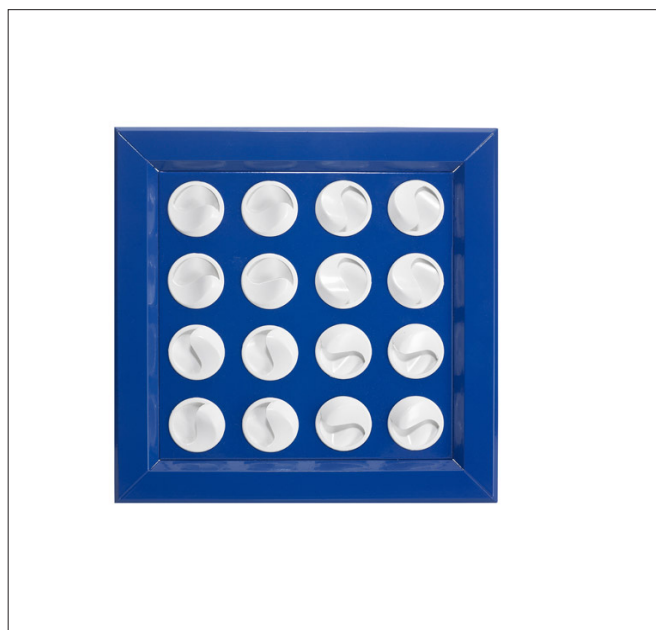


perf. 200 m³/h at 50 Pa

2.16 'Mini' ceiling air vents

round diffusers with moveable lamellas

2



DESCRIPTION

KW/RDM-M are rectangular ceiling air vents with round moveable nozzles. They are to be installed in low- and mid-pressure systems. Ø 35mm nozzles (RDM) have a sinusoidal outlet, which results in significant spread of the airstream.

Nozzle air outlet can be set in any direction, which allows to create a custom profile of supplied air stream. The air vent is designed to work with constant and variable air flow. The supplied air can have higher or lower temperature than the air present in the room.

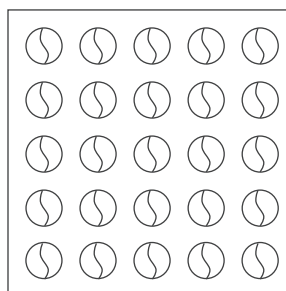
It is recommended to install it in the ceiling level, or hang it below the ceiling. The air vent comes in a rectangular (K) or round (O) version.

ORDER REFERENCE

KW/RDM-M - K - 150 / 9 - R RAL9003

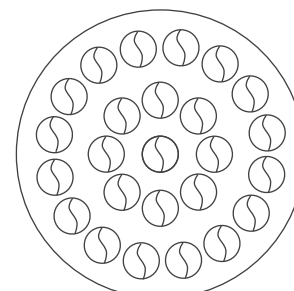
type
 version
 K – rectangular; O – round
 size
 number of nozzles
 R frame (only K version)
 colour

KW/RDM-M-K 250/25



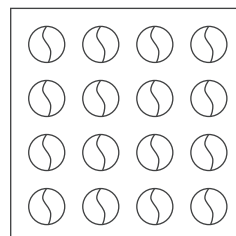
perf. 150 m³/h at 30 Pa

KW-RDM-M-O 250/23



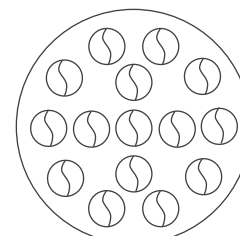
perf. 138 m³/h at 30 Pa

KW/RDM-M-K 200/16



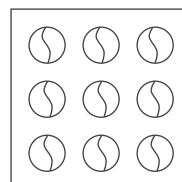
perf. 96 m³/h at 30 Pa

KW/RDM-M-O 200/15



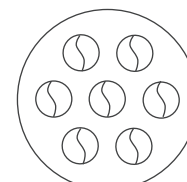
perf. 90 m³/h at 30 Pa

KW/RDM-M-K 150/9

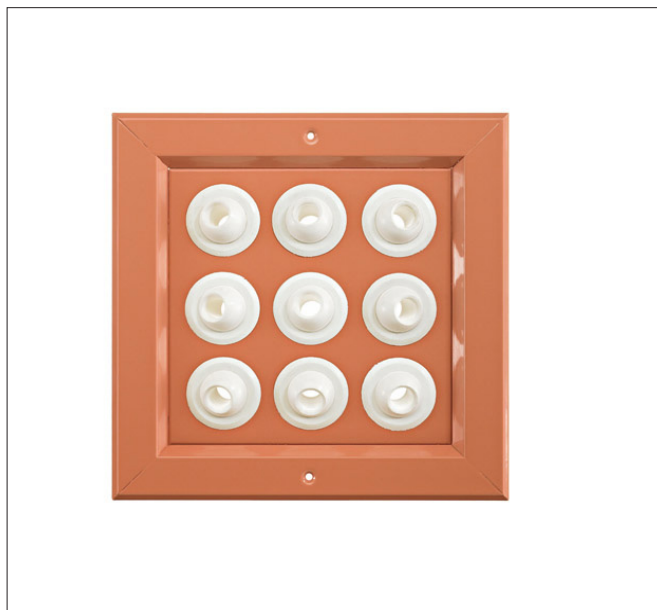


perf. 54 m³/h at 30 Pa

KW/RDM-M-O 150/7



perf. 42 m³/h at 30 Pa



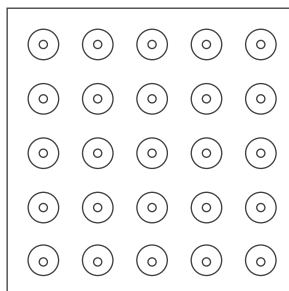
DESCRIPTION

KW/DZ-M are rectangular wall air vents with long-range moveable nozzles. They are to be installed in low- and mid-pressure systems. The air vent is designed to work with constant or variable air flow. The supplied air can have higher or lower temperature than the air present in the room. Adjustable DZ nozzles allow to adjust the air-stream exhaust angle, both vertically and horizontally. It is recommended to install it in the wall level.

ORDER REFERENCE

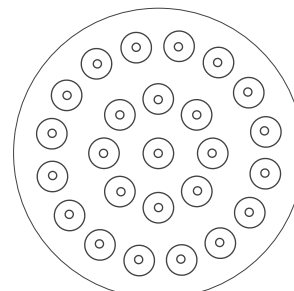
KW/DZ-M -K- 150/9	-	R	-	RAL9003
type				colour
				R frame (only K version)
				number of nozzles
				size
				version: K – rectangular; O – round

KW/DZ-M-K 250/25



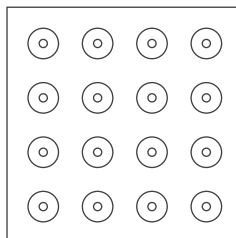
perf. 113 m³/h at 100 Pa

KW/DZ-M-O 250/23



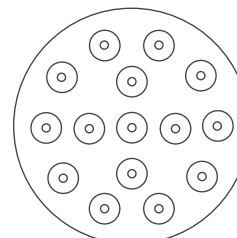
perf. 104 m³/h at 100 Pa

KW/DZ-M-K 200/16



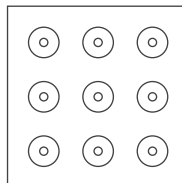
perf. 72 m³/h at 100 Pa

KW/DZ-M-O 250/15



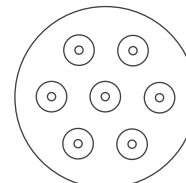
perf. 68 m³/h at 100 Pa

KW/DZ-M-K 150/9

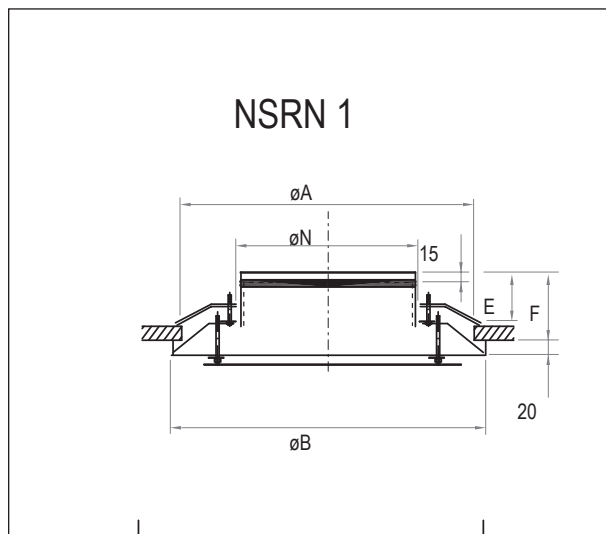


perf. 41 m³/h at 100 Pa

KW/DZ-M-O 150/7



perf. 32 m³/h at 100 Pa



DESCRIPTION

NSRN 1 and NRSN 2 air vents are used for hot and cold air-supply/air-exhaust in offices and shopping centres. Air vents can be installed on the ceiling, where certain aesthetic standards are required. They have an adjustable air system (vertical and horizontal), which is perfect for constant supply of air.

FEATURES

- The vent is made of powder coated sheet metal in RAL 9003.
- The vent can be painted any colour of the RAL palette upon special request

Size	N mm	A mm	B mm	E mm	F mm
100	100	190	215	51	58
125	125	215	240	51	58
160	160	305	330	71	93
200	200	345	370	71	93
250	250	395	420	71	93
315	315	460	485	71	93

ORDER REFERENCE

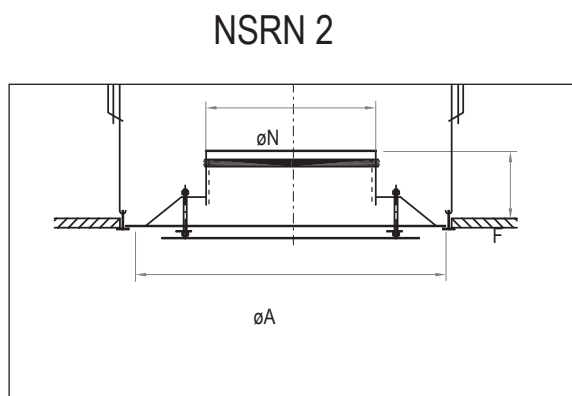
NSRN - 1 - 100 - RAL9003

colour

size

version:
1 ; 2

type:
NSRN



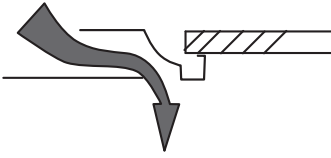
Size	N mm	A mm	F mm
100	100	295	75
125	125	295	75
160	160	295	95
200	200	595	110
250	250	595	110
315	315	595	110

2.17 NSRN Air vent

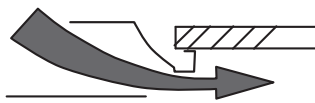
ceiling air vent with adjustable air-supply

2

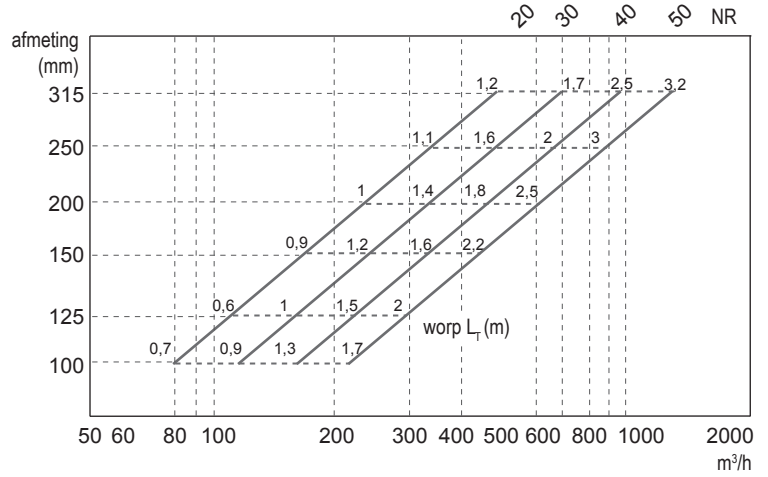
Vertical air-supply



Horizontal air-supply

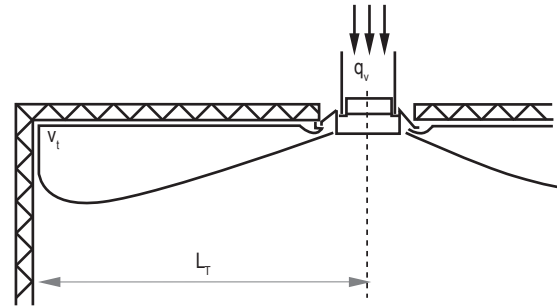
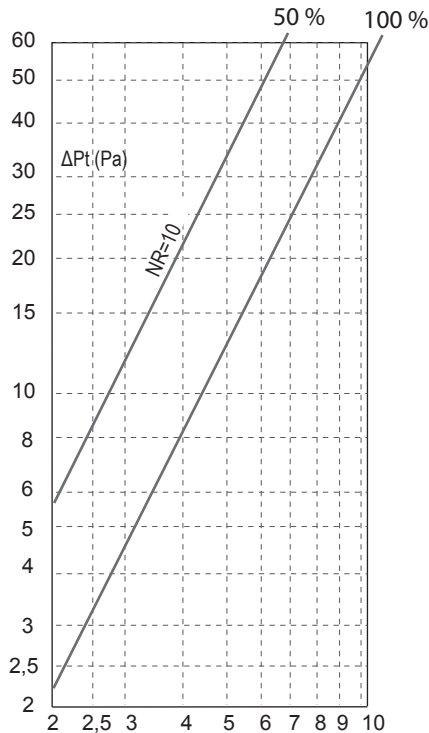


FAST SELECTION DIAGRAM



EXAMPLE

DECREASE OF PRESSURE WITH A CHOKE VALVE



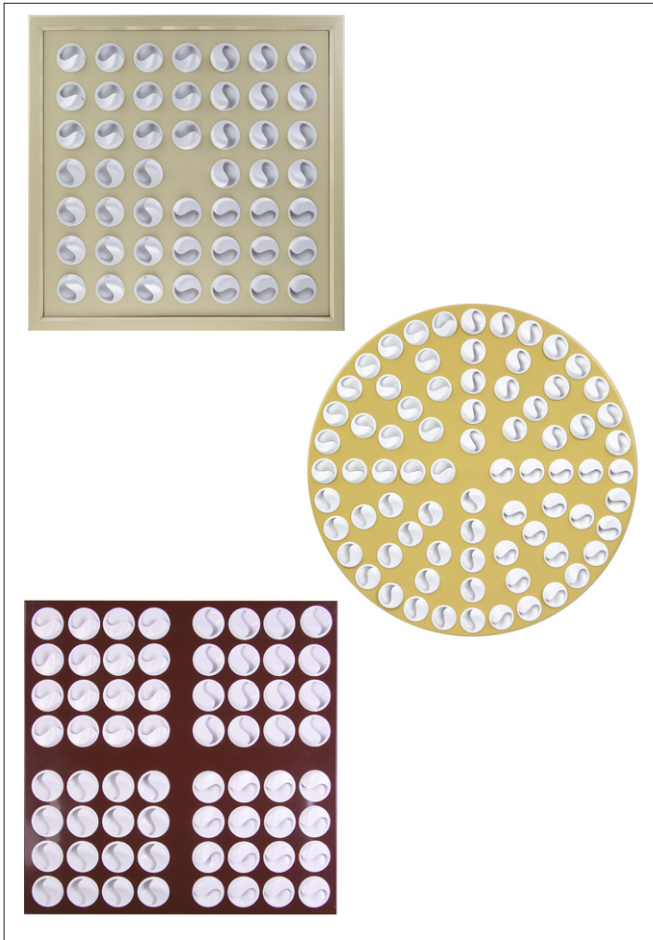
Sample data:

- $q_v = 0,07 \text{ m}^3/\text{s}$
- $L_T = 1 \text{ m}$ at $v_t = 0,50 \text{ m/s}$

Solution:

- size 200
- velocity $v_k = 4,1 \text{ m/s}$
- noise NR 22
- total pressure at wide open throttle: $\Delta P_t = 8,5 \text{ Pa}$.

$A_k - i A_n - (\text{m}^2)$						
Size	100	125	160	200	250	315
A_k	0,0044	0,0066	0,0110	0,0171	0,0270	0,0429
A_n	0,0079	0,0123	0,0201	0,0314	0,0491	0,0779



- high induction factor
- possible to be installed with an expansion box (SR/KWRD)
- nozzles are made of high-quality ABS material, and painted standard white
- all diffusers use nozzles of 35mm (RDM) and 57 mm (RD) diameter; single nozzle capacity of 6 and 9 m³ with acoustic pressure of 30 dB (A)
- diffusers of type R are additionally equipped with a decorative aluminium frame
- available in standard RAL 9003 colour
- upon customer's request, can be made available in any size and colour from RAL palette

INSTALLATION

KW/RD and KW/RDM diffusers are designed for installation with the expansion box SR/KWRD.

INSTALLATION IN THE FULL UNDERSLUNG CEILING:

prepare an installation hole in the ceiling of a size of the expansion box. Put the expansion box in so that edges stick out by approx. 12 mm from the ceiling panel. Fix it with steel screws. Remember to seal joints

INSTALLATION IN PANEL CEILING:

ventilator together with the expansion box should be installed above the ceiling level so that the front panel of the ventilator sticks evenly to the ceiling panel.

INSTALLING R-TYPE:

ventilator with the decorative frame can be fixed into the ceiling by appropriate bolts and screws through installation holes in the frame. Remember to seal joints.

DESCRIPTION

KW/RD are square ceiling with adjustable round nozzles designed for low- and medium-pressure installations. Nozzles of diameter sizes 57 (RD) and 35 (RDM) are ended with sinusoidal outlets that allows for high air diffusion. Nozzles position can be adjusted to any direction so that shape of the air stream can be regulated. They can be used with constant and variable airflow. The air can be supplied at the temperature lower or higher than the temperature in the ventilated room. It is recommended to install KW diffusers into the ceiling or hang them from the ceiling. diffusers available are square (K) or round (O).

FEATURES

- adjustable airflow stream shape (360°)
- easy dispersion of vertical stream
- possible to swirl the stream
- possible simultaneous vertical and horizontal ventilation

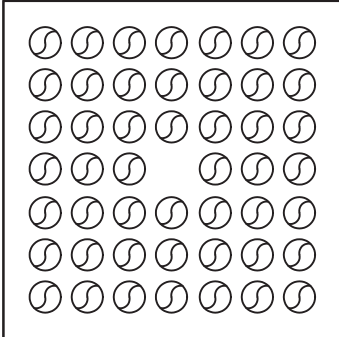
ORDER REFERENCE

KW / RD - K - 500 / 36	- R	RAL9003
type		
diffuser size		colour
number of nozzles		R frame (version K)
version: K - square, O - round		
RD nozzles of 57 mm diameter		
RDM nozzles of 35 mm diameter		

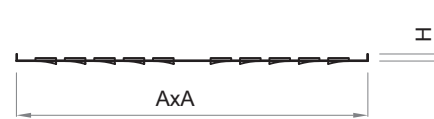
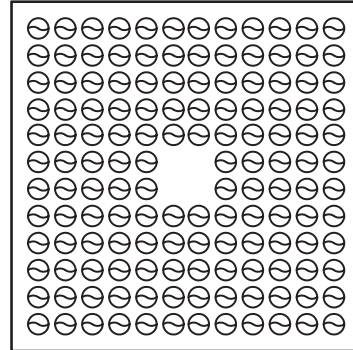
3.1 KW/RD, KW/RDM

square ceiling diffusers with adjustable nozzles

DIFFUSERS KW/RD-K



DIFFUSERS KW/RDM-K



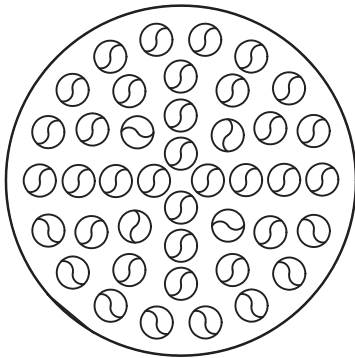
STANDARD SIZES

size	300	400	500	600
A [mm]	300	400	500	595
H [mm]	12	12	12	12
number of nozzles	16	25	36	48

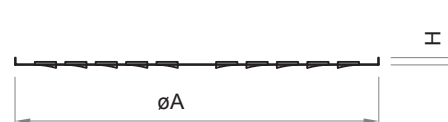
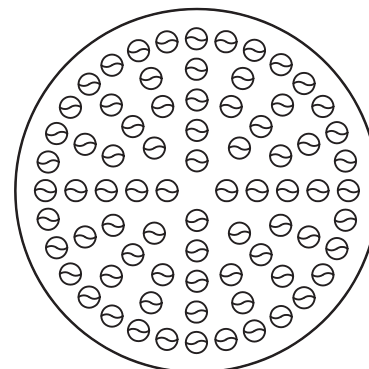
STANDARD SIZES

size	300	400	500	600
A [mm]	300	400	500	595
H [mm]	12	12	12	12
number of nozzles	36	64	100	140

DIFFUSERS KW/RD-O



DIFFUSERS KW/RDM-O



STANDARD SIZES

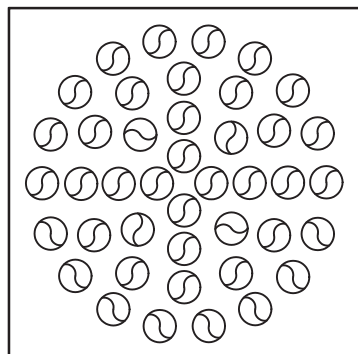
size	300	400	500	600
øA [mm]	300	400	500	600
H [mm]	12	12	12	12
number of nozzles	14	21	36	50

STANDARD SIZES

size	300	400	500	600
øA [mm]	300	400	500	600
H [mm]	12	12	12	12
number of nozzles	28	45	76	108

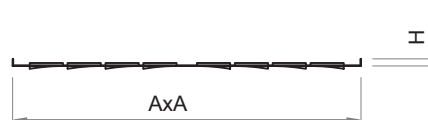
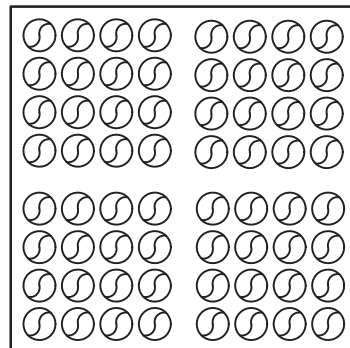
DIFFUSERS KW/RD-OK

round diffusers in square board (optional)



DIFFUSERS KW/RD-K

(optional)



STANDARD SIZES

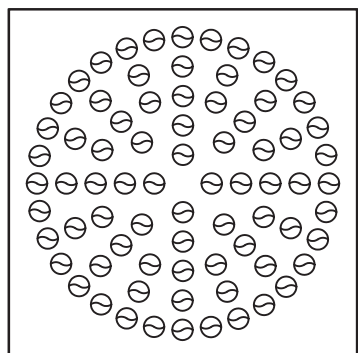
size	300	400	500	600
A [mm]	300	400	500	595
H [mm]	12	12	12	12
number of nozzles	14	21	36	50

STANDARD SIZES

size	600
A [mm]	595
H [mm]	12
number of nozzles	64

DIFFUSERS KW/RDM-OK

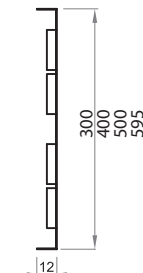
round diffusers in square board (optional)



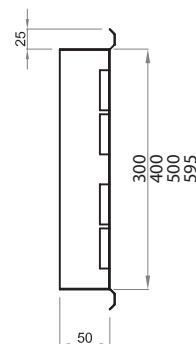
STANDARD SIZES

size	300	400	500	600
øA [mm]	300	400	500	595
H [mm]	12	12	12	12
number of nozzles	28	45	76	108

STANDARD



R- VERSION



3.1 KW/RD, KW/RDM

square ceiling diffusers with adjustable nozzles

NUMBER OF LINES OF OUTFLOW OF AIR

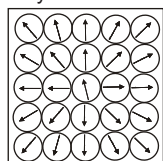
	4	3	2	2	1
$b_n = l_{0,2} \times$	-	0,3	0,6	0,3	0,6
$L_{bn} = l_{0,2} \times$	-	0,8	0,8	0,8	1,0
$b_v = l_{0,2} \times$	0,05	0,05	0,05	0,05	0,05
$L_{bv} = l_{0,2} \times$	0,5	0,5	0,5	0,5	0,6

bv = width vertical
 bn = horizontal width

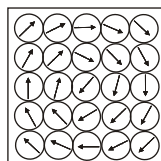
ARRANGEMENT OF NOZZLES

example arrangement of nozzles for different profiles of air outflow

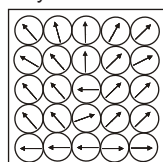
4 way



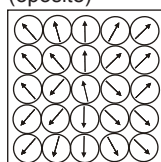
turmoil



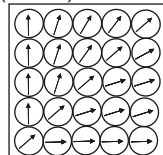
3 way



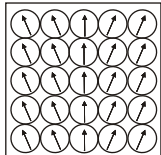
2 way
(opposite)



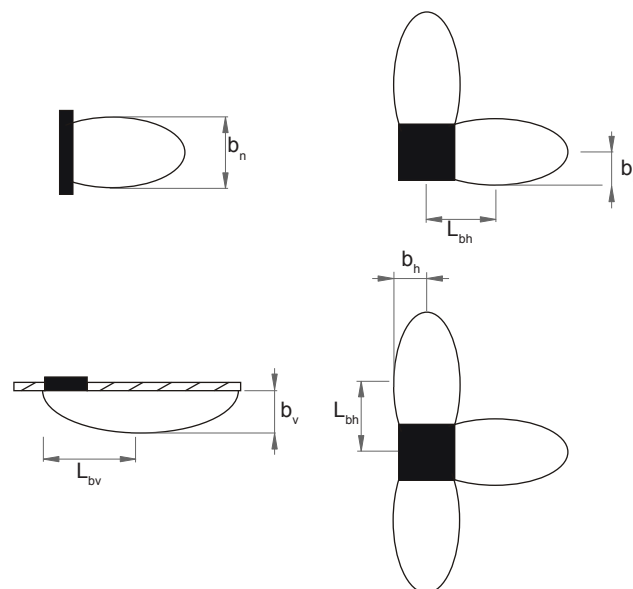
2 way
(corner)



1 direction



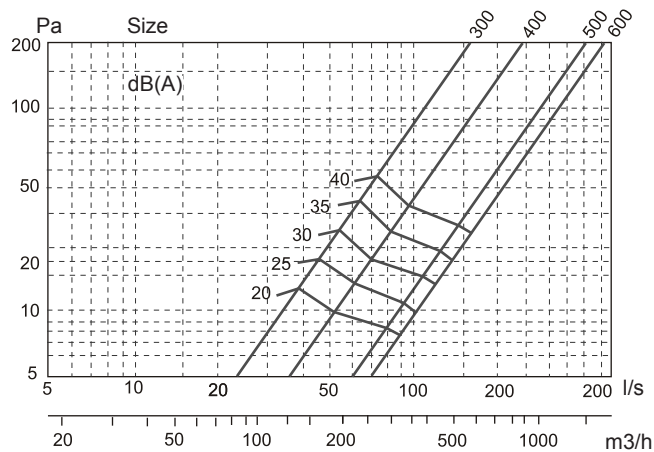
Dimensions stream (Isothermal flow)



FLOW - PRESSURE DROP - SOUND LEVEL

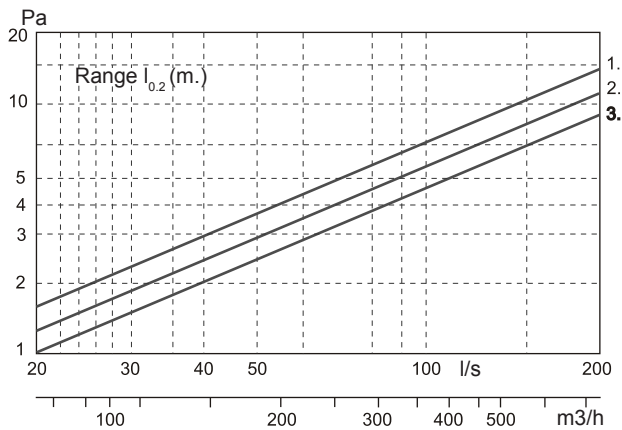
Characteristics may not be used to regulate.

KW/RD-K



MOVEMENT - RANGE

4-WAY DISCHARGE



Size:

1. 300 2. 400 3. 600

Multiplier correction range

Number of lines of outflow:

3	2M	2H	1	turmoil
1.3	1.5	1.5	2.3	0.6

3.1 KW/RD, KW/RDM

square ceiling diffusers with adjustable nozzles

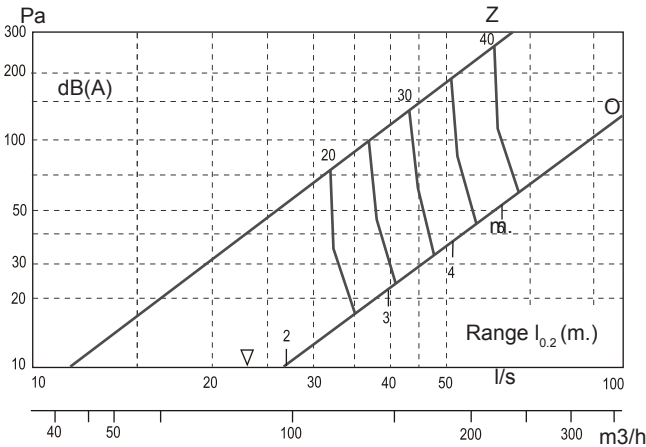
FLOW - PRESSURE DROP - SOUND LEVEL - RANGE

Characteristics may not be used to regulate

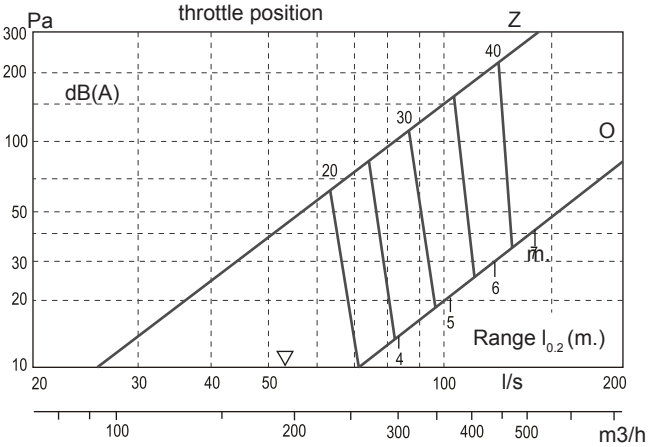
▽ = adjustable minimum flow

Coverage given to the outflow of the 4-way

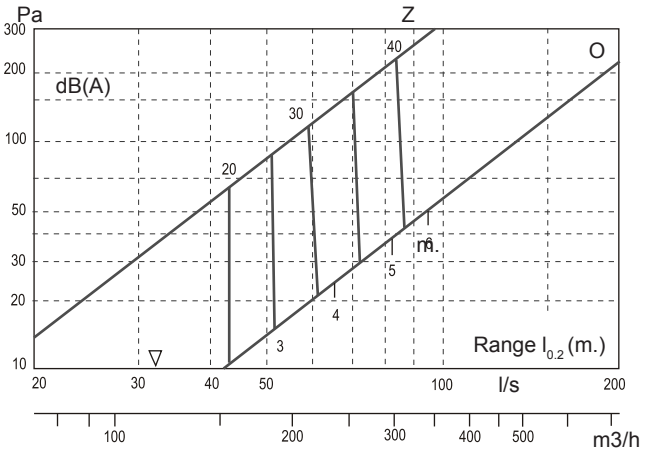
KW/RD-K 300 + SR/KW/RD



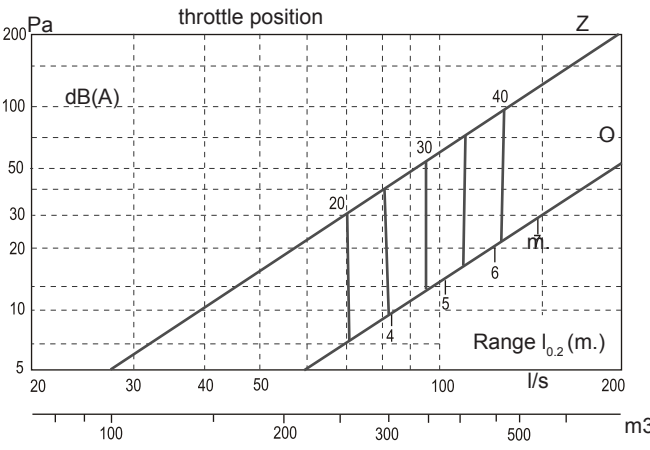
KW/RD-K 500 + SR/KW/RD



KW/RD-K 400 + SR/KW/RD

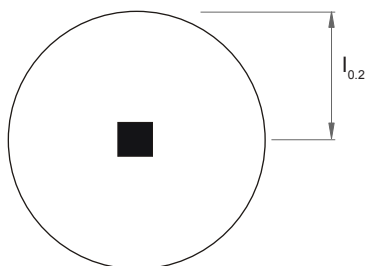


KW/RD-K 600 + SR/KW/RD

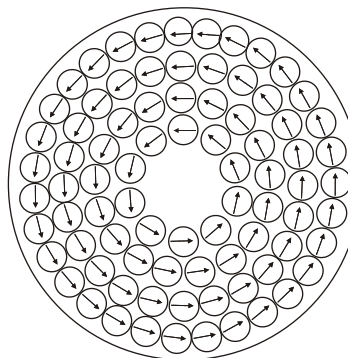


DIMENSIONS STREAM

(isothermal flow)



VARIANT DISTRIBUTION NOZZLES


3

ACOUSTICAL DATA - KW-RDM

 Sound power level L_w (dB)
 Madman 1, 2 and 3 Closed slot side

 Factor K_{OK}

Size	Center frequency band, Hz						
	125	250	500	1000	2000	4000	8000
300	5	2	1	1	-9	-29	-31
400	5	2	1	2	-12	-31	-31
500	6	4	3	-1	-14	-31	-29
600	5	3	3	0	-14	-33	-29
Tol. +/-	2	2	2	2	2	2	2

 Sound insulation ΔL (dB)

Size	Center frequency band, Hz						
	125	250	500	1000	2000	4000	8000
300	14	9	4	3	5	5	4
400	14	8	3	3	4	5	5
500	11	5	4	2	3	4	4
600	9	4	2	2	2	3	3
Tol. +/-	2	2	2	2	2	2	2

ACOUSTICAL DATA - KW/RDM + SR/KW/RDM

 Sound power level L_w (dB)

 Factor K_{OK}

Size	Center frequency band, Hz						
	125	250	500	1000	2000	4000	8000
300	6	4	0	1	-11	-28	-28
400	6	5	0	1	-12	-29	-29
500	10	6	2	1	-12	-27	-25
600	8	4	2	0	-13	-31	-29
Tol. +/-	2	2	2	2	2	2	2

 Sound insulation ΔL (dB)

Size	Center frequency band, Hz						
	125	250	500	1000	2000	4000	8000
300	14	10	17	19	12	10	12
400	11	10	17	19	12	10	12
500	8	8	16	17	12	12	13
600	6	7	19	14	10	10	13
Tol. +/-	2	2	2	2	2	2	2

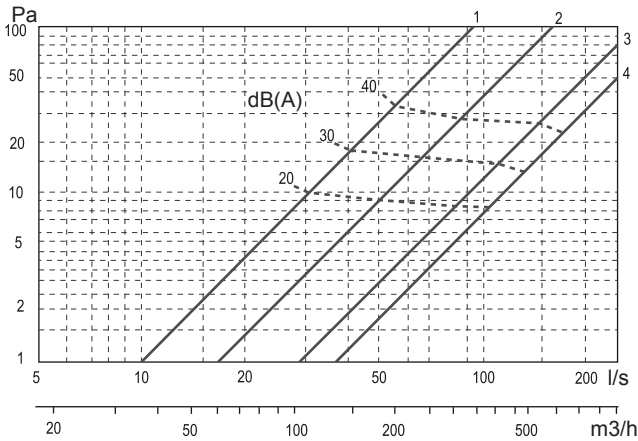
3.1 KW/RD, KW/RDM

square ceiling diffusers with adjustable nozzles

Flow - Pressure drop - Sound level

Data refer to the diffuser without the box
Characteristics It may not be used to adjust.

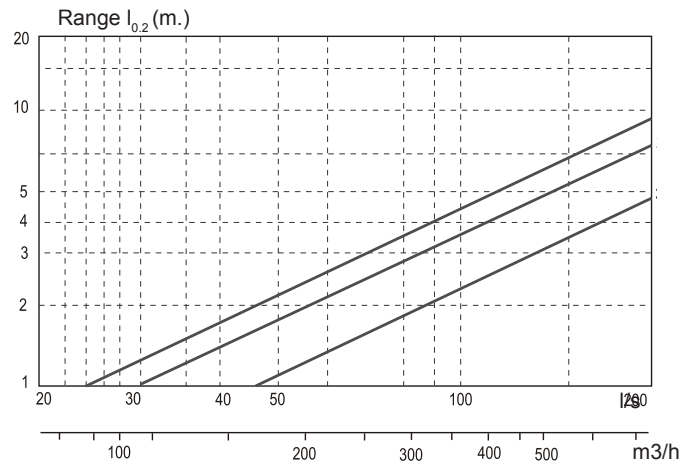
KW/RDM-K



- 1. 300
- 2. 400
- 3. 500
- 4. 600

MOVEMENT - RANGE

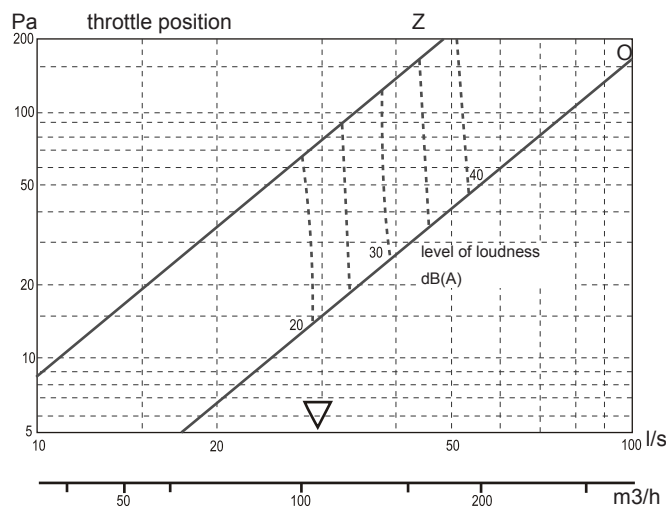
TURBULENCE



CHARACTERISTIC

Flow - Pressure drop - Sound level
Characteristics can not be used to adjust

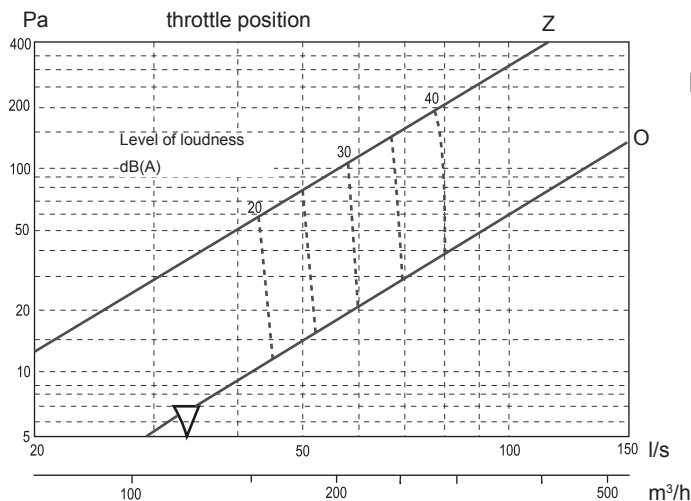
KW/RDM-K 300 + SR/KW/RDM



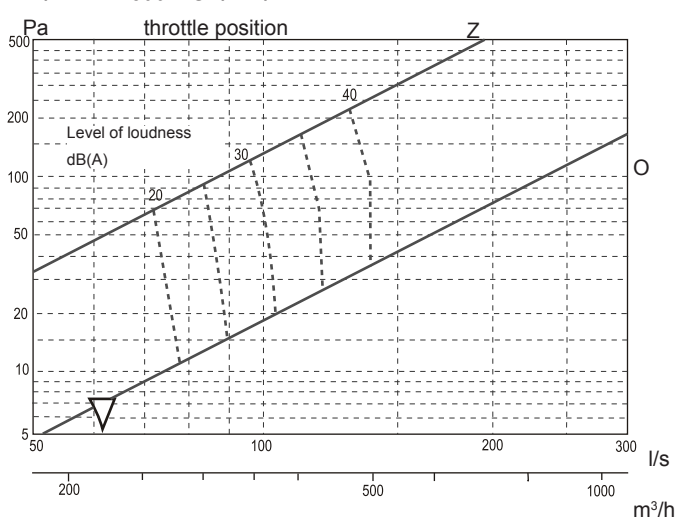
FLOW - PRESSURE DROP - SOUND LEVEL

Characteristics can not be used to adjust

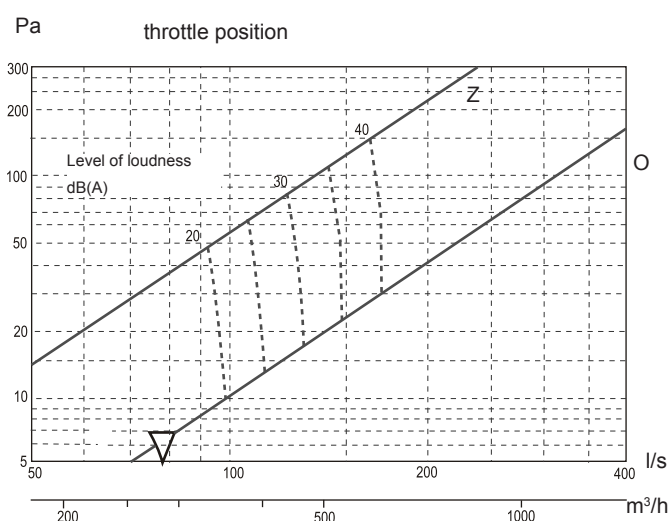
KW/RDM-K 400 + SR/KW/RDM



KW/RDM-K 500 + SR/KW/RDM



KW/RDM-K 600 + SR/KW/RDM

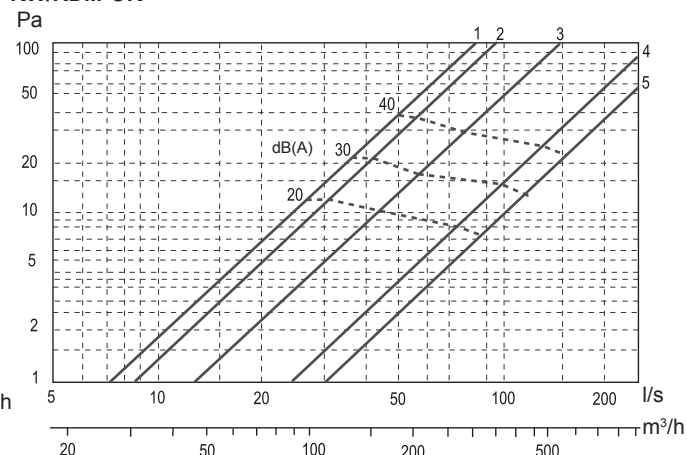


FLOW - PRESSURE DROP - SOUND LEVEL

Data refer to the diffuser KW / RDM-OK

Characteristics can not be used to adjust

KW/RDM-OK



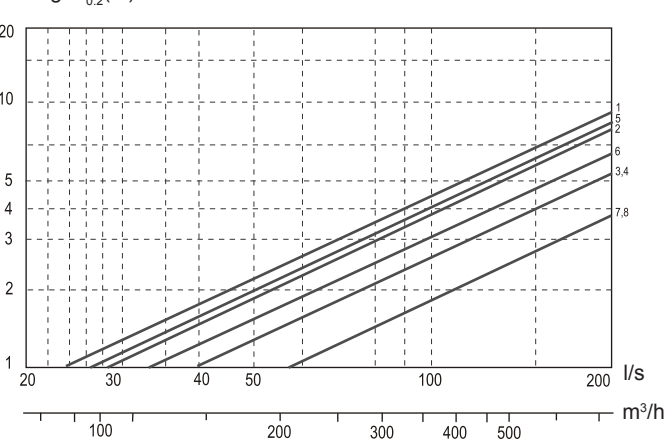
1. 300
2. 400
3. 500
4. 600

FLOW - RANGE

KW/RDM - OK, turmoil in accordance with (ZZ) and opposite (ZP)

KW/RDM-OK

Range $I_{0.2}$ (m)



Turmoil in line

1. 160-300
2. 200-400
3. 250-600
4. 315-600

Against turmoil

5. 160-300
6. 200-400
7. 250-600
8. 315-600

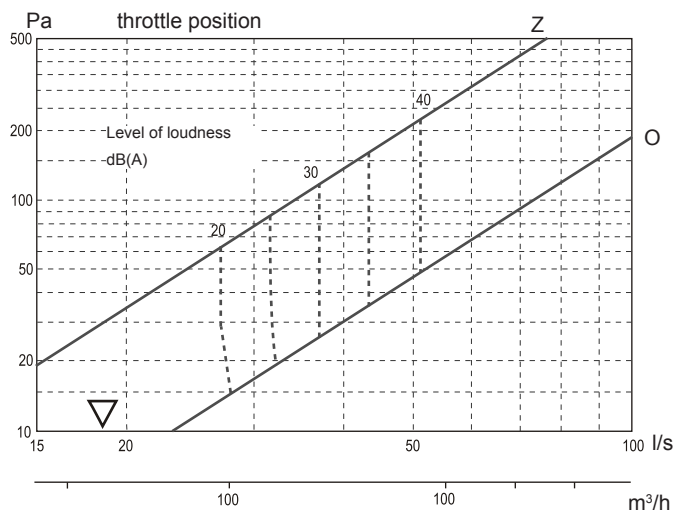
3.1 KW/RD, KW/RDM

square ceiling diffusers with adjustable nozzles

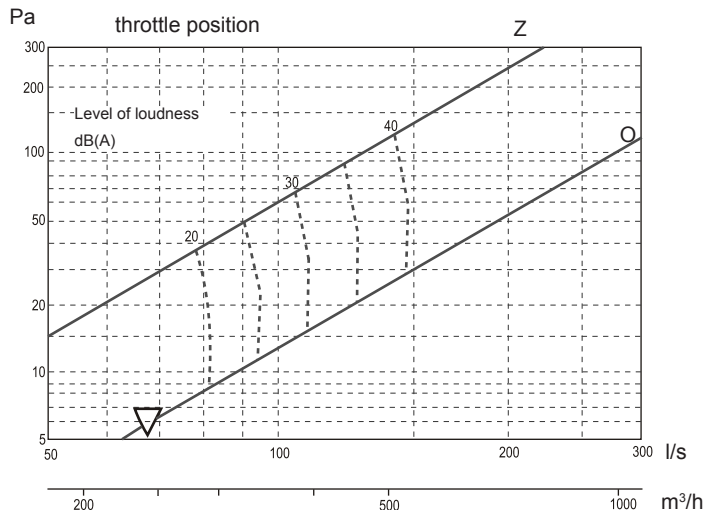
FLOW - PRESSURE DROP - SOUND LEVEL - RANGE

Characteristics may not be used to regulate

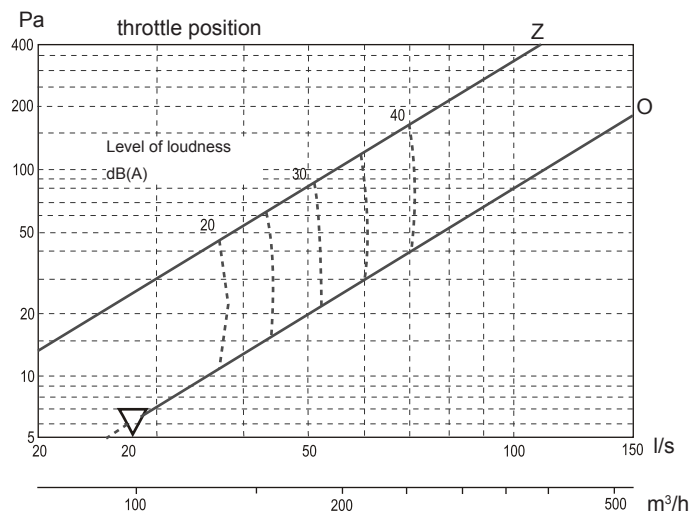
KW/RDM-OK 300 + SR/KW/RDM



KW/RDM-OK 600 + SR/KW/RDM

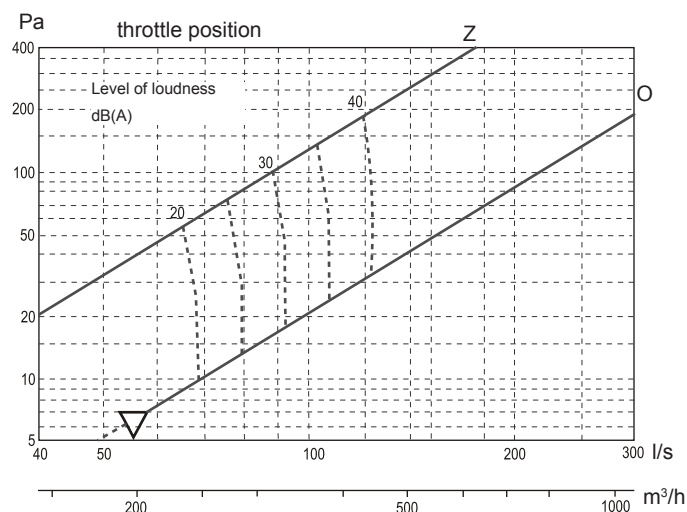


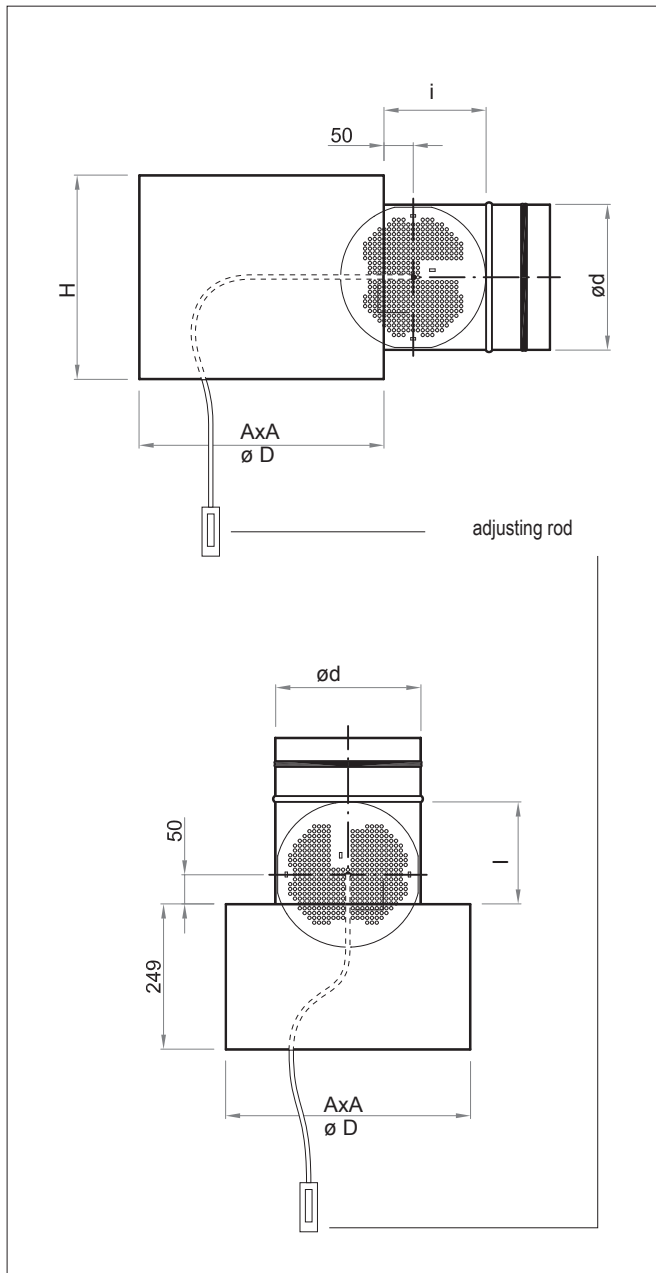
KW/RDM-OK 400 + SR/KW/RDM



∇ = adjustable minimum flow
Coverage given to the outflow of the 4-way

KW/RDM-OK 500 + SR/KW/RDM





DESCRIPTION

SR/KWRD are expansion boxes for diffusers KW/RD, KW/RDM. They stabilize the airflow and ensure uniform air supply to the diffuser. Expansion boxes connect diffusers with ventilation installation. They are made of zinc-coated sheet, joint by non-welded Click-Clock connection. In standard expansion boxes are equipped on the ferrule with machine crimped rubber gasket. The expansion box may be provided with a mounting bar, which allows the diffuser assembly with a single bolt through the hole placed in the central part of the diffuser.

Expansion boxes can be connected to the ventilation installation through the side or top.

Boxes can be thermally and acoustically insulated from the inside by K-Flex rubber mat.

Upon customer's request we can make other types of expansion boxes accordingly to provided drawings.

ORDER REFERENCE

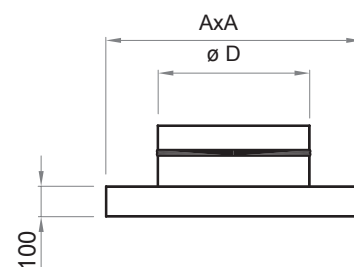
SR / KWRD - K - 300 - P - I - g - p				
				Additional accessories
				P - mounting crossbar
				b side connection
				g top connection
				- non-insulated
				I insulated
				- no throttle
				P perforated damper with adjusting rod
				size
				diffuser type

SR expansion box
PS spiro transition

STANDARD SIZES

size	300	400	500	600
A [mm]	295	395	495	595
H [mm]	260	300	350	420
ød [mm]	158	198	248	313
øD [mm]	295	395	495	595
i [mm]	130	150	175	210

PS - Spiro transition



3.1 SR/KW/RD, SR/KW/RDM

expansion boxes for diffusers KW/RD i KW/RDM

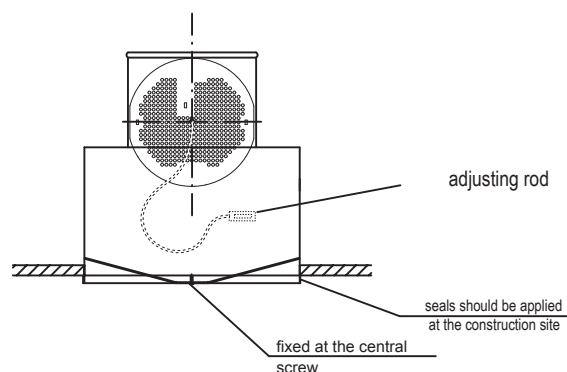
INSTALLATION

Expansion boxes SR/ KWRD are designed for installation between the ceiling and underslung ceiling,. Prepare an installation hole of a size of ØD or AxA. The box can be mounted onto the ceiling by appropriate hangers (bars, pins...) and installation slings.

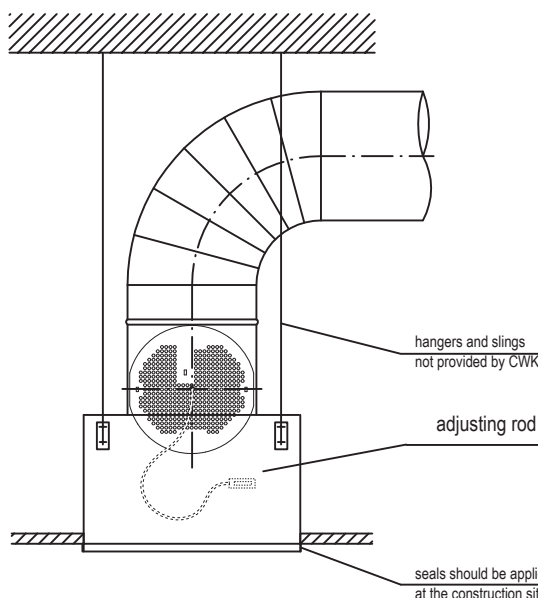
Upon customer's request, boxes can be equipped with

1. factory slings
2. a crossbar that allows for installation of the front panel with one central screw

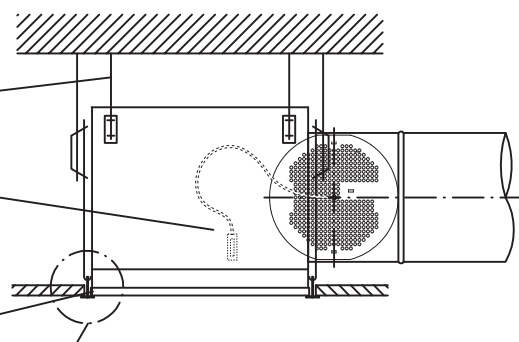
INSTALLATION WITH THE CROSSBAR AND SCREW



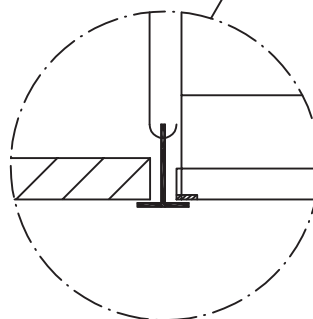
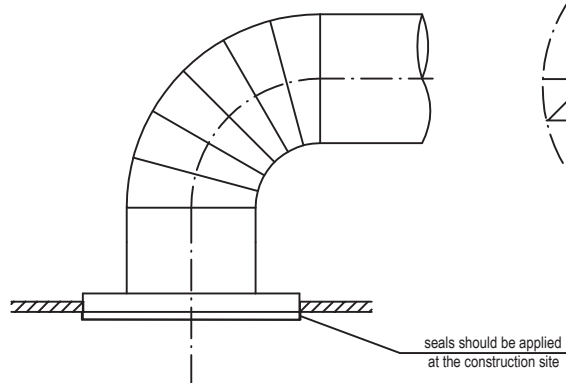
INSTALLATION IN THE ROOF

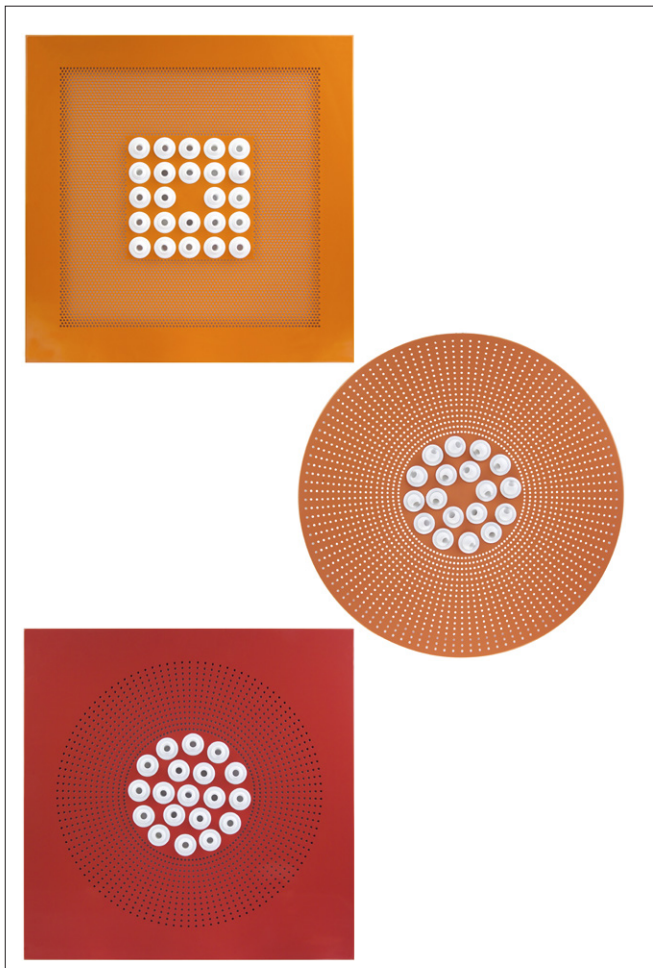


INSTALLATION IN THE FULL UNDERSLUNG PANEL CEILING



INSTALLATION WITH SPIRO TRANSITION





DESCRIPTION

NSP/DZ are square (Q and RQ) and round (R) diffusers designed for low- and medium-pressure installations. They can be used for rooms as high as 2.4 – 4.4 m. Due to two working parts for air supply, they are highly inductive (pulsating dispersion of air). External part is perforated; the inside is made of adjustable long-throw nozzles. NSP/DZ diffusers provide high comfort temperature conditions for shopping centres, conference facilities, halls and lounges.

FEATURES

- made of steel sheet
- highly inductive (pulsating dispersion of air)
- nozzle air supply direction can be adjusted as necessary
- nozzles are made of high-quality material, and painted standard white
- can be installed with an expansion can SR/NSP
- available in standard RAL 9003 colour
- upon customer's request, can be made in any colour from RAL palette

INSTALLATION

NSP are designed for installation with the expansion box SR/NSP. **INSTALLATION IN THE FULL UNDERSLUNG CEILING:** prepare an installation hole in the ceiling of a size of the expansion box. Put the expansion box in so that edges stick out by approx. 12 mm from the ceiling panel. Slide the front panel of the ventilated and fix it with steel screws. Remember to seal joints.

INSTALLATION IN PANEL CEILING: diffuser together with the expansion box should be installed above the ceiling level so that the front panel of the diffuser sticks evenly to the ceiling panel.

ORDER REFERENCE

NSP / DZ - Q

RAL9003

colour

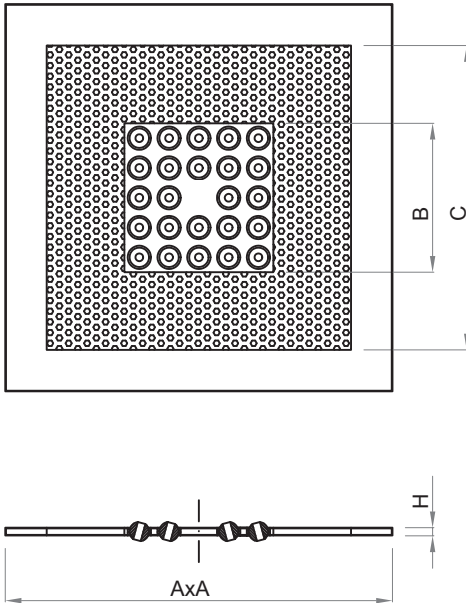
version:
Q , RQ, R

type

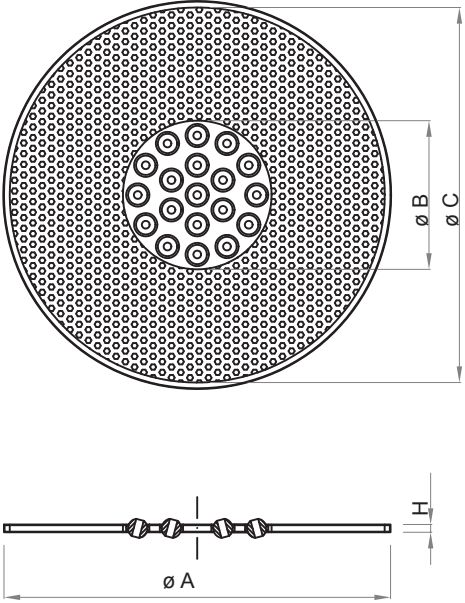
3.2 NSP/DZ

perforated ceiling diffusers with long-throw nozzles

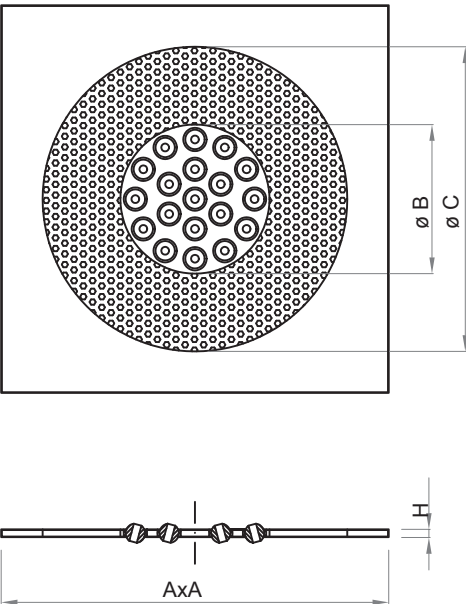
DIFFUSER NSP/DZ-Q



DIFFUSER NSP/DZ-R



DIFFUSER NSP/DZ-RQ



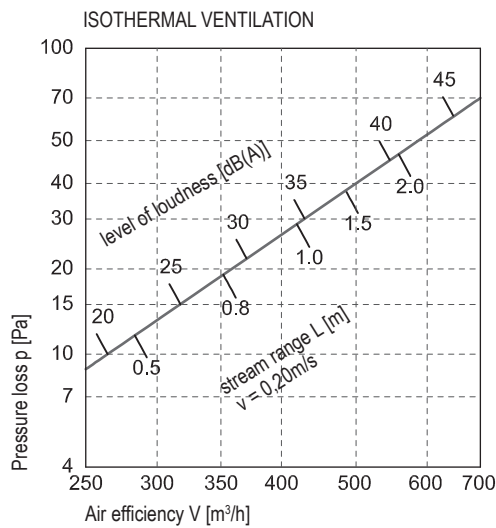
STANDARD SIZES

Diffuser	A [mm]	B [mm]	C [mm]	H [mm]	Number of nozzles
NSP-DZ-Q	598	230	470	12	25
NSP-DZ-RQ	598	230	470	12	19
NSP-DZ-R	600	230	580	12	19

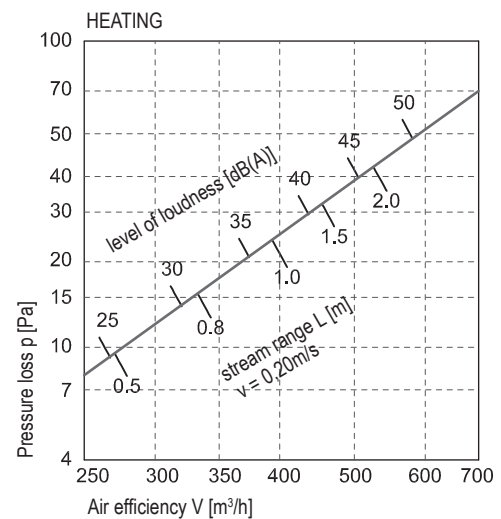
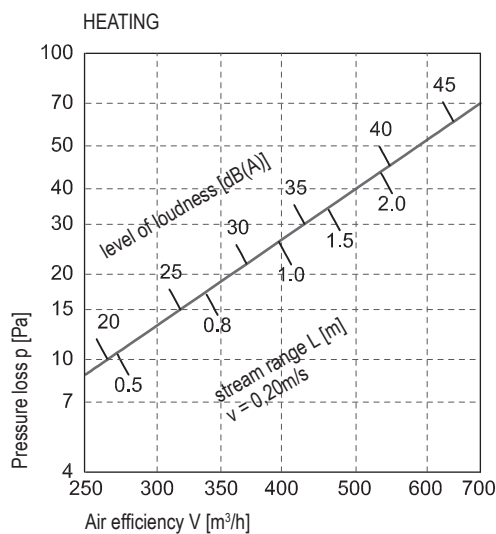
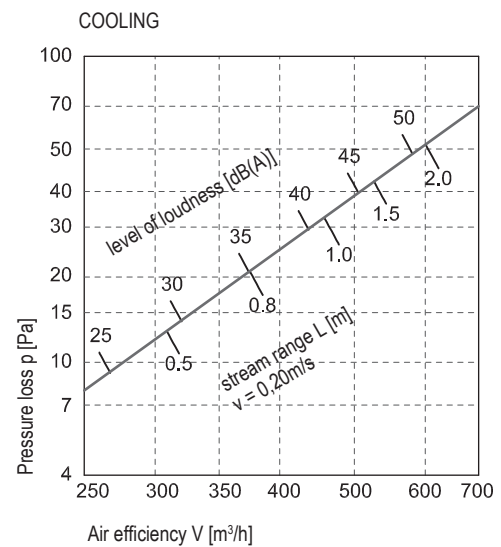
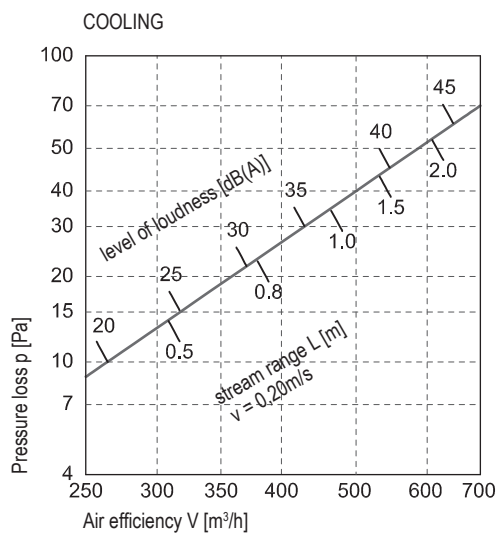
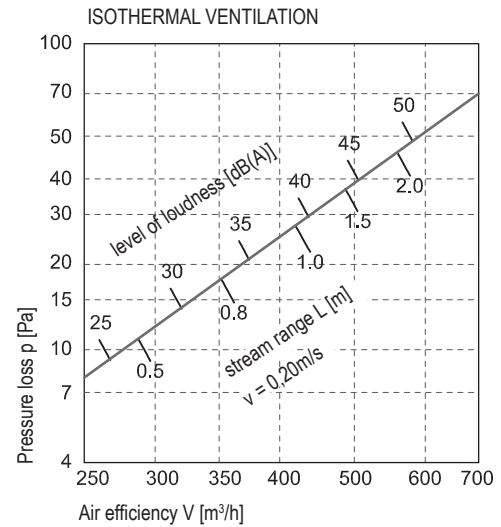
FEATURES

The figure shows airflow capacity V (m³/h), pressure loss p (Pa), airflow scope L (m) for end speed of 0.20 m/s, and volume level [db(A)].

FEATURES NSP/DZ-Q



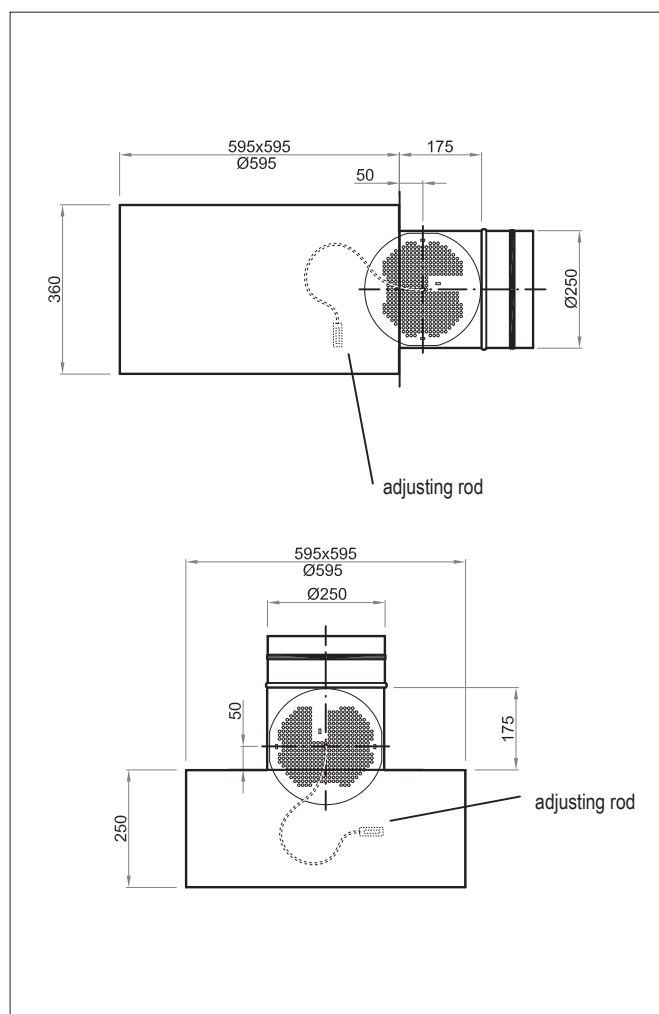
FEATURES NSP/DZ-RQ i NSP/DZ-R



3.2 SR/NSP/DZ

expansion boxes for diffusers NSP/DZ

3



DESCRIPTION

SR/NSP are expansion boxes for diffusers NSP/DZ. They stabilize the airflow and ensure uniform air supply to the diffuser. Expansion boxes connect diffusers with ventilation installation. They are made of zinc-coated sheet, joint by non-welded Click-Clock connection. Expansion boxes can be connected to the ventilation installation through the side or top.

Boxes can be thermally and acoustically insulated from the inside by K-Flex rubber mat.

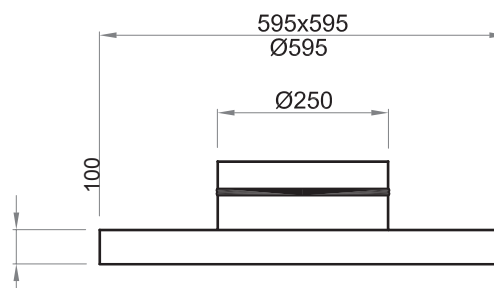
Upon customer's request we can make other types of expansion boxes accordingly to provided drawings.

In standard expansion boxes are equipped on the ferrule with machine crimped rubber gasket.

ORDER REFERENCE

SR / NSP - RQ - P - I - g						-	p
SR	NSP	RQ	P	I	g		Additional accessories
							P - mounting crossbar
							b side connection
							g top connection
PS	NSP	RQ	P	I	g		- non-insulated
							I - insulated
PS	NSP	RQ	P	I	g		- no throttle
							P perforated damper with adjusting rod
PS	NSP	RQ	P	I	g		diffuser version
							diffuser type
PS	NSP	RQ	P	I	g		expansion box
							spiro transition

PS - SPIRO TRANSITION



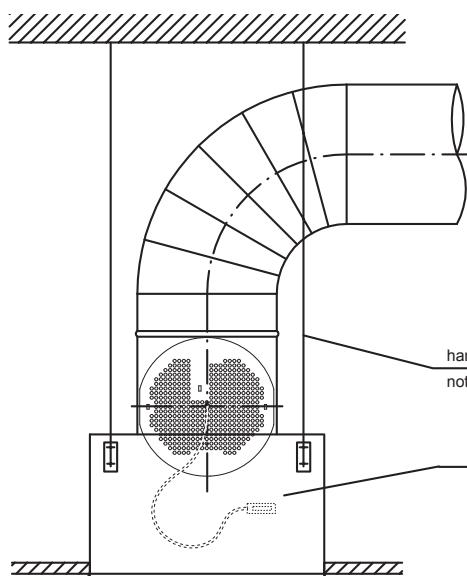
INSTALLATION

Expansion boxes SR/NSP are designed for installation between the ceiling and underslung ceiling. Prepare an installation hole of a size of 595x595 or Ø595 mm. The box can be mounted onto the ceiling by appropriate hangers (bars, pins...) and installation slings or mounted directly in the underslung ceiling.

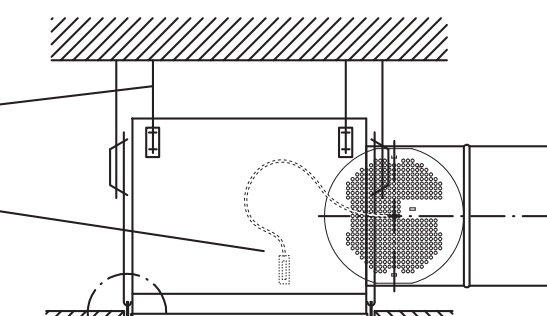
Upon customer's request, boxes can be equipped with

1. factory slings
2. a crossbar that allows for installation of the front panel with one central screw

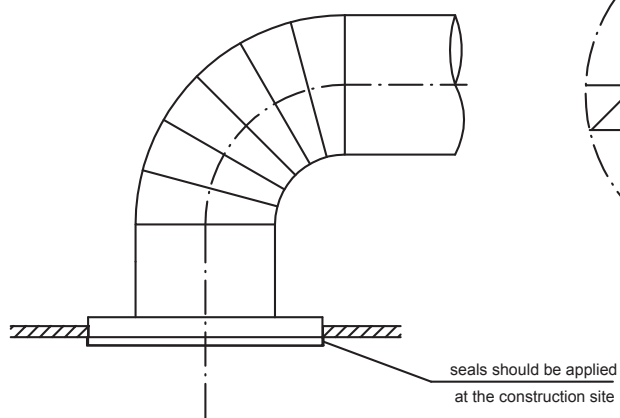
INSTALLATION IN THE ROOF



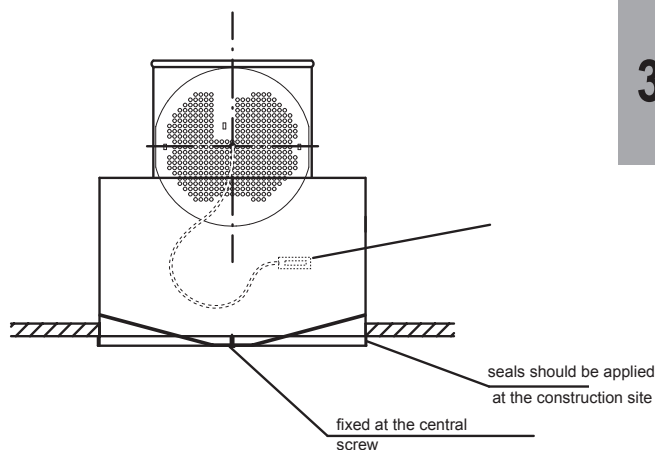
INSTALLATION IN THE FULL UNDERSLUNG PANEL CEILING



INSTALLATION WITH SPIRO TRANSITION



INSTALLATION WITH THE CROSSBAR AND SCREW



notes

3



DESCRIPTION

ON/RD and ON/RDM are round ceiling diffusers with adjustable round nozzles. They are equipped with an expansion box with side connection and are designed for low- and medium-pressure installations in ceilings in visible places. Nozzles of diameter sizes 57 mm (RD) and 35 mm (RDM) are ended with sinusoidal outlets that allows for high air diffusion. They can be used with constant and variable airflow. The air can be supplied at the temperature lower or

higher than the temperature in the ventilated room.

FEATURES

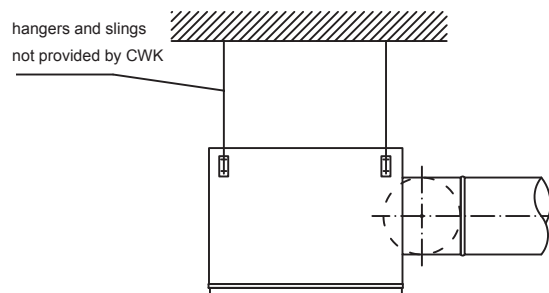
- adjustable airflow stream shape (360°)
- easy dispersion of vertical stream
- possible to swirl the stream
- possible simultaneous vertical and horizontal ventilation
- high induction factor
- nozzles are made of high-quality ABS material, and painted standard white
- all diffusers use nozzles of 35mm (RDM) and 57 mm (RD) diameter; single nozzle capacity of 6 and 9 m³/h with acoustic pressure of 30 dB (A)
- installation in uncovered ceilings systems
- available in standard RAL 9003 colour
- upon customer's request, can be made available in any size and colour from RAL palette

ORDER REFERENCE

ON / RDM - P - 400 / 45				-	RAL9003
					colour
					number of nozzles
					diffuser size
					- no throttle
					P control throttle
					RD nozzles of 57 mm diameter
					RDM nozzles of 35 mm diameter
					type

INSTALLATION

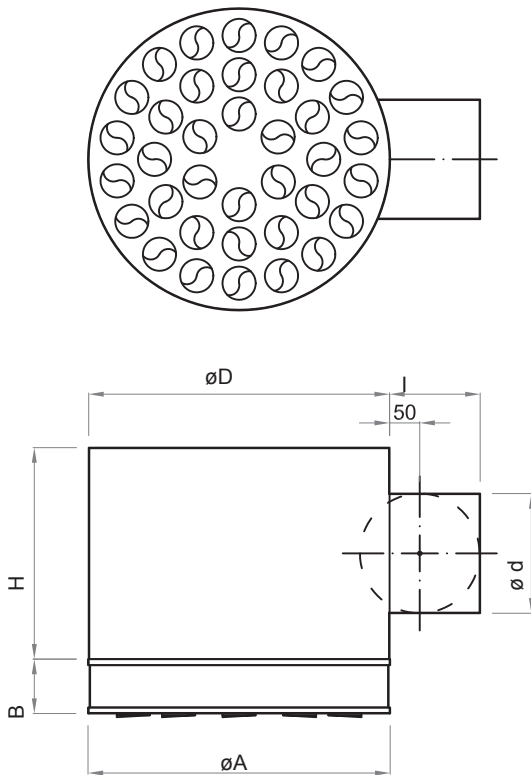
ON/RD and ON/RDM diffusers are designed for installation in uncovered ceilings systems. The diffusers should be mounted onto the ceiling by appropriate hangers (bars, pins...) and installation slings. Upon customer's request, boxes can be equipped with factory slings.



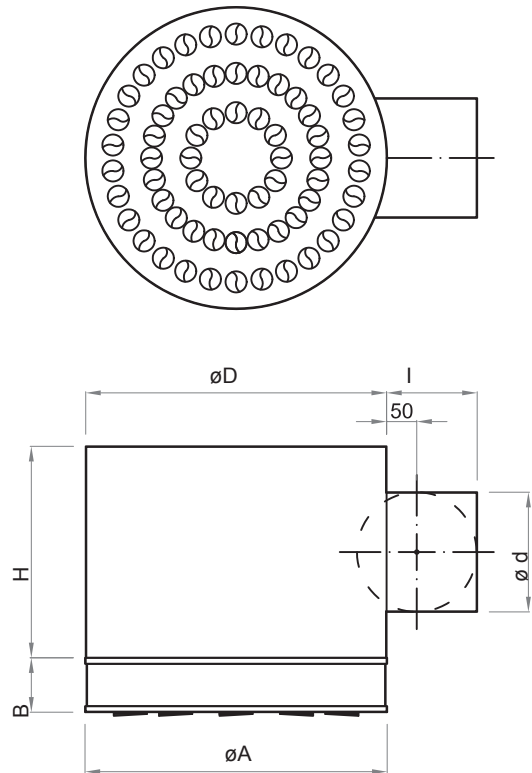
3.3 ON/RD, ON/RDM

ceiling diffusers with adjustable nozzles

DIFFUSERS ON/RD



DIFFUSERS ON/RDM



STANDARD SIZES

Size	300	400	500	600	700	700
ØA [mm]	300	400	500	600	700	700
B [mm]	60	60	90	90	90	90
Ød [mm]	98	123	158	198	248	313
ØD [mm]	298	398	498	598	698	698
H [mm]	275	300	350	400	450	450
i [mm]	115	130	150	175	200	200
number of nozzles	14	21	36	50	77	77

STANDARD SIZES

Size	300	400	500	600	700	700
ØA [mm]	300	400	500	600	700	700
B [mm]	60	60	90	90	90	90
Ød [mm]	98	123	158	198	250	313
ØD [mm]	298	398	498	598	698	698
H [mm]	275	300	350	400	450	450
i [mm]	115	130	150	175	200	200
number of nozzles	28	45	76	108	143	143

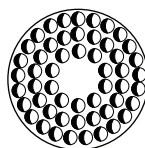
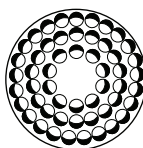
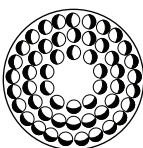
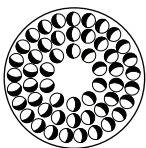
ABILITY TO CONFIGURE THE DIFFUSER NOZZLES

STANDARD TURMOIL

3 LINES

VERTICAL FOCUSING

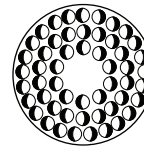
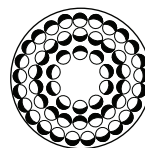
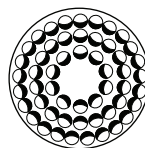
1 COURSE



4 LINES

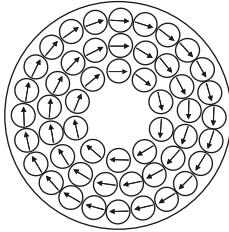
VERTICAL DISTRIBUTED

2 LINES



SET THE NOZZLE

standard settings



With a standard arrangement of nozzles for supplying the temperature should not be lower than the room temperature more than 14°C.

m^2 = error of the method according to the report NVG T32:1982

interfering element	Required distance	
	$m_2 = 5\%$	$m_2 = 10\%$
Knee 90°	$3 \cdot \varnothing d$	$2 \cdot \varnothing d$
Two knees 90°	$4 \cdot \varnothing d$	$3 \cdot \varnothing d$
Throttle 45°	$6 \cdot \varnothing d$	$3 \cdot \varnothing d$
Tee	$4 \cdot \varnothing d$	$3 \cdot \varnothing d$

size and painted in any color from the palette RAL

DIMENSIONS STREAM

Scope and size of the stream shall be determined by a computer program selection - ProAir

ACOUSTICAL DATA ON/RD(M)

Sound power level L_w (dB)

Factor K_{OK}

Size	Center frequency band, Hz						
	125	250	500	1000	2000	4000	8000
300	10	11	-3	-8	-18	-24	-26
400	11	10	-4	-8	-15	-23	-26
500	12	10	-2	-7	-16	-24	-26
600	14	8	-1	-6	-15	-23	-25
700	14	7	0	-4	-14	-23	-26
700	14	7	2	-4	-15	-26	-29
Tol +/-	2	2	2	2	2	2	2

Size	Center frequency band, Hz						
	125	250	500	1000	2000	4000	8000
300	13	7	18	17	13	10	11
400	12	8	16	15	12	10	11
500	9	8	14	12	10	10	10
600	7	10	11	10	10	10	11
700	4	8	12	9	9	10	12
700	4	10	11	7	9	9	12
Tol +/-	2	2	2	2	2	2	2

3.3 ON/RD, ON/RDM

ceiling diffusers with adjustable nozzles

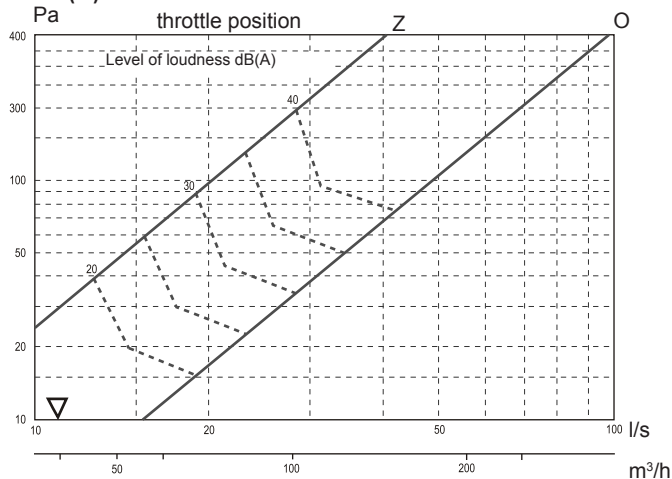
FEATURES

Flow - Pressure drop - Sound level

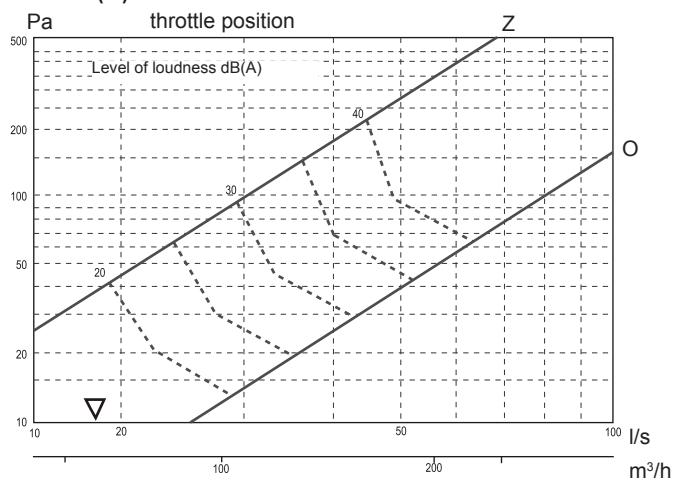
Characteristics can not be used for adjustment.

▽=Adjustable minimum flow

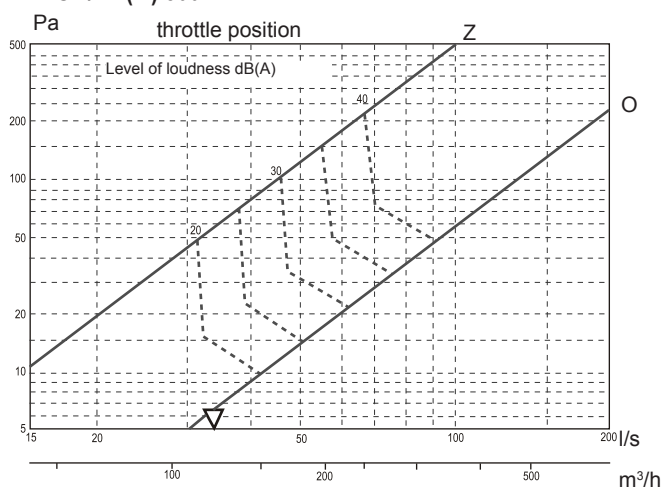
ON/RD(M) 300



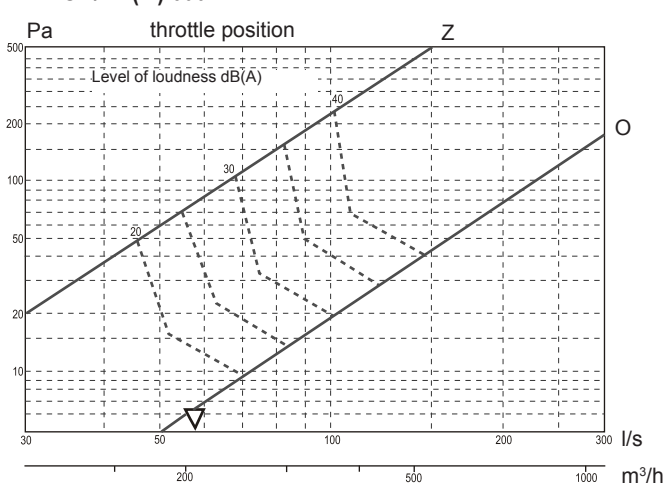
ON/RD(M) 400



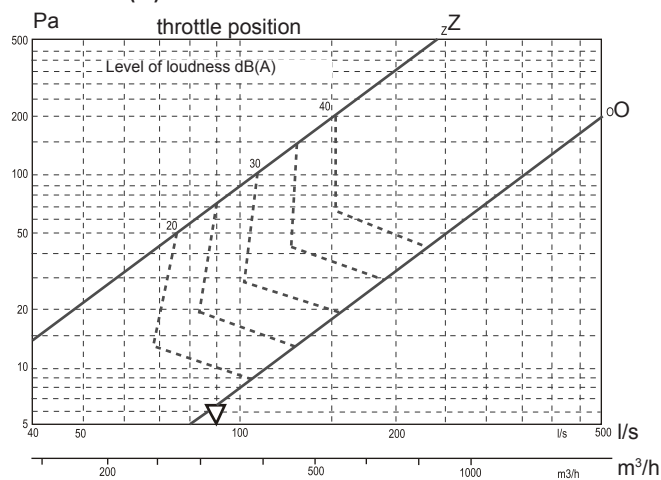
ON/RD(M) 500



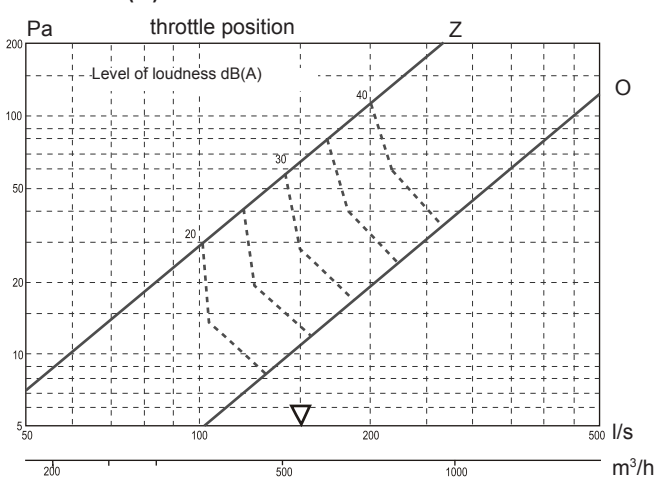
ON/RD(M) 600



ON/RD(M) 700 Ød=248



ON/RD(M) 700 Ød=313





- nozzles are made of high-quality ABS material, and painted standard white
- all diffusers use nozzles of 35mm (RDM) and 57 mm (RD) diameter; single nozzle capacity of 6 and 9 m³/h with acoustic pressure of 30 dB (A)
- installation in uncovered ceilings systems
- available in standard RAL 9003 colour
- upon customer's request, can be made available in any size and colour from RAL palette

INSTALLATION

ONS/RD, ONS/RDM diffusers can be installed directly in the round ventilation duct using rivets. Or the upper part of the diffuser can be fixed to the ceiling using screws (only variant 1). To take off the front panel, unscrew down bolts.

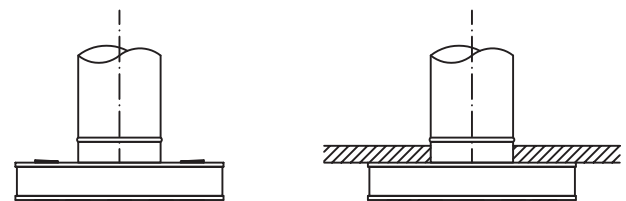
They can be also installed with the expansion box SR/ONS. See: SR/ONS

DESCRIPTION

ONS/RD and ONS/RDM are round ceiling with adjustable round nozzles designed for low- and medium-pressure uncovered ceilings installations. Nozzles of diameter sizes 57 mm (RD) and 35 (RDM) mm are ended with sinusoidal outlets that allows for high air diffusion. Nozzles position can be adjusted to any direction so that shape of the air stream can be regulated. They can be used with constant and variable airflow. The air can be supplied at the temperature lower or higher than the temperature in the ventilated room. They are available in two variants: with nozzles in lower plate and with nozzles in lower and upper plates. It is recommended to install ONS diffusers into the ceiling or hang them from the ceiling. Hanging diffusers will increase air supply capacity.

FEATURES

- adjustable airflow stream shape (360°C)
- easy dispersion of vertical stream
- available in two variants:
 - ONS/RD-1 - with nozzles in lower plate
 - ONS/RD-2 - with nozzles in lower and upper plates
- possible to swirl the stream
- possible simultaneous vertical and horizontal ventilation
- high induction factor
- possible to be installed with an expansion box SR/ONS



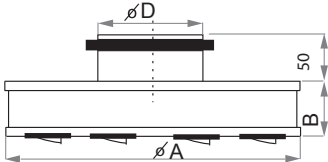
ORDER REFERENCE

ONS / RDM - 400 - 1		RAL9003
type	diffuser size	colour
		version:
		1 - with nozzles in lower plate,
		2 - with nozzles in lower and upper plate
RD	nozzles of 57 mm diameter	
RDM	nozzles of 35 mm diameter	

3.4 ONS/RD, ONS/RDM

round ceiling diffusers with round nozzles

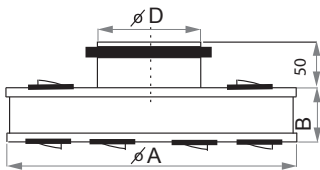
Diffuser ONS/RD, ONS/RDM



STANDARD SIZES

size	300	400	500	600	700
ØA [mm]	300	400	500	600	700
B [mm]	60		90		120
ØD [mm]	98	123	158	198	248/313
number of nozzles RD	1	14	21	36	50
	2	24	35	66	86
number of nozzles RDM	1	28	45	76	108
	2	52	77	140	188

Diffuser ONS/RD, ONS/RDM
version 2



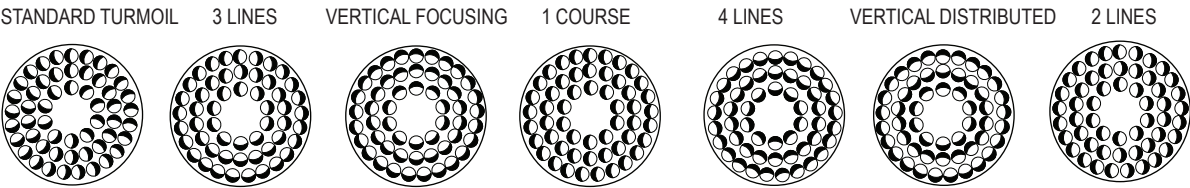
FEATURES

The figure shows airflow capacity V (m³/h), pressure loss p (Pa), airflow scope L (m) for end speed of 0.25 m/s, and volume level [db(A)].

The airflow scope L relates to isothermal air supply and standard nozzle position - rotation. For other positions, the airflow stream scope should be recalculated using the figures below.

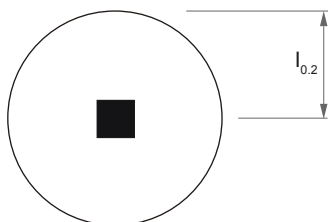
1 direction	2 direction	3 direction	4 direction
3,71	2,45	2,02	1,47

ABILITY TO CONFIGURE THE DIFFUSER NOZZLES



DIMENSIONS STREAM

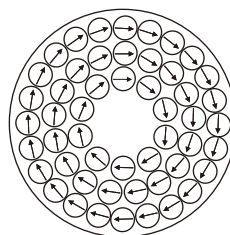
Isothermal Flux



ARRANGEMENT OF NOZZLES ONS/RD(M) 1

Isothermal Flux

Turmoil



Acoustical data - ONS/RD(M) 1 i 2

Sound power level L_w (dB)

Factor K_{OK}

Size	Center frequency band, Hz						
	125	250	500	1000	2000	4000	8000
300-1	4	4	4	-1	-19	-28	-24
400-1	3	3	5	-2	-18	-30	-29
500-1	5	5	5	-4	-22	-32	-29
600-1	5	4	5	-5	-22	-32	-29
700-1	4	5	6	-7	-25	-32	-29
700-1	3	5	6	-7	-23	-32	-29
300-2	8	2	3	0	-13	-22	-29
400-2	7	5	3	0	-13	-26	-29
500-2	5	4	4	-2	-17	-29	-29
600-2	6	6	4	-2	-16	-27	-29
700-2	6	6	5	-4	-20	-30	-29
700-2	5	6	5	-4	-22	-32	-29
Tol +/-	2	2	2	2	2	2	2

Arrangement of nozzles ONS/RD(M) 2

Standard Arrangement

Turmoil in line

- Nozzles at the top and bottom side of the diffuser arranged in the same direction.

Alternative arrangement of nozzles

Against turmoil

- Nozzles on the bottom arranged in a direction opposite to the nozzles at the top of the page

ACOUSTICAL DATA - ONS/RD(M) 1 i 2 + ONS/RD(M)

Sound power level L_w (dB)

Factor K_{OK}

Size	Center frequency band, Hz						
	125	250	500	1000	2000	4000	8000
300-1	12	6	5	-7	-20	-22	-24
400-1	10	7	4	-6	-20	-27	-25
500-1	10	7	5	-7	-21	-26	-24
600-1	8	6	4	-6	-17	-23	-22
700-1	10	6	5	-7	-18	-24	-23
700-1	7	4	6	-7	-24	-31	-27
300-2	13	6	2	-6	-17	-20	-23
400-2	12	8	2	-4	-14	-22	-23
500-2	13	-7	-3	-7	-16	-22	-22
600-2	11	8	2	-4	-12	-19	-20
700-2	12	7	3	-5	-13	-19	-21
700-2	10	5	4	-4	-17	-23	-22
Tol +/-	2	2	2	2	2	2	2

3.4 ONS/RD, ONS/RDM

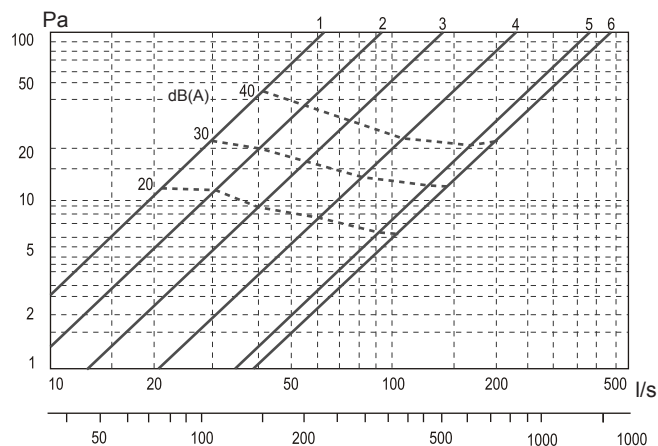
round ceiling diffusers with round nozzles

FLOW - PRESSURE DROP - SOUND LEVEL

Data refer to the diffuser ONS / RD (M) without Plenums

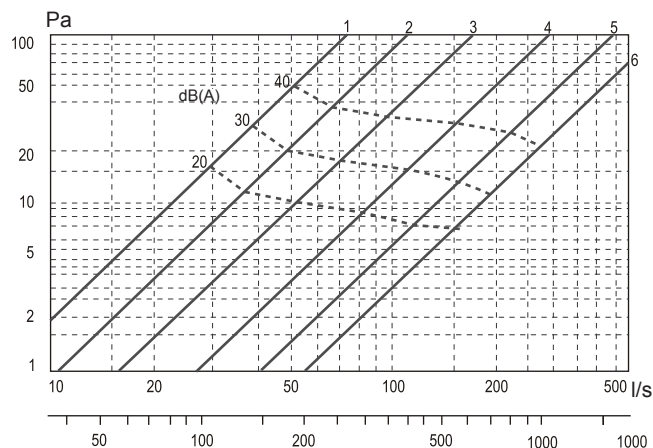
Characteristics can not be used to regulate

ONS/RD(M) 1



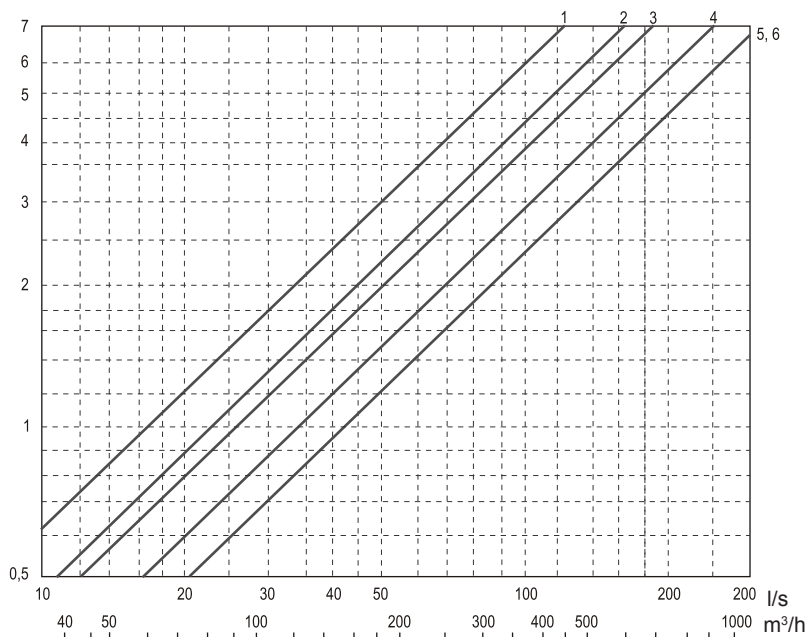
Size: 1 = 300 4 = 600
2 = 400 5 = 700 Ød = 248
3 = 500 6 = 700 Ød = 313

ONS/RD(M) 2



Movement - range, the standard arrangement of nozzles

ONS/RD(M) 1

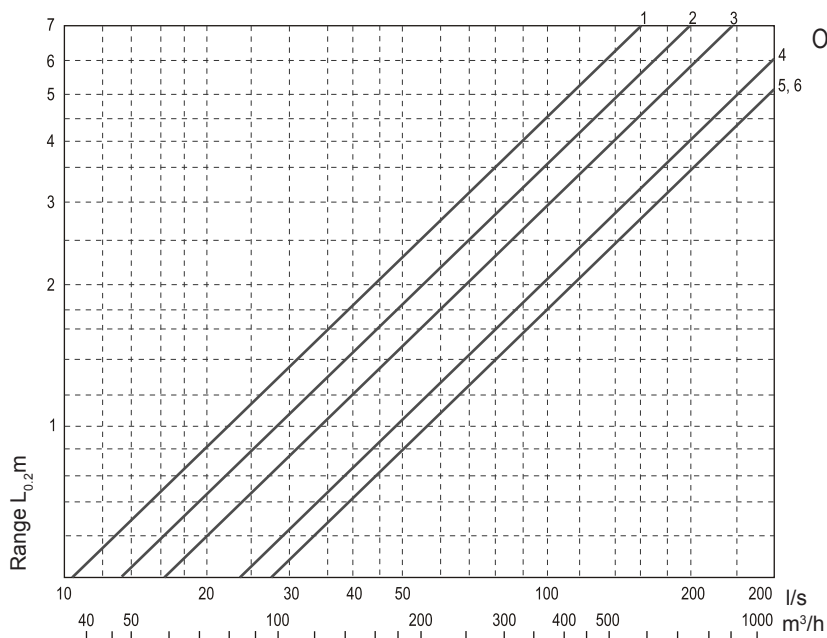


ONS/RD(M) 1, size 1. 300
2. 400
3. 500
4. 600
5. 700 Ød = 248
6. 700 Ød = 313

Range $L_{0.2}m$

MOVEMENT - RANGE

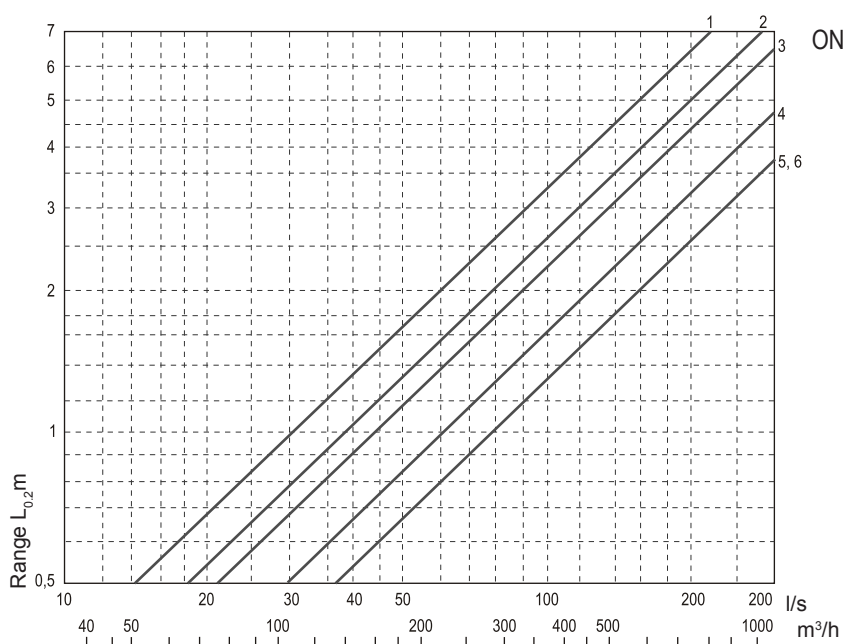
ONS/RD(M) 2, LOWER AND UPPER NOZZLES ARRANGED IN ACCORDANCE



ONS/RD(M) 2 size:

1. 300
2. 400
3. 500
4. 600
5. 700 Ød = 248
6. 700 Ød = 313

ONS/RD(M) 2 LOWER NOZZLES ARRANGED IN THE OPPOSITE DIRECTION THAN THE UPPER



ONS/RD(M) 2 size:

1. 300
2. 400
3. 500
4. 600
5. 700 Ød = 248
6. 700 Ød = 313

3.4 ONS/RD, ONS/RDM

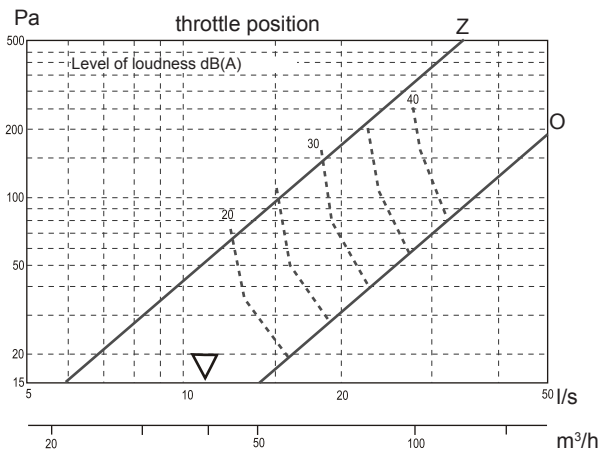
round ceiling diffusers with round nozzles

Flow - Pressure drop - Sound level

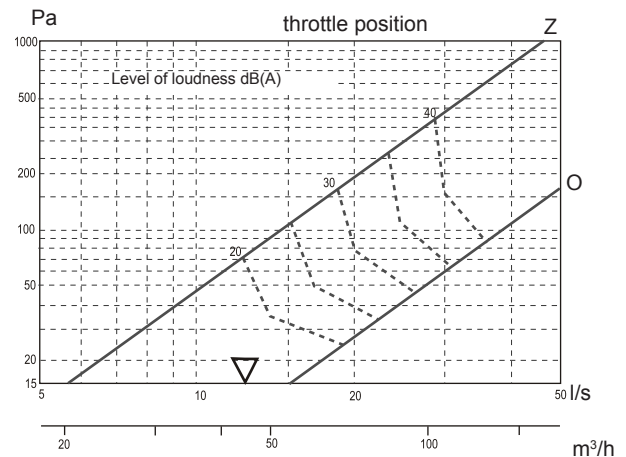
Data refer to the diffuser ONS / RD (M) to the mailbox expansion
Characteristics can not be used to regulate

▽ = adjustable minimum flow

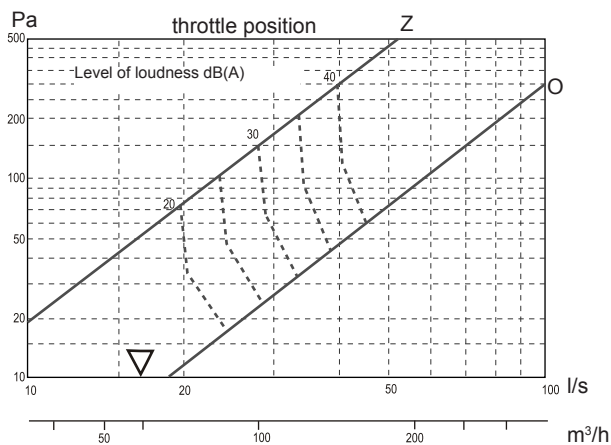
ONS/RD(M) 300-1 + SR/ONS



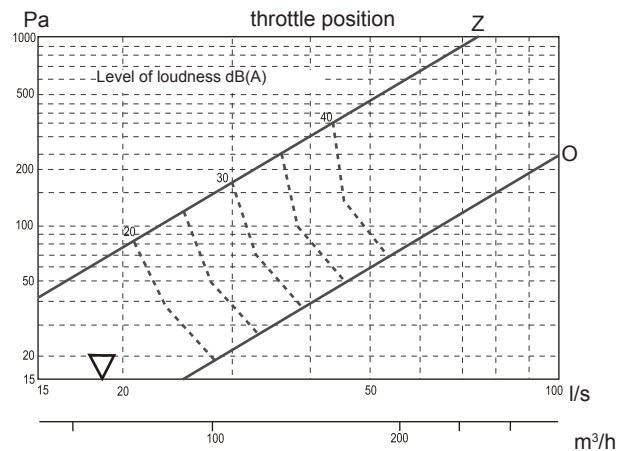
ONS/RD(M) 300-2 + SR/ONS



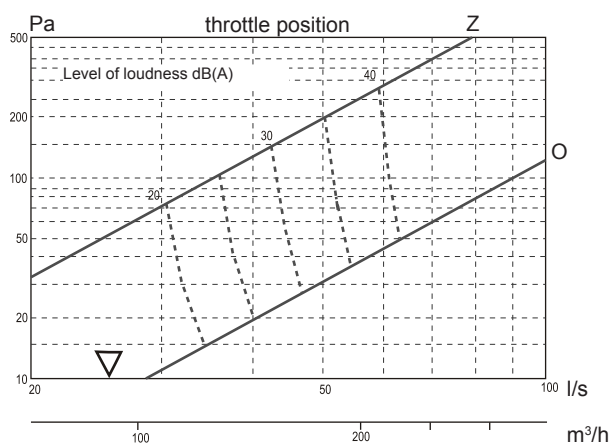
ONS/RD(M) 400-1 + SR/ONS



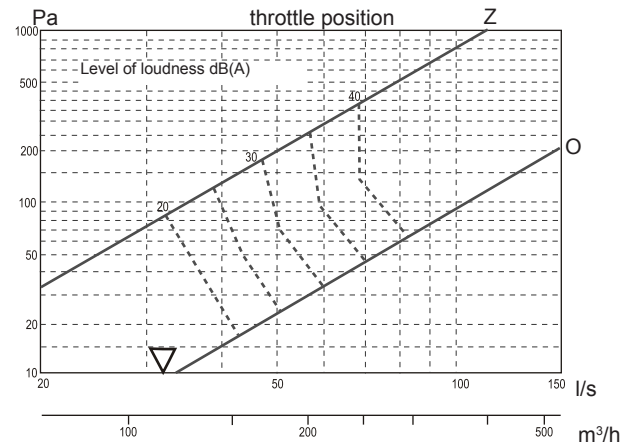
ONS/RD(M) 400-2 + SR/ONS



ONS/RD(M) 500-1 + SR/ONS



ONS/RD(M) 500-2 + SR/ONS

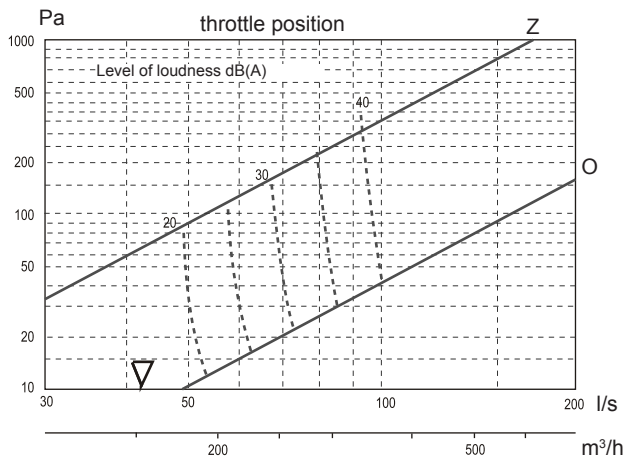


Flow - Pressure drop - Sound level

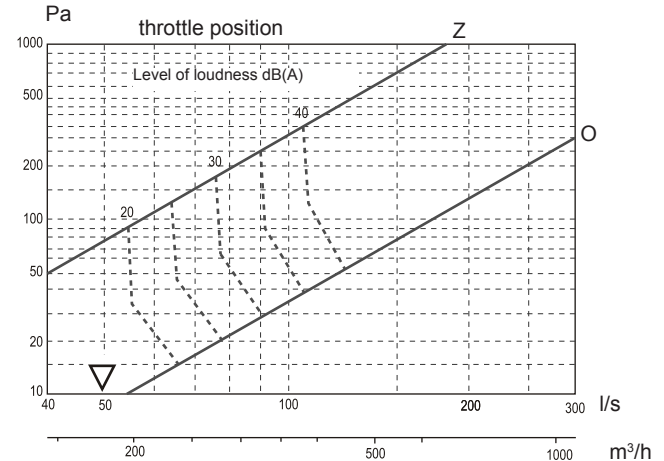
Data refer to the diffuser ONS / RD (M) to the mailbox expansion
Characteristics can not be used to regulate

▽ = adjustable minimum flow

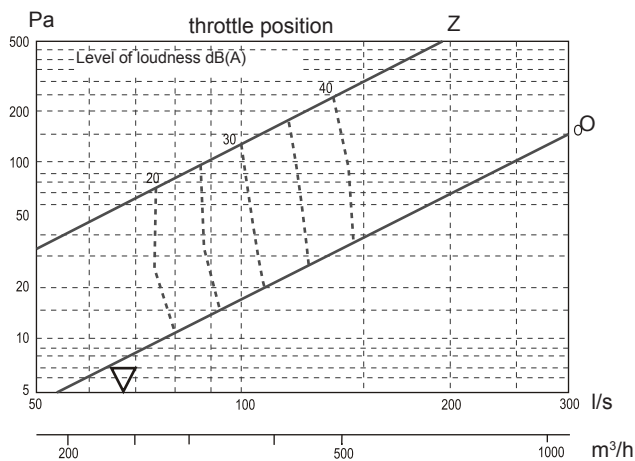
ONS/RD(M) 600-1 + SR/ONS



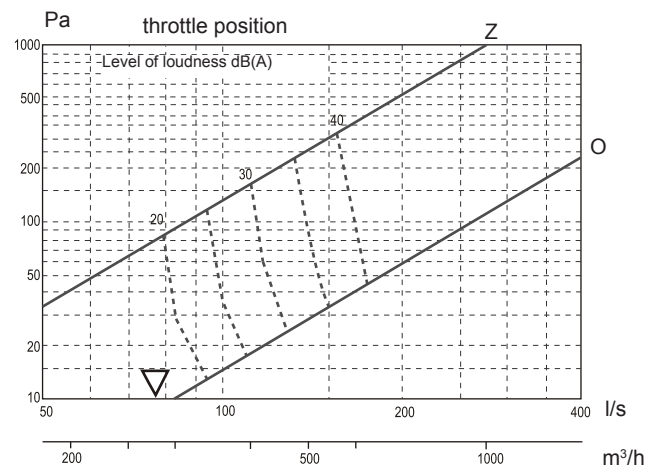
ONS/RD(M) 600-2 + SR/ONS



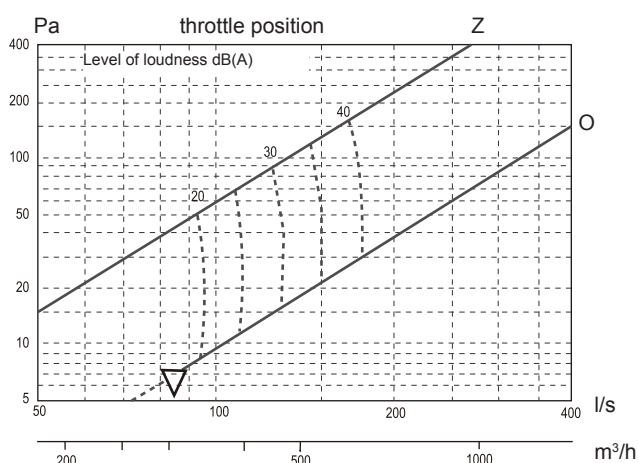
ONS/RD(M) 700-1 + SR/ONS (Ød = 248)



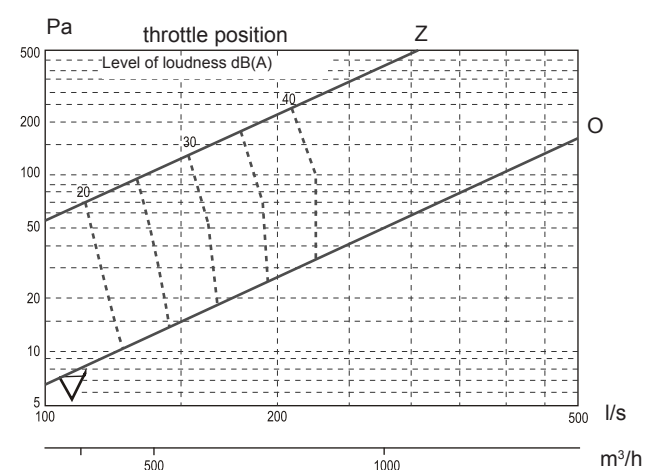
ONS/RD(M) 700-2 + SR/ONS (Ød = 313)



ONS/RD(M) 700-1 + SR/ONS (Ød = 313)



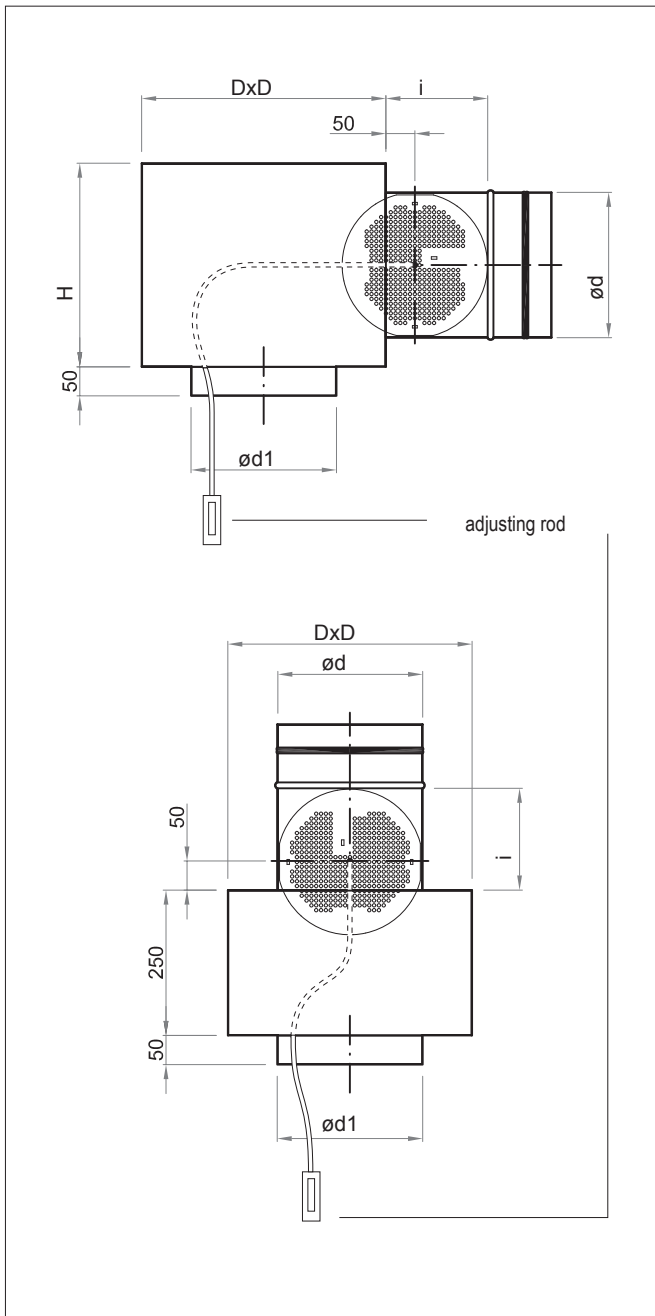
ONS/RD(M) 700-2 + SR/ONS (Ød = 313)



3.4 SR/ONS/RD, SR/ONS/RDM

expansion boxes for diffusers ONS/RD i ONS/RDM

3



Expansion boxes can be connected to the ventilation installation through the side or top.

Boxes can be thermally and acoustically insulated from the inside by K-Flex rubber mat.

Upon customer's request we can make other types of expansion boxes accordingly to provided drawings.

ORDER REFERENCE

SR / ONS - 400 - P - I - g

b side connection
g top connection

— non-insulated
I insulated

— no throttle
P perforated damper
with adjusting rod

size

diffuser type

STANDARD SIZES

Size	300	400	500	600	700	700
D [mm]	225	260	300	350	400	400
H[mm]	225	260	300	350	400	400
Ød [mm]	78	98	123	158	198	248
Ød1 [mm]	100	125	160	200	250	315
i [mm]	115	130	150	175	200	200

DESCRIPTION

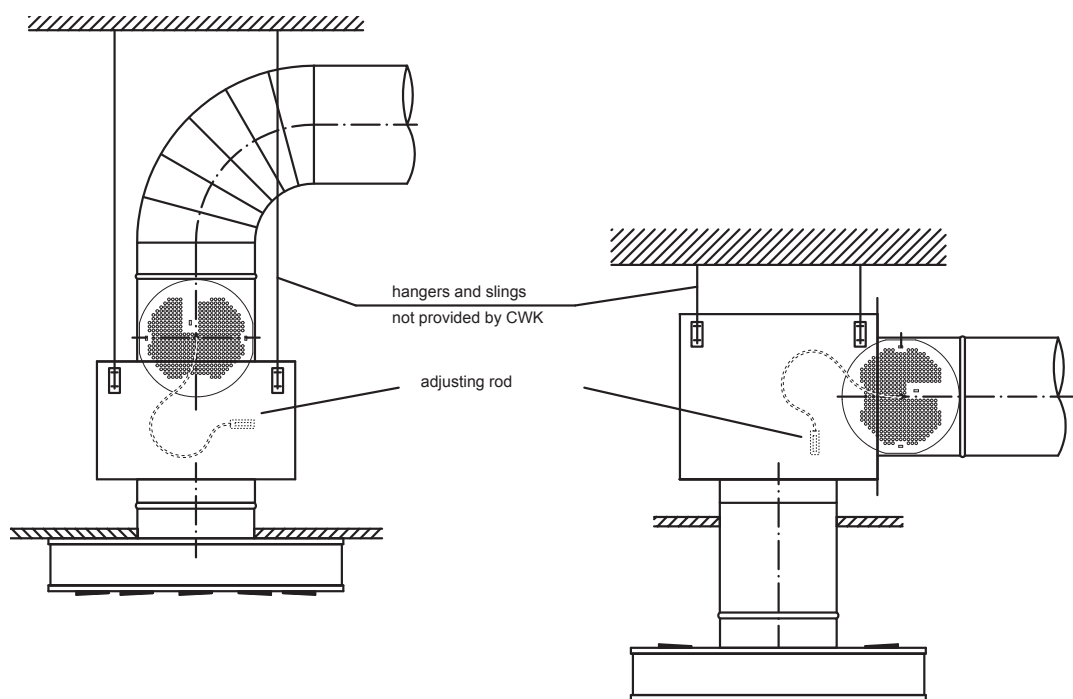
SR/ONS are expansion boxes for diffusers ONS/RD AND ONS/RDM. They stabilize the airflow and ensure uniform air supply to the diffuser. Expansion boxes connect diffusers with ventilation installation. They are made of zinc-coated sheet, joint by non-welded Click-Clock connection. In standard expansion boxes are equipped on the ferrule with machine crimped rubber gasket.

INSTALLATION

Expansion boxes SR/ONS are designed for installation above the underslung ceiling. Prepare an installation hole of a size of $\varnothing d1$. The box can be mounted onto the ceiling by appropriate hangers (bars, pins...) and installation slings. If installing the diffuser with the expansion box in variant 2, they can be connected through the round ventilation duct by a distance of no more than 500 mm.

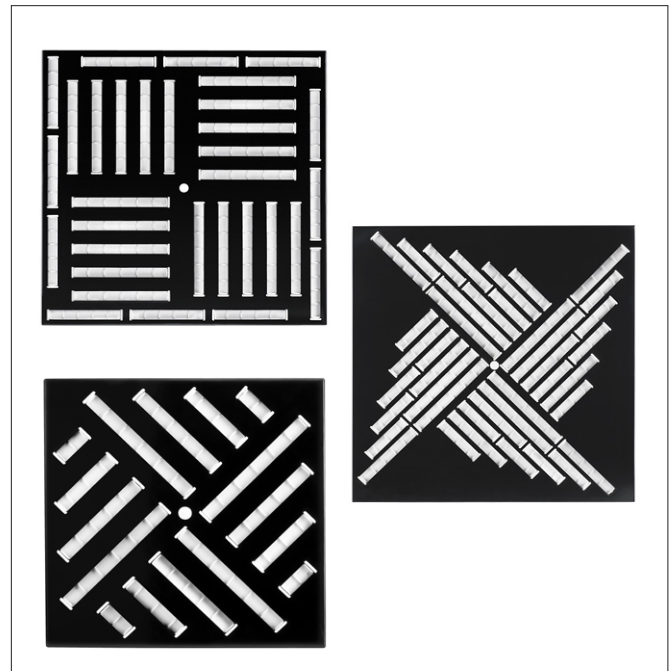
Upon customer's request, boxes can be equipped with factory slings.

INSTALATION IN THE ROOF



notes

3



DESCRIPTION

ANW and AWW are square supply and exhaust diffusers designed for low- and medium-pressure installations. The supplied air is swirled which allows for mixing the ventilated air with the air in the room. They can be used with constant and variable airflow. Recommended installation in the ceiling.

ORDER REFERENCE

ANW - K - 625 / 54M - c - R - RAL9003

colour

R frame (only version K)

blades colour:
b - white, c - black

number and size of blades:
M - small, S - medium, D - large

diffuser size

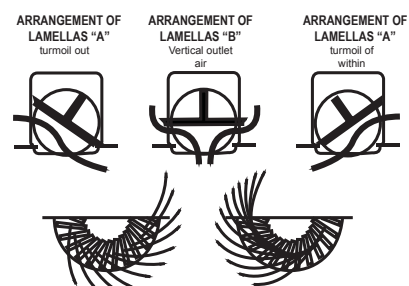
version: K - square, O - round

type: ANW - air supply, AWW - air exhaust

FEATURES

- made of zinc-coated sheet, available in standard RAL 9003 colour
- ANW is equipped with adjustable plastic blades that allow for setting the direction of the air flow
- plastic blades are available in three sizes:
 - small (M) 100 mm
 - medium (S) 150 mm
 - large (D) 200 mm
- plastic blades are available in two colours: black and white
- diffusers can be square (K) or round (O)
- AWW do not have the blades and are designed to exhaust
- R version is additionally equipped with decorative aluminium frame
- can be installed with the expansion box SR/ANW or SR/AWW
- upon customer's request, diffusers can be made in any size and colour from the RAL palette
- blades arrangement in ANW version can be set accordingly to the order

BLADES LAY OUT



4.1 ANW, AWW

swirl diffusers with adjustable blades

INSTALLATION

Diffusers ANW and AWW are designed for installation with the expansion box SR/ANW or SR/AWW.

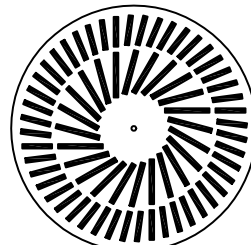
INSTALLATION IN THE FULL UNDERSLUNG CEILING: prepare an installation hole in the ceiling of a size of the expansion box. Put the expansion box in so that edges stick out by approx. 12 mm from the ceiling panel. Slide the front panel of the ventilator onto the box and fix it to the sides with steel screws. Remember to seal joints.

INSTALLATION IN PANEL CEILING: ventilator together with the expansion box should be installed above the ceiling level so that the front panel of the ventilator sticks evenly to the ceiling panel.

INSTALLING R-TYPE: ventilator with the decorative frame can be fixed into the ceiling by appropriate bolts and screws through installation holes in the frame. Remember to seal joints.

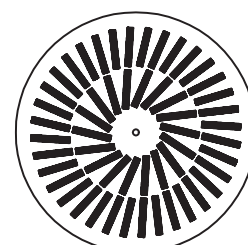
ROUND DIFFUSERS ANW-O WITH SMALL BLADES

ANW-O-825/24S/48M



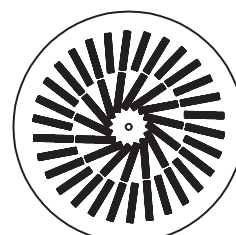
Ø825

ANW-O-625/54M



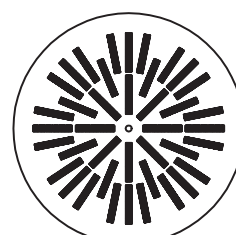
Ø625

ANW-O-600/48M



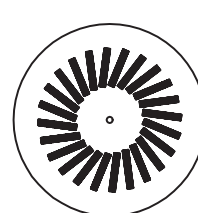
Ø600

ANW-O-600/40M



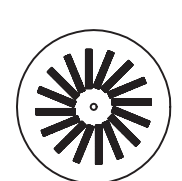
Ø600

ANW-O-500/24M



Ø500

ANW-O-400/16M



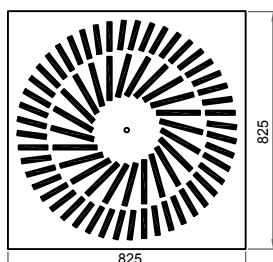
Ø400

ANW-O-300/8M

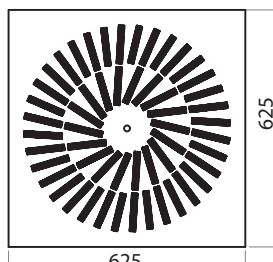


SQUARE DIFFUSERS ANW-K WITH SMALL BLADES

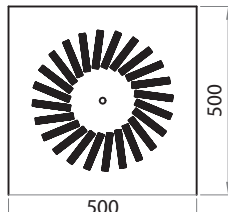
ANW-K-825/24S/48M



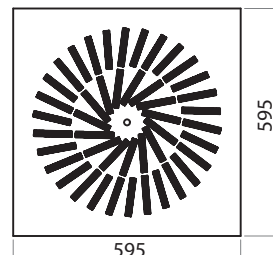
ANW-K-625/54M



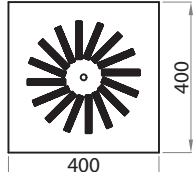
ANW-K-500/24M



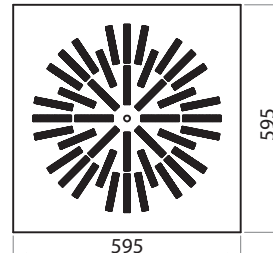
ANW-K-600/48M



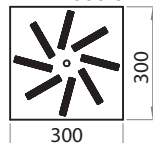
ANW-K-400/16M



ANW-K-600/40M

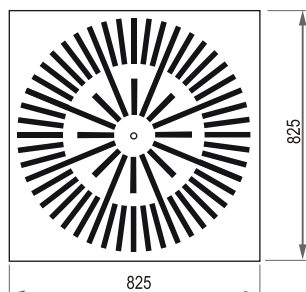


ANW 300/8M

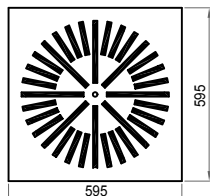


SQUARE DIFFUSERS ANW-K WITH BLADES OF VARIOUS SIZES

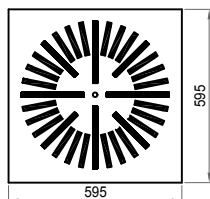
ANW-K-825/8D/48S/8M



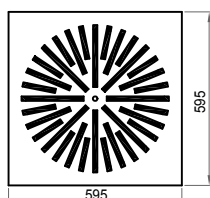
ANW-K-600/8D/24M



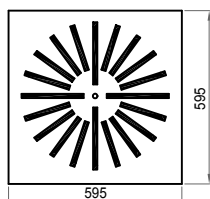
ANW-K-600/4D/4S/24M



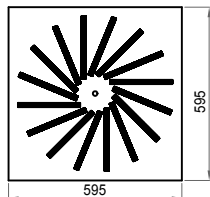
ANW-K-600/8D/8S/16M



ANW-K-600/4D/16S

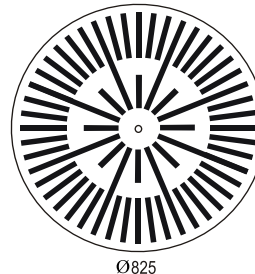


ANW-K-600/16D



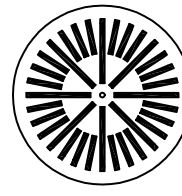
ROUND DIFFUSERS ANW-O WITH BLADES OF VARIOUS SIZES

ANW-O-825/8D/48S/8M



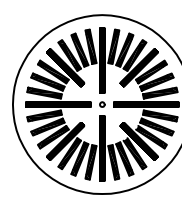
Ø825

ANW-O-600/8D/24M



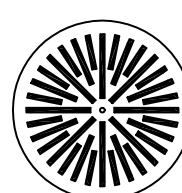
Ø600

ANW-O-600/4D/4S/24M



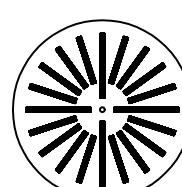
Ø600

ANW-O-600/8D/8S/16M



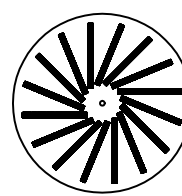
Ø600

ANW-O-600/4D/16S



Ø600

ANW-O-600/16D



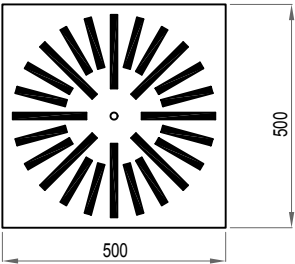
Ø600

4.1 ANW, AWW

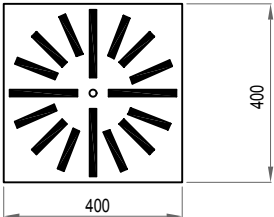
swirl diffusers with adjustable blades

Square diffusers ANW-K with blades of various sizes

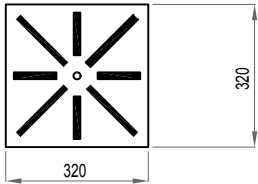
ANW-K-500/8S/16M



ANW-K-400/4S/12M



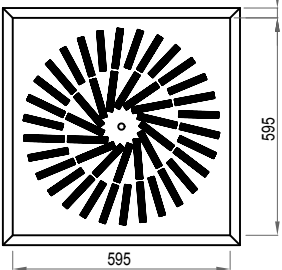
ANW-K-320/4S/4M



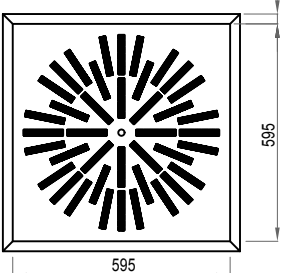
Square diffusers ANW-K with small blades

Square diffusers ANW-K with a decorative frame (sample)

ANW-K-600/48M-R

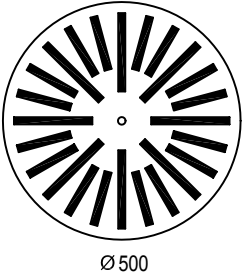


ANW-K-600/40M-R

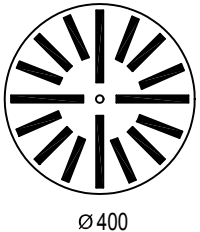


Round diffusers ANW-O with blades of various sizes

ANW-O-500/8S/16M

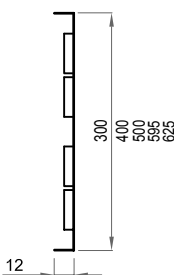


ANW-O-400/4S/12M

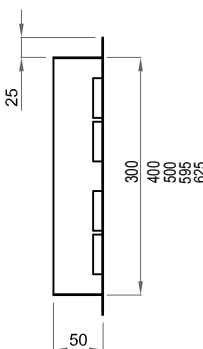


Diffusers profiles for ANW and ANW R

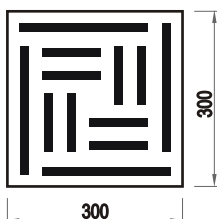
ANW-K



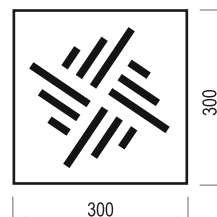
ANW-K R



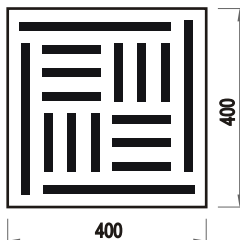
ANW-KP300



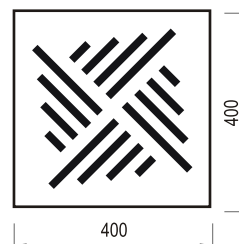
ANW-KK300



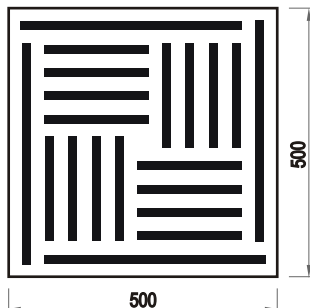
ANW-KP400



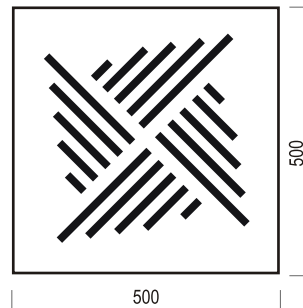
ANW-KK400



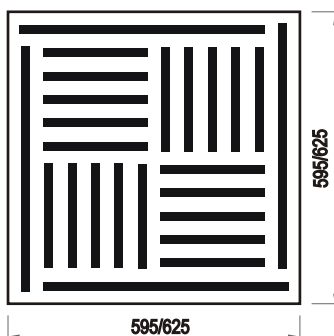
ANW-KP500



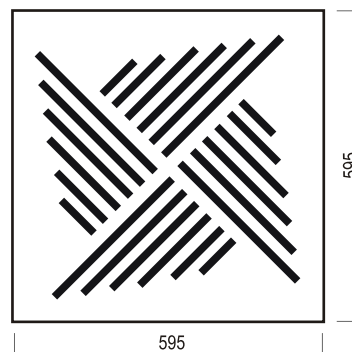
ANW-KK500



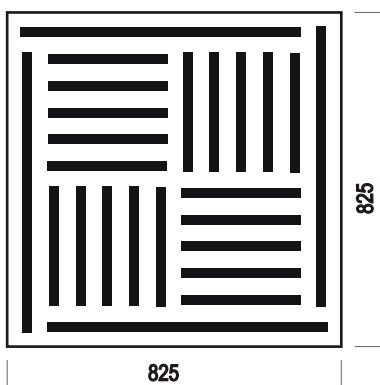
ANW-KP600/625



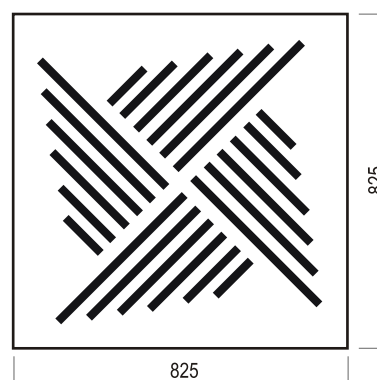
ANW-KK600



ANW-KP825



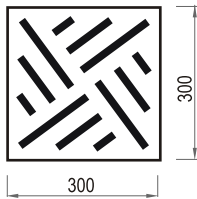
ANW-KK825



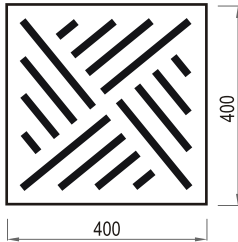
4.1 ANW, AWW

swirl diffusers with adjustable blades

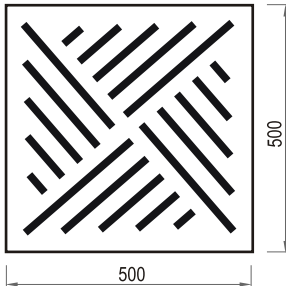
ANW-KX300



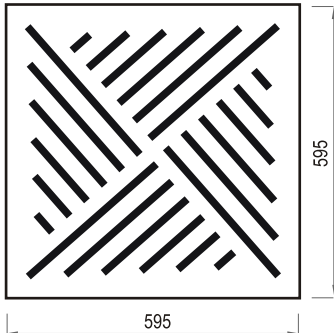
ANW-KX400



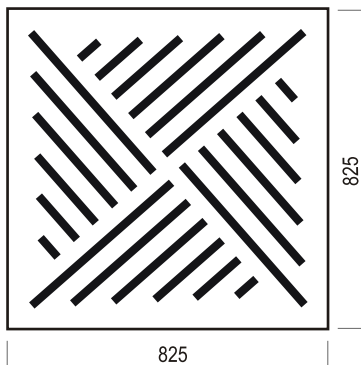
ANW-KX500



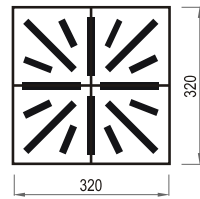
ANW-KX600



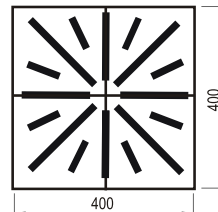
ANW-KX825



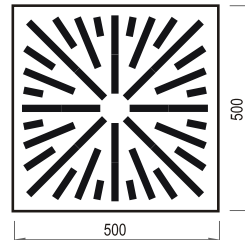
ANW-SQ320



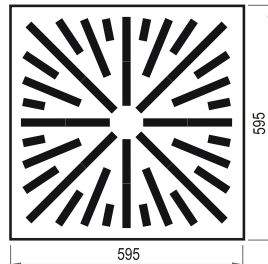
ANW-SQ400



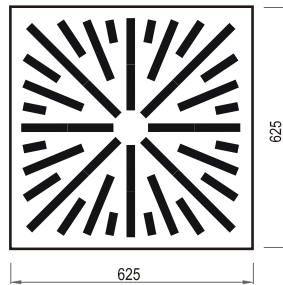
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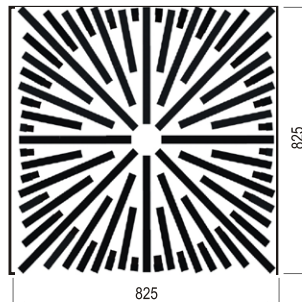
ANW-SQ600



ANW-SQ625

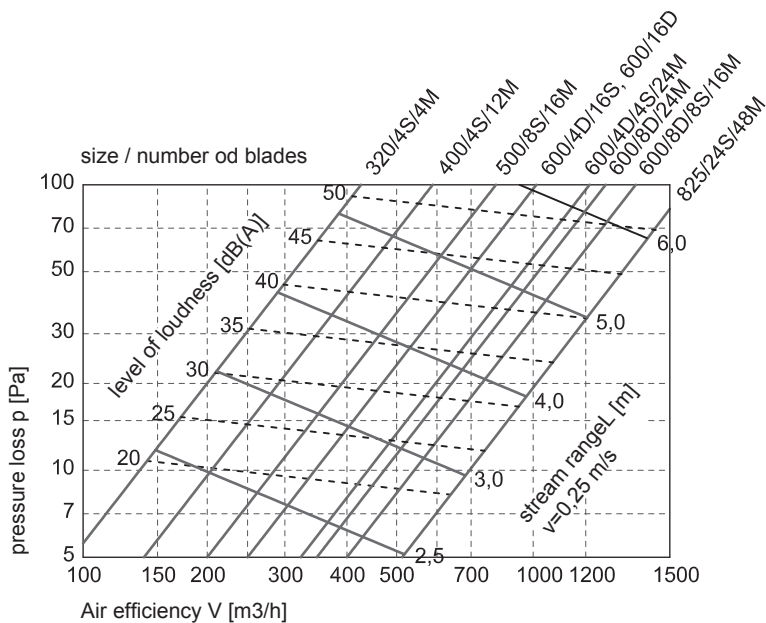
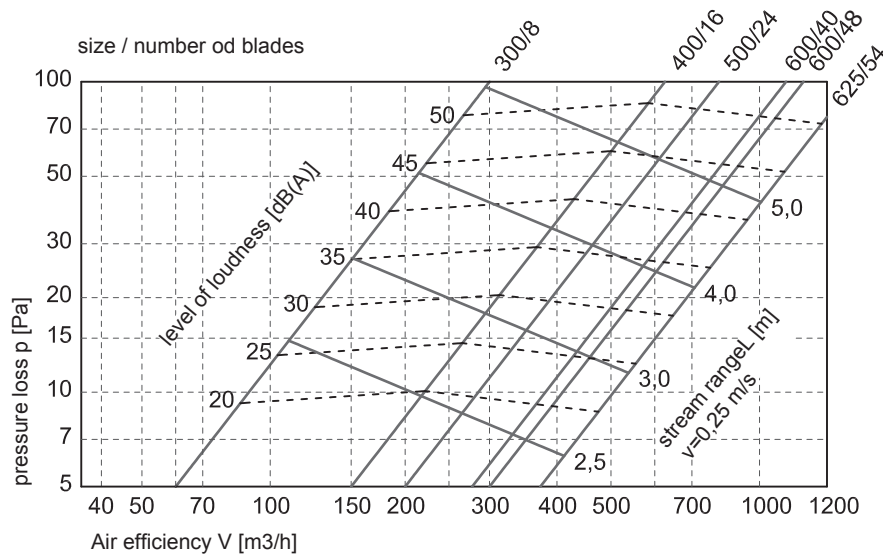


ANW-SQ825



FEATURES

The figure shows airflow capacity V (m³/h), pressure loss p (Pa), air-flow scope L (m) for end speed of 0.25 m/s, and volume level [db(A)]. The airflow scope L relates to isothermal air supply.

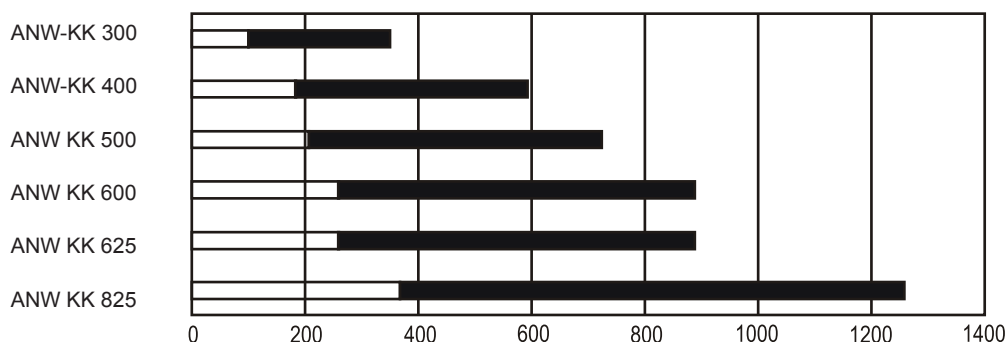


4.1 ANW, AWW

swirl diffusers with adjustable blades

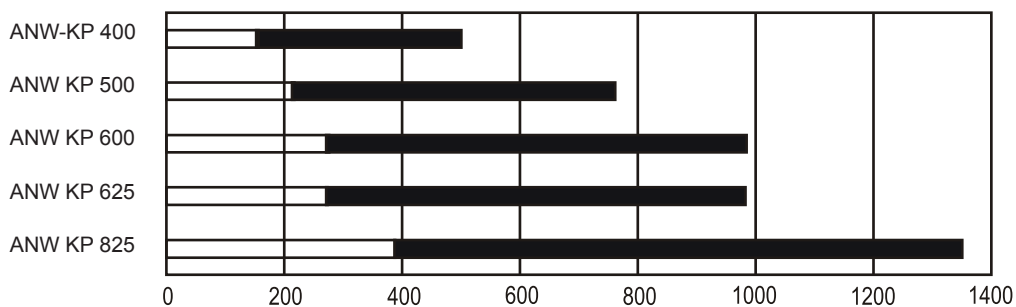
ANW-KK

Model	The volume of air flow Q [m³/h]	Ventilation levels X0.37 [m] (V _t 0.37 m/s)	Pressure drop	Noise L _A [dB(A)]
ANW-KK 300	[101-356]	[0.3-1.0]	[5-50]	[---47]
ANW-KK 400	[171-594]	[0.4-1.5]	[5-50]	[---37]
ANW-KK 500	[207-713]	[0.5-1.7]	[5-50]	[---33]
ANW-KK 600	[254-885]	[0.5-1.9]	[5-50]	[---29]
ANW-KK 625	[254-885]	[0.5-1.9]	[5-50]	[---29]
ANW-KK 825	[364-1253]	[0.7-2.6]	[5-50]	[---22]



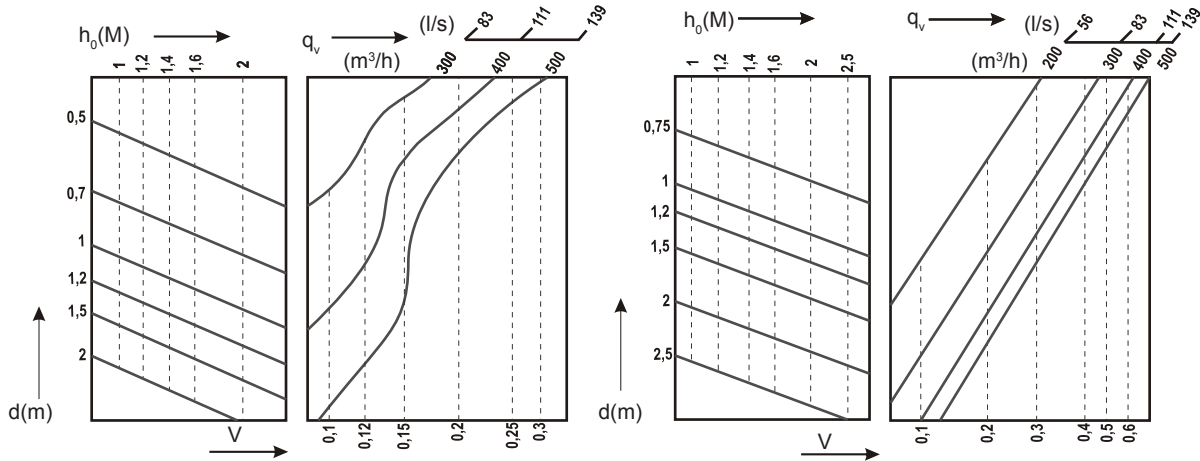
ANW-KP

Model	The volume of air flow Q [m³/h]	Ventilation levels X0.37 [m] (V _t 0.37 m/s)	Pressure drop	Noise L _A [dB(A)]
ANW-KP 400	[145-509]	[0.3-1.2]	[5-50]	[---24]
ANW-KP 500	[216-756]	[0.5-1.6]	[5-50]	[---25]
ANW-KP 600	[278-984]	[0.6-2.0]	[5-50]	[---26]
ANW-KP 625	[278-984]	[0.6-2.0]	[5-50]	[---26]
ANW-KP 825	[381-1341]	[0.8-2.6]	[5-50]	[---26]

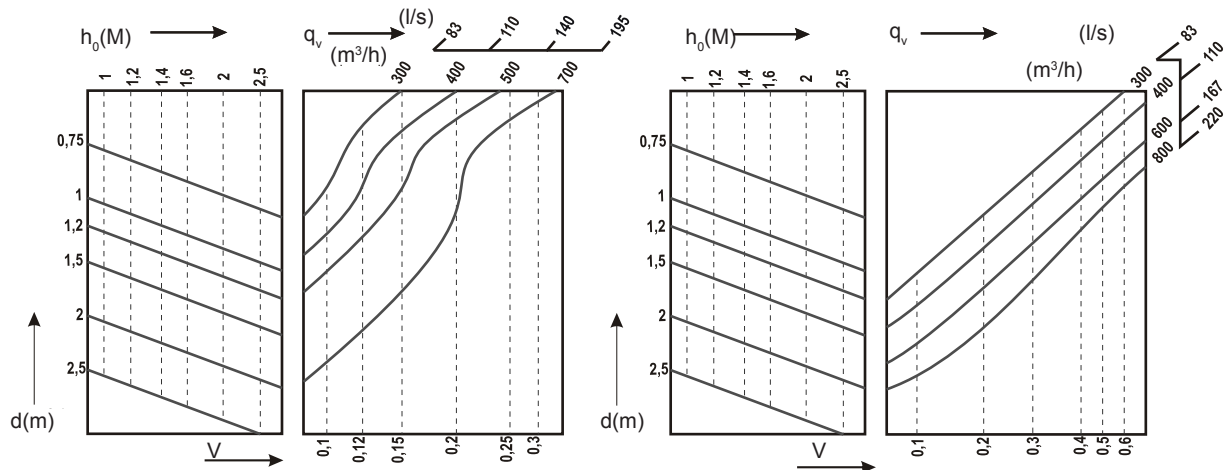


FEATURES

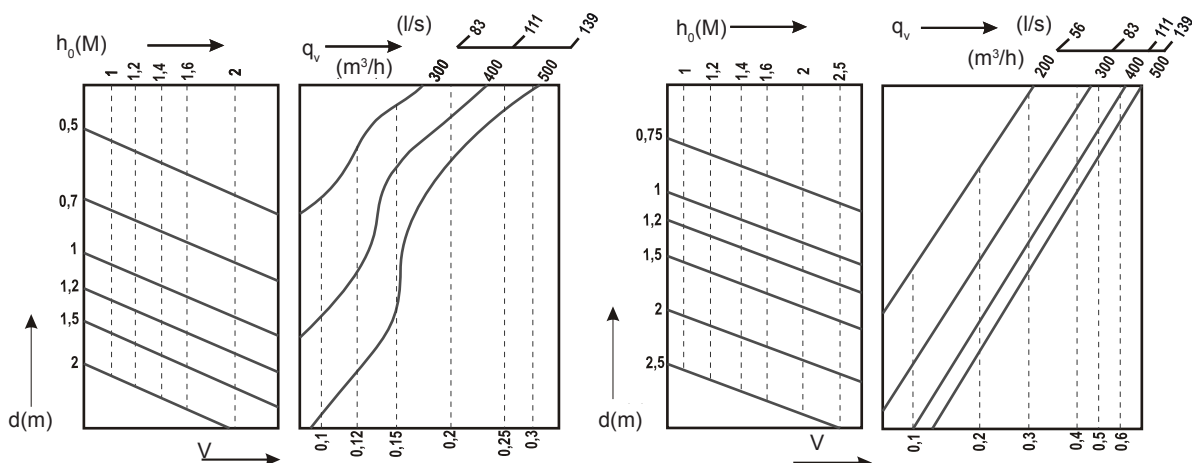
ANW-KK 400



ANW-KK 500



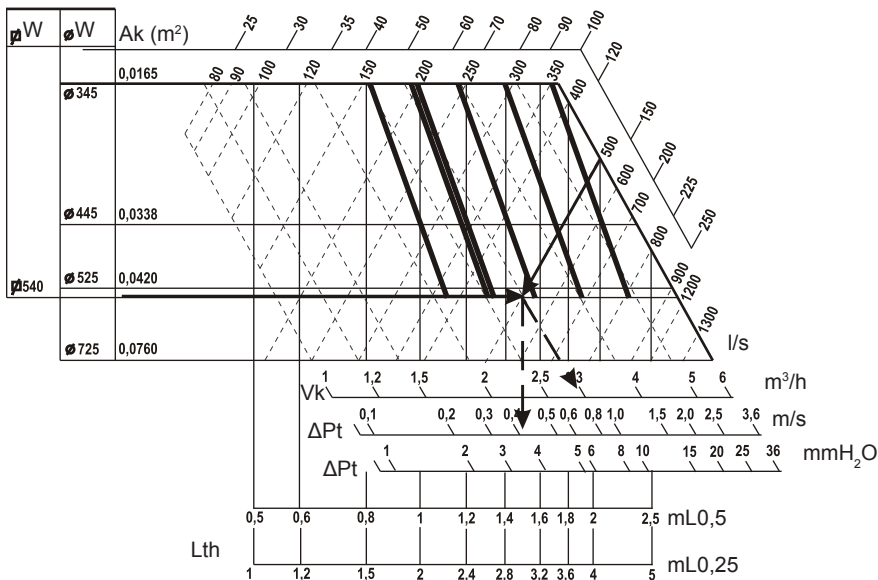
ANW-KK 600



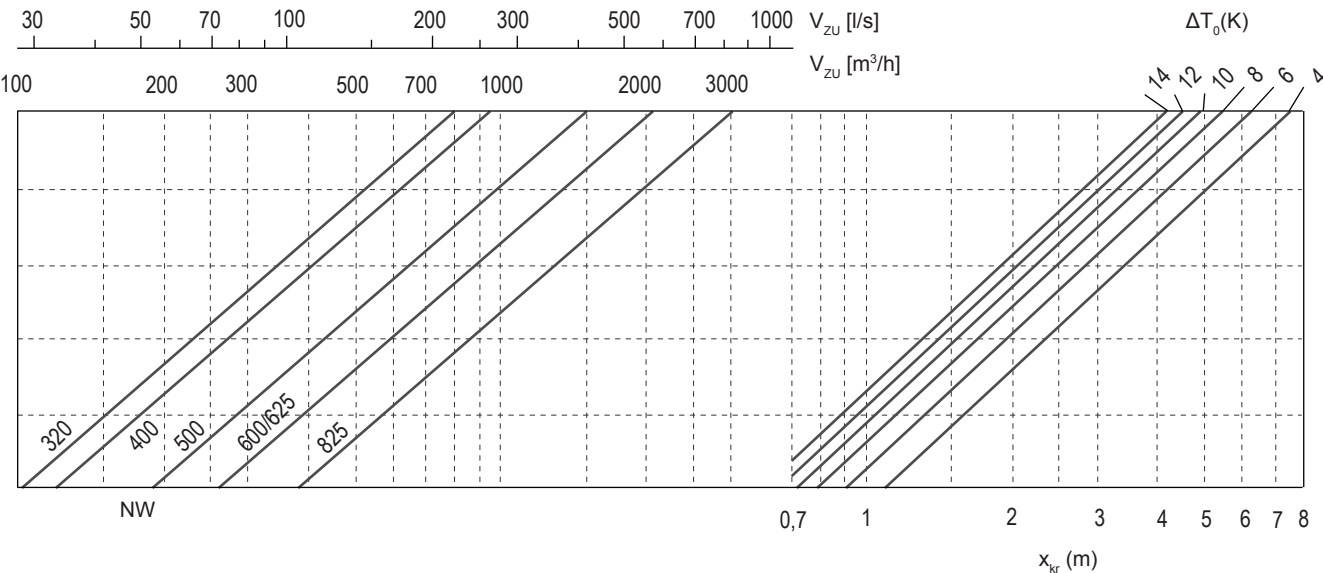
4.1 ANW, AWW

swirl diffusers with adjustable blades

ANW-KK



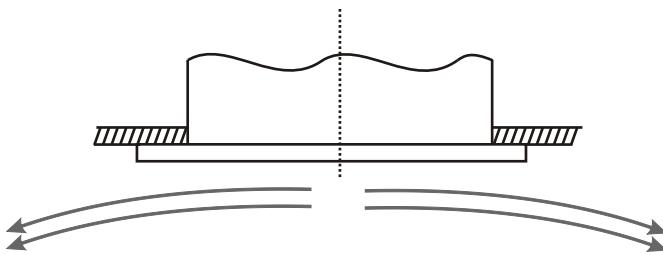
ANW-K



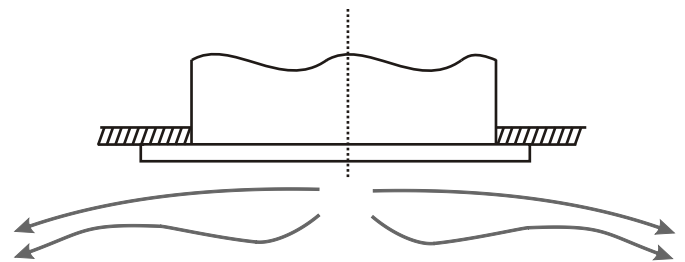
ROTATIONAL DIFFUSER CEILING

Maximum speed of the airflow

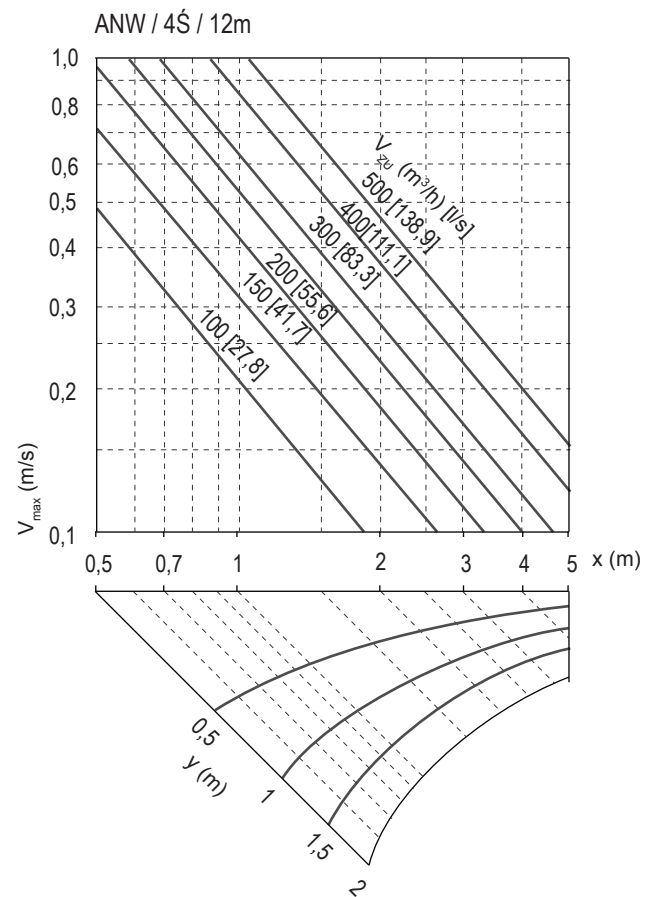
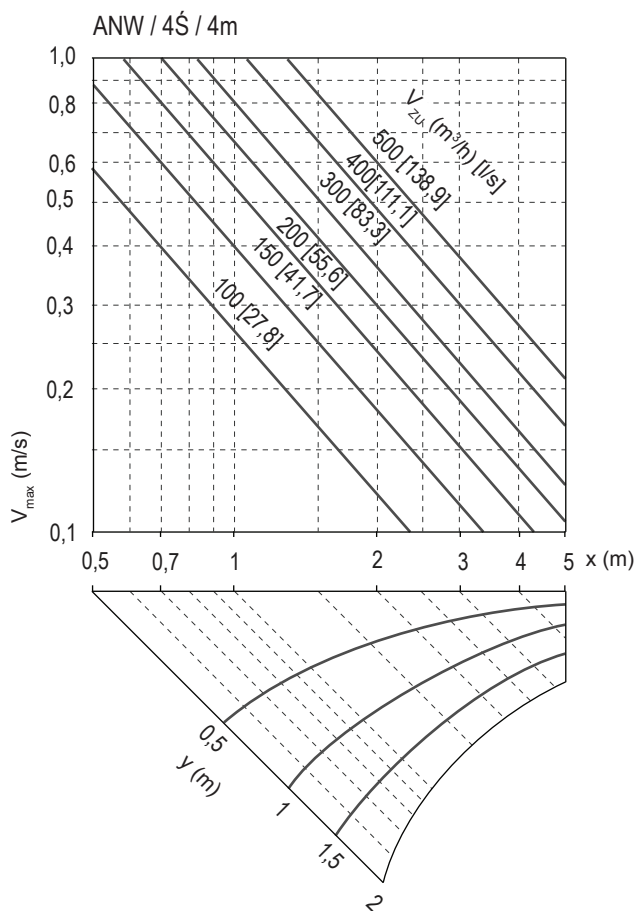
Position of lamella „A”



Position of lamella „B”



4



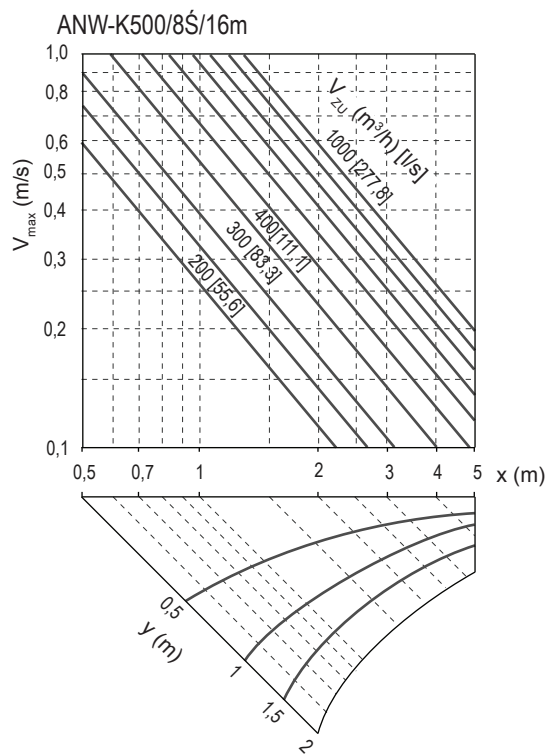
Location lamella 'A' = the value of graphs x 1.31
Free stream = value in the graphs x 0.7

4.1 ANW, AWW

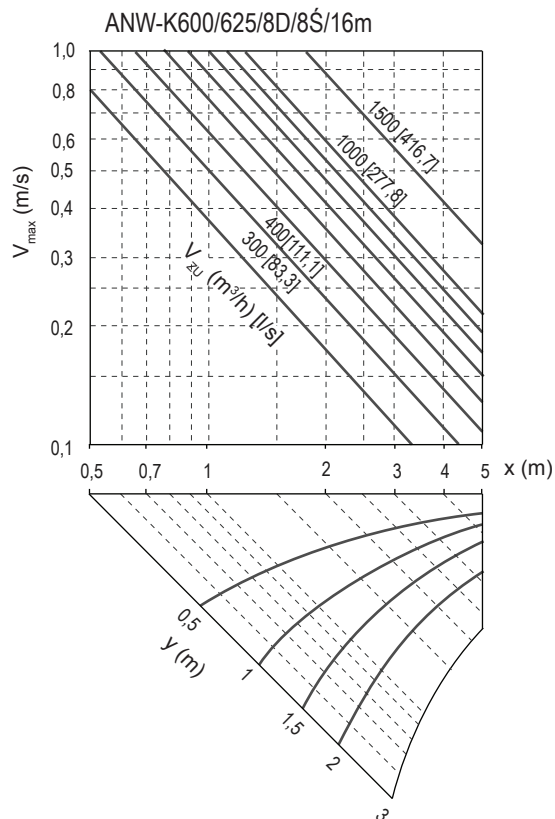
swirl diffusers with adjustable blades

Rotational diffuser Ceiling

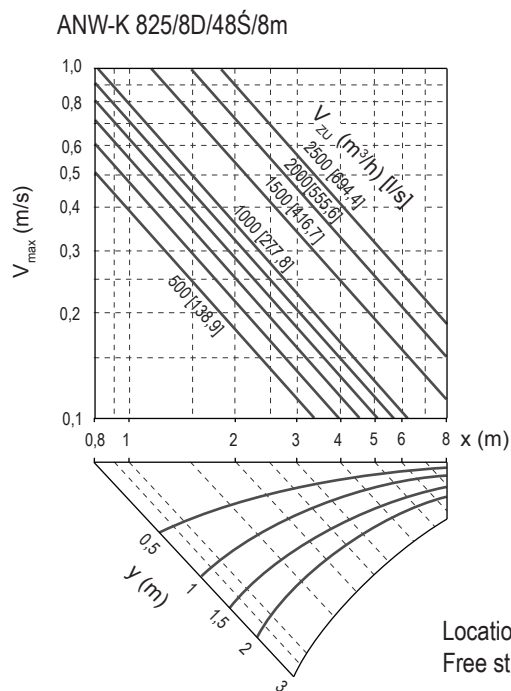
4



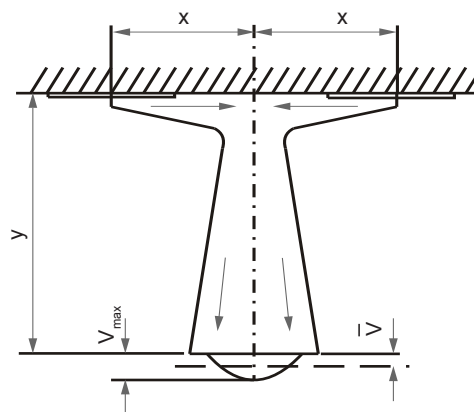
Location lamella 'A' = the value of graphs x 1.25
Free stream = value in the graphs x 0.7



Location lamella 'A' = the value of graphs x 1.4
Free stream = value in the graphs x 0.7

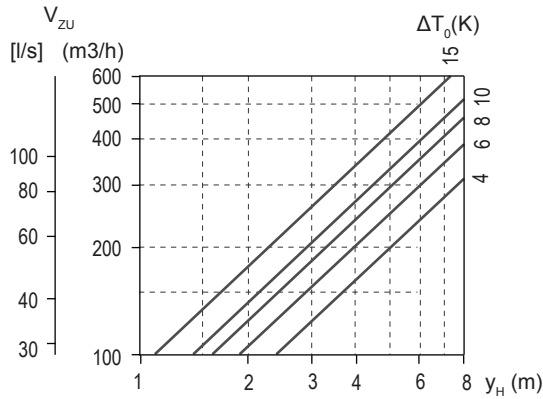


Location lamella 'A' = the value of graphs x 1.4
Free stream = value in the graphs x 0.7

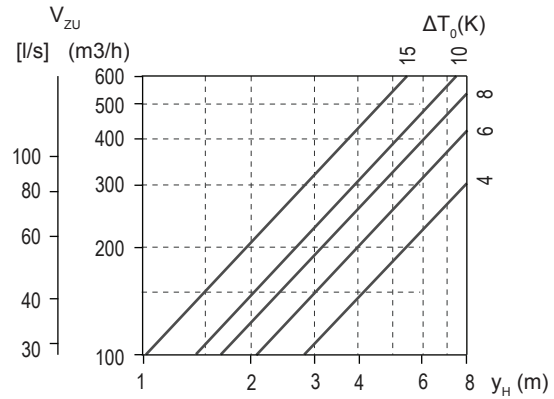


CRITICAL RANGE OF AIR FLOW. MAXIMUM RANGE FOR THE HEATING FLUX, THE SYSTEM BLADES 'B'

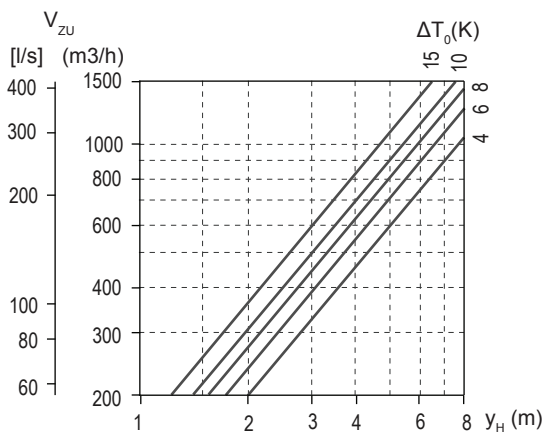
ANW-K 320/4Ś/4M



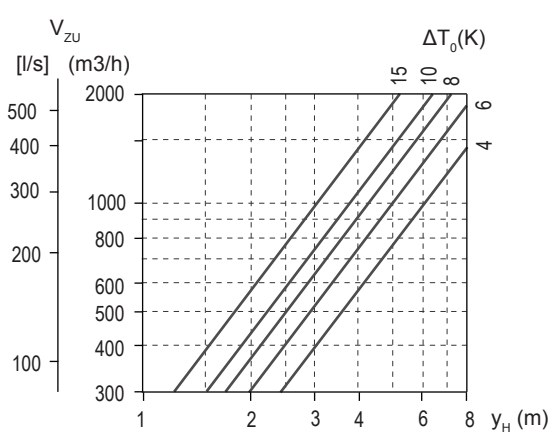
ANW-K 400/4Ś/12M



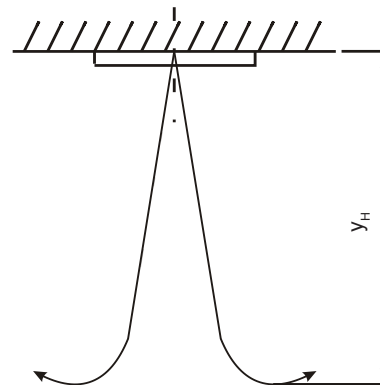
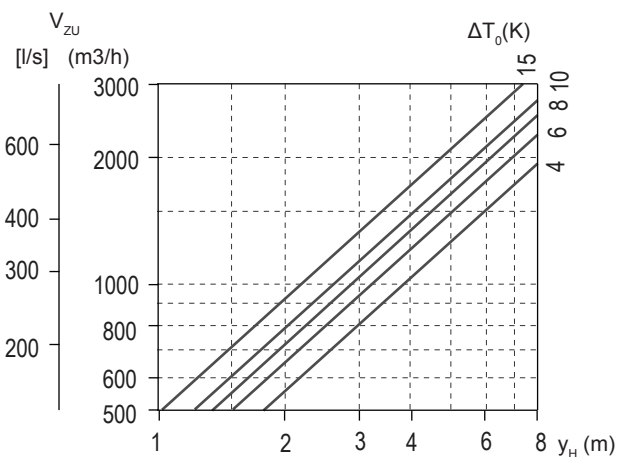
ANW-K 500/8Ś/16M



ANW-K 600/625/8D/8Ś/16M



ANW-K 825/8D/48Ś/8M

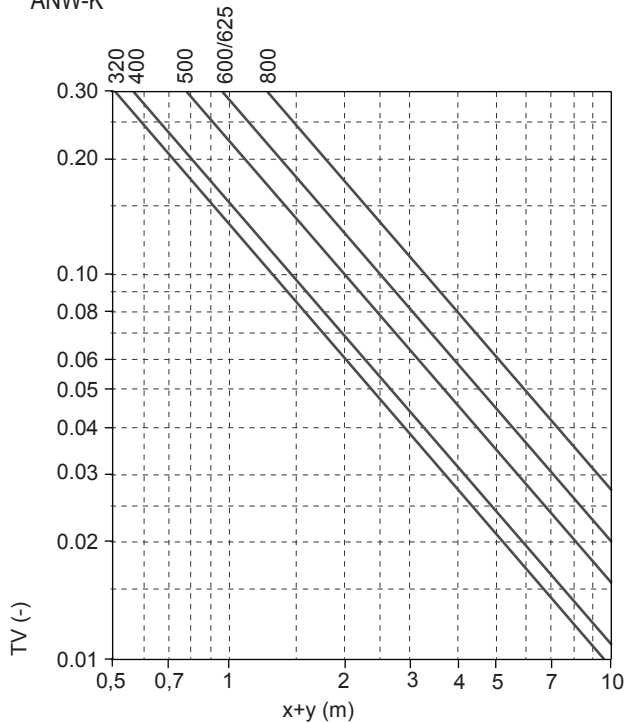


4.1 ANW, AWW

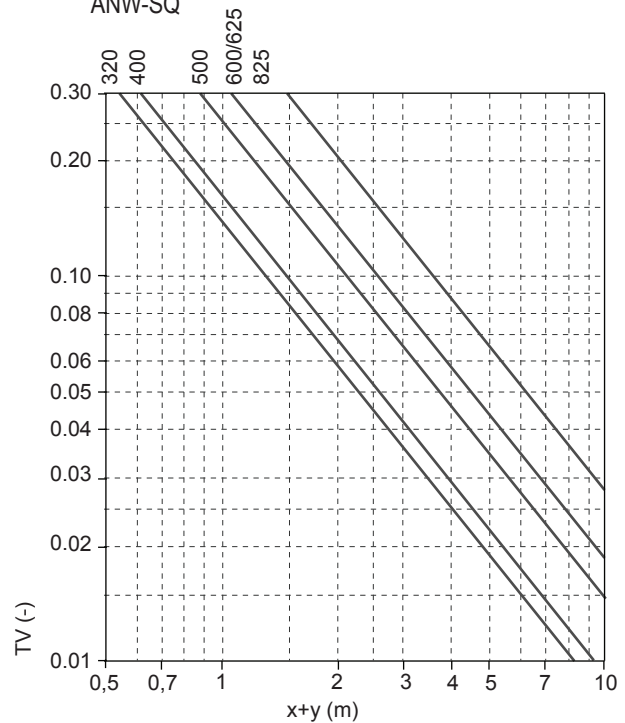
swirl diffusers with adjustable blades

THE COEFFICIENT OF REDUCTION OF TEMPERATURE DIFFERENCE TO THE EFFECT OF THE CEILING

ANW-K



ANW-SQ

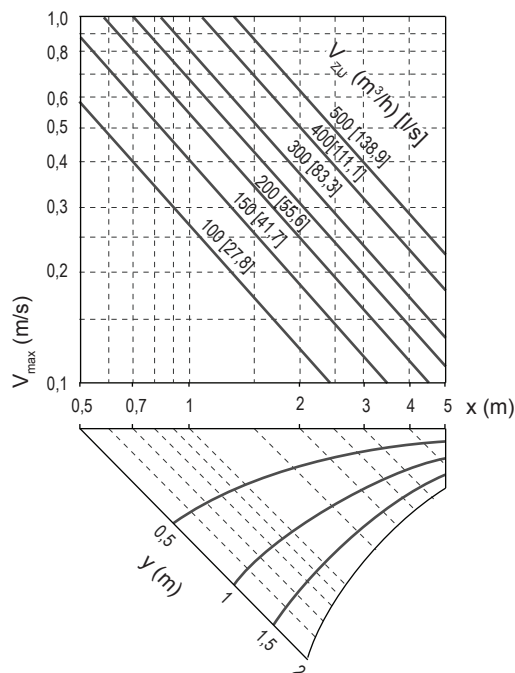


Location lamella 'A' = the value of graphs x 1.4
Free stream = value in the graphs x 0.7

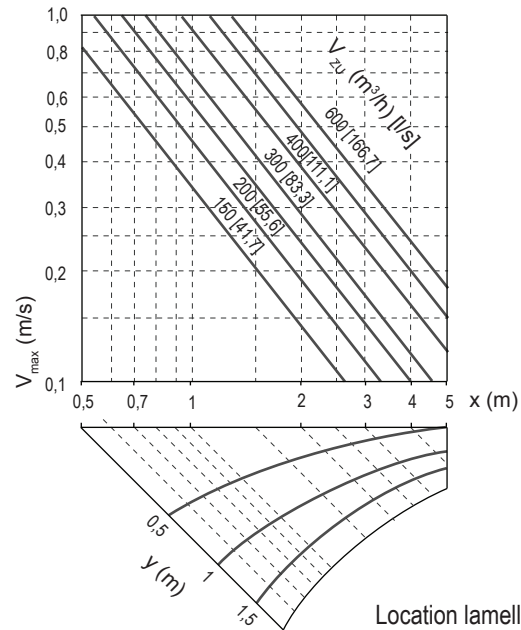
Location lamella 'A' = the value of graphs x 1.8

WHIRLING CEILING DIFFUSER (VENT TO THE EFFECT OF THE CEILING)

ANW-SQ 320

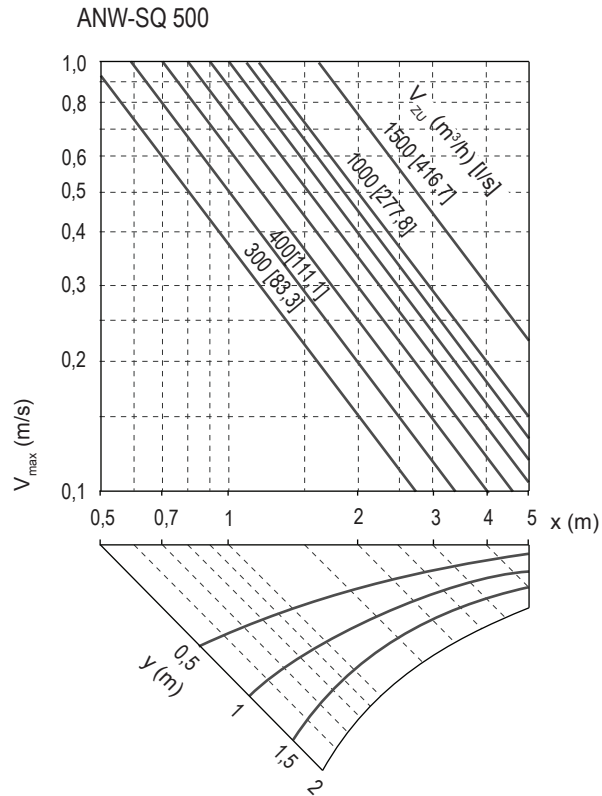


ANW-SQ 400

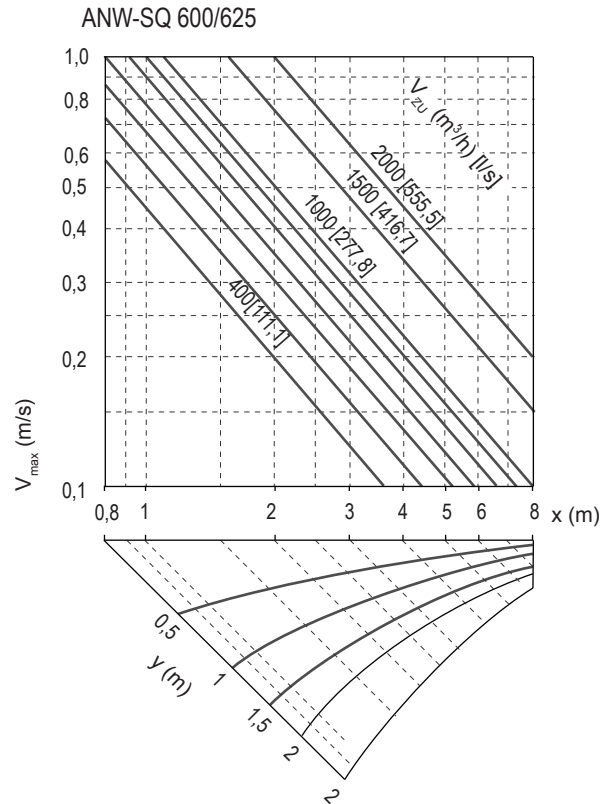


Location lamella 'A'
= the value of graphs x 1.18

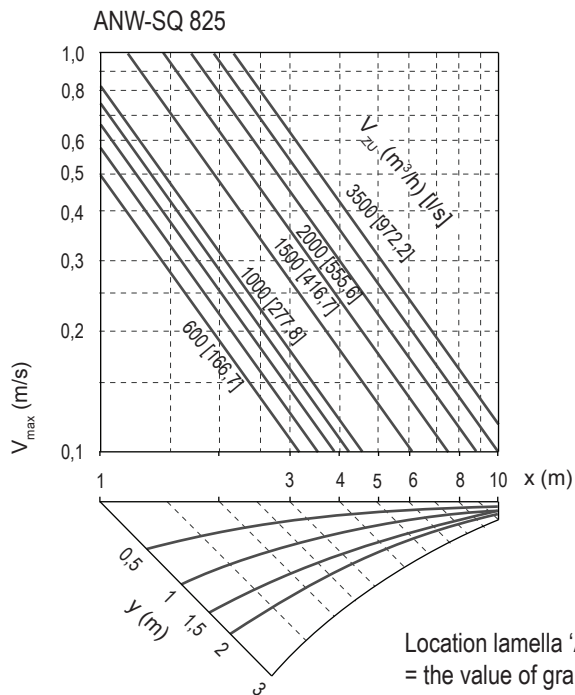
ROTATIONAL DIFFUSER CEILING



Location lamella 'A' = the value of graphs x 1.22



Location lamella 'A' = the value of graphs x 1.4



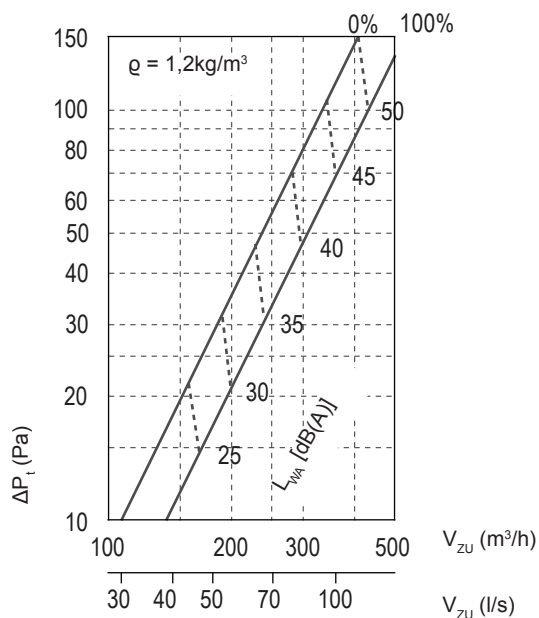
Location lamella 'A'
= the value of graphs x 1.4

4.1 ANW, AWW

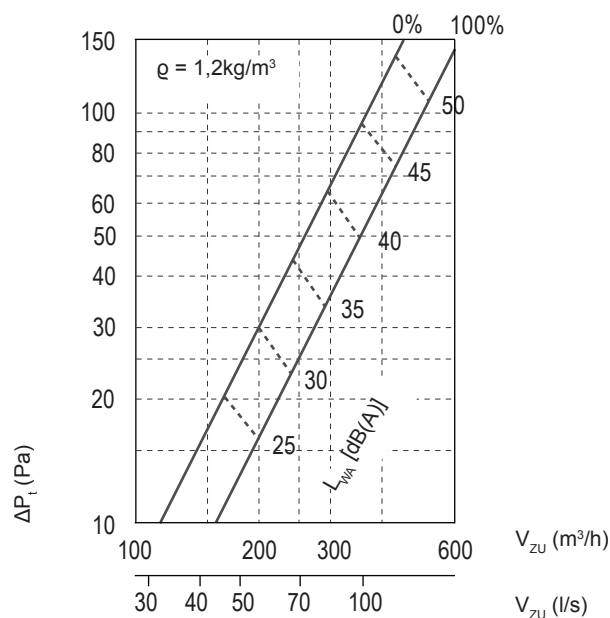
swirl diffusers with adjustable blades

ROTATIONAL DIFFUSER CEILING

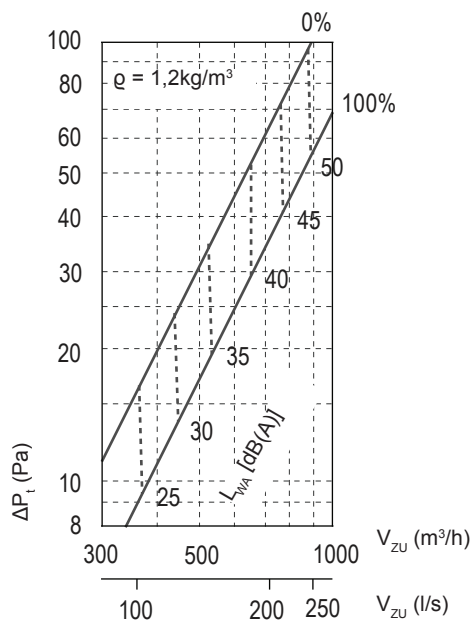
ANW-SQ 320



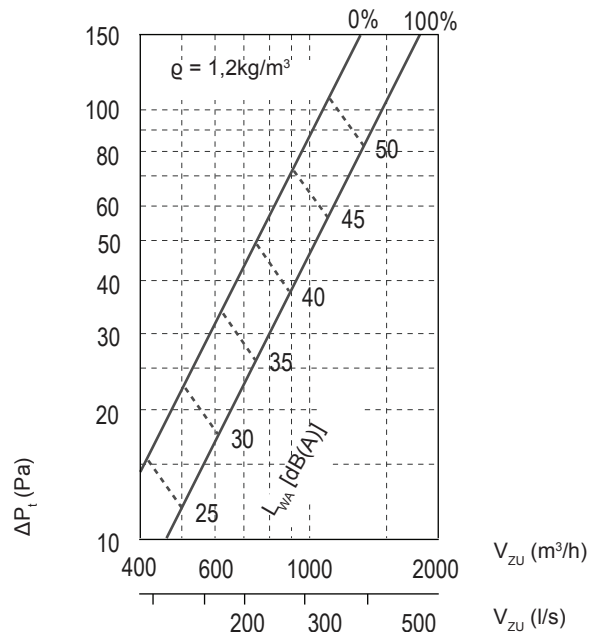
ANW-SQ 400



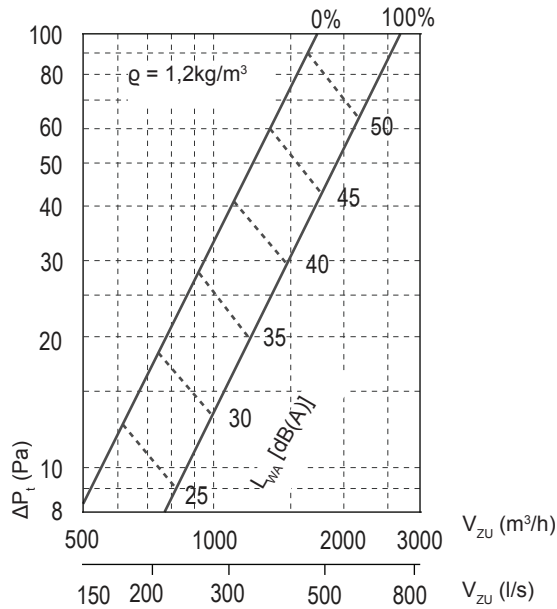
ANW-SQ 500



ANW-SQ 600/625



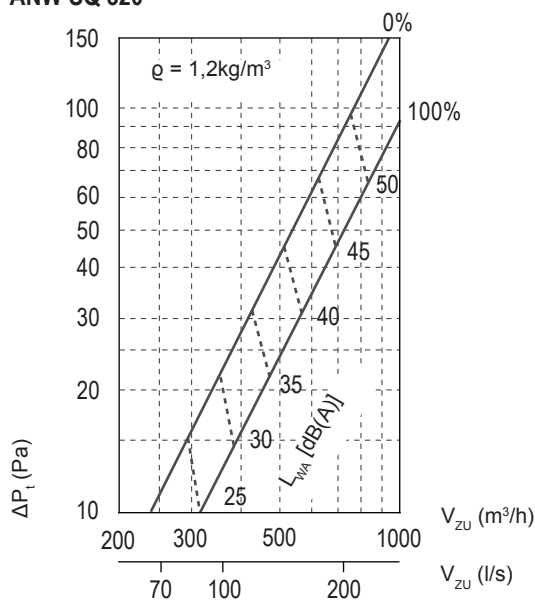
ANW-SQ 825



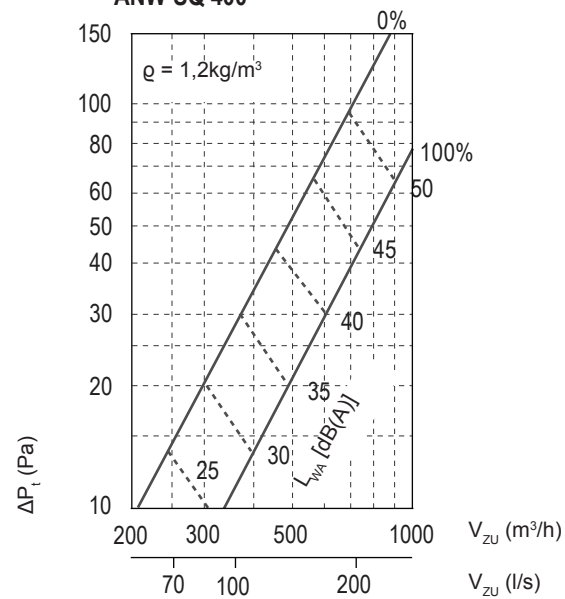
Throttle setting: 0% = closed 100% = open

ROTATIONAL DIFFUSER CEILING (VENTILATION) ATTACHABLE TO THE BOX

ANW-SQ 320



ANW-SQ 400

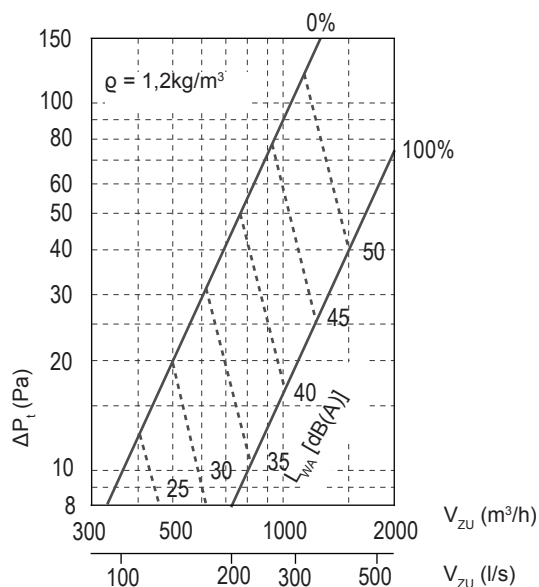


4.1 ANW, AWW

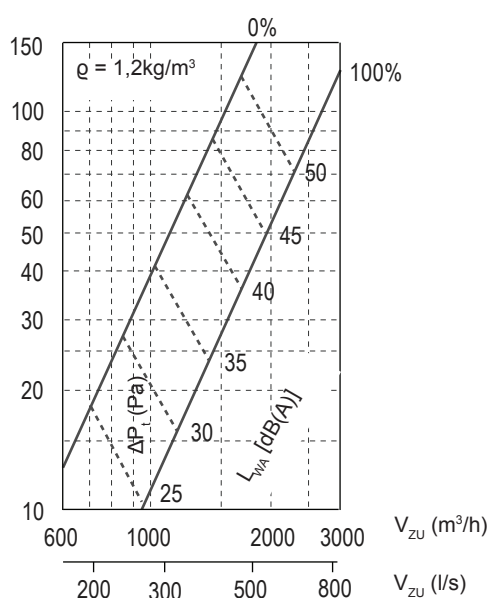
swirl diffusers with adjustable blades

ROTATIONAL DIFFUSER CEILING

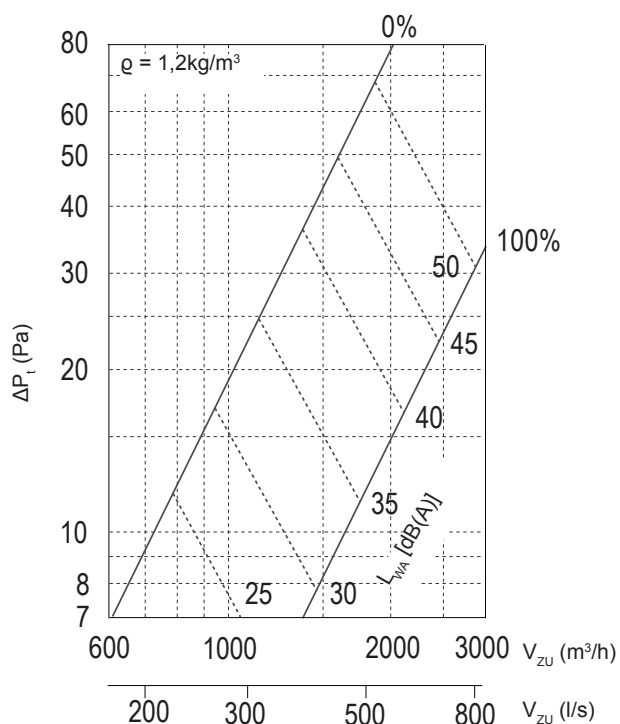
ANW-SQ 500



ANW-SQ 600/625



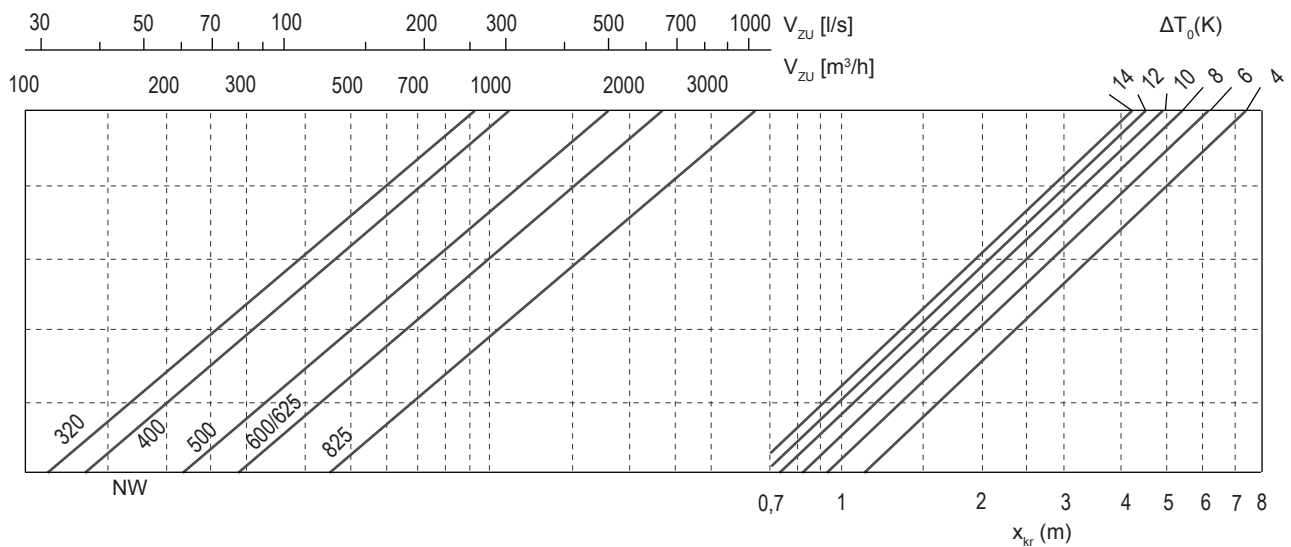
ANW-SQ 825



Throttle setting: 0% = closed 100% = open

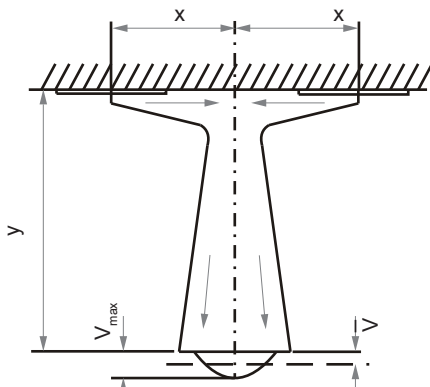
CRITICAL RANGE OF AIR FLOW (VENTILATION) TO THE EFFECT OF THE CEILING

ANW-SQ



Location slats "B"

Location slats "A" = $x_{kr} \times 1.12$



**Critical range of air flow (ventilation)
to the effect of the ceiling**

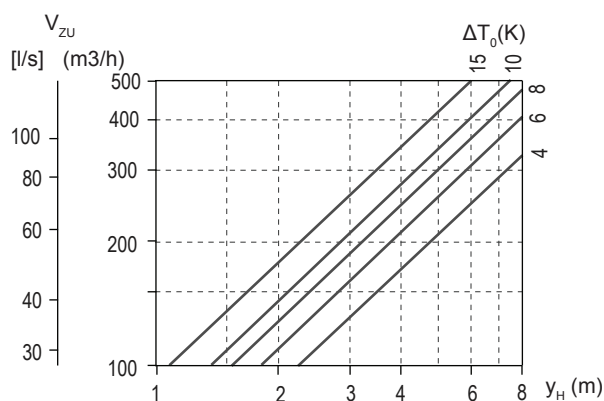
4.1 ANW, AWW

swirl diffusers with adjustable blades

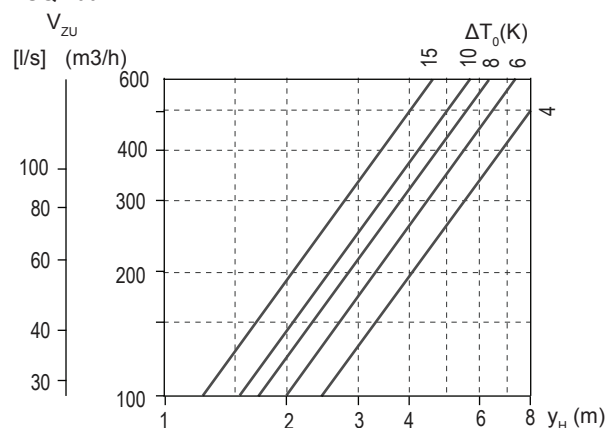
ROTATIONAL DIFFUSER CEILING

Critical range of air flow stream for maximum range of heating, the location of slats 1

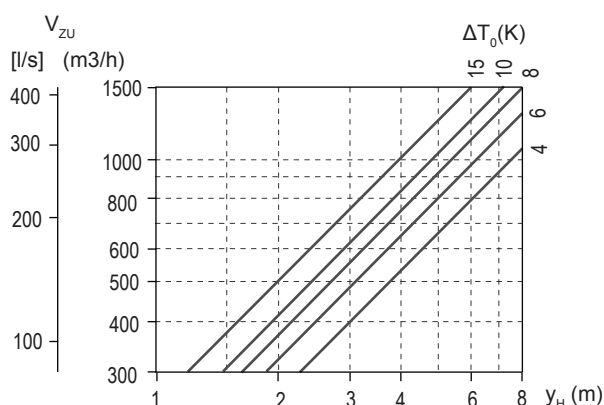
ANW-SQ 320



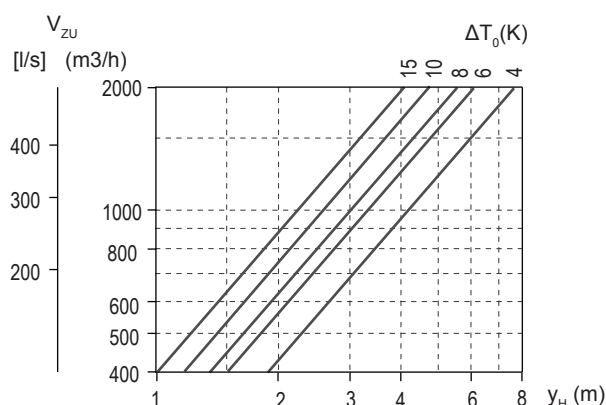
ANW-SQ 400



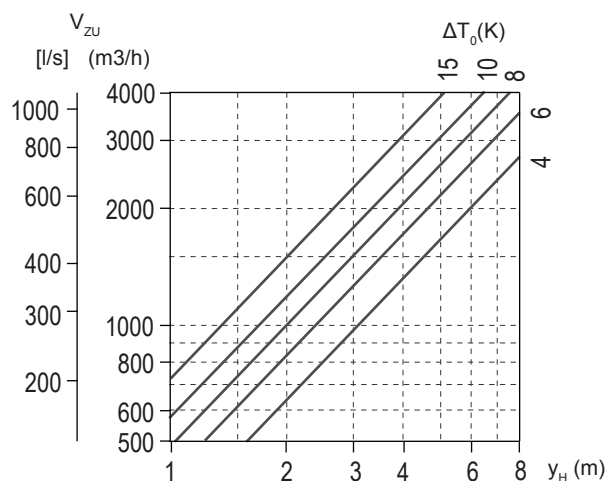
ANW-SQ 500



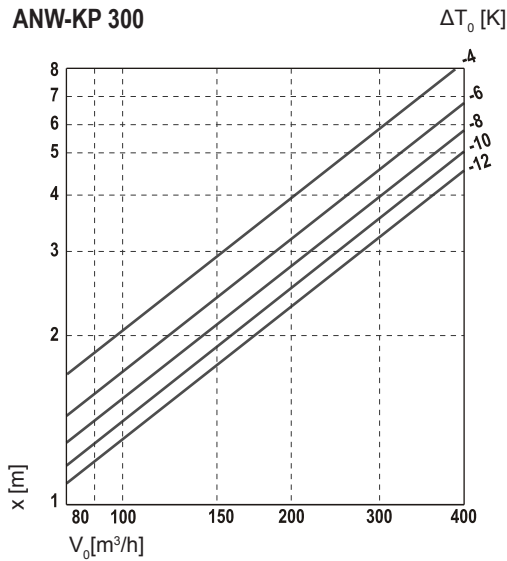
ANW-SQ 600/625



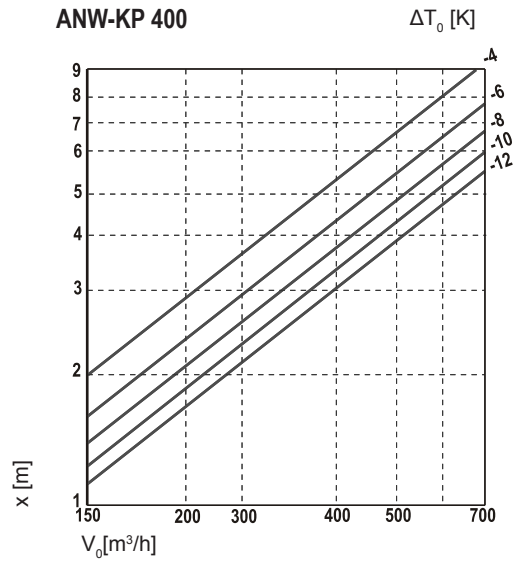
ANW-SQ 825



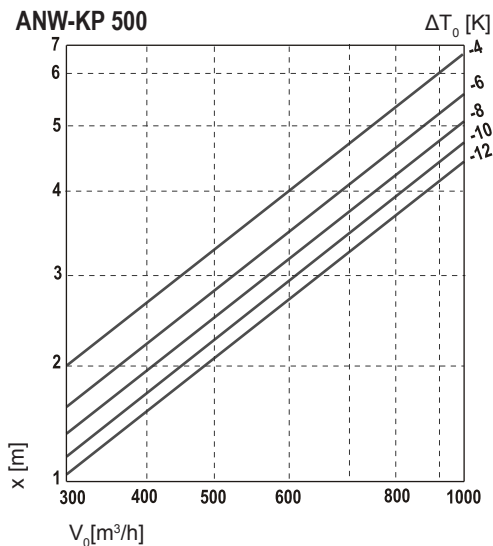
ANW-KP 300



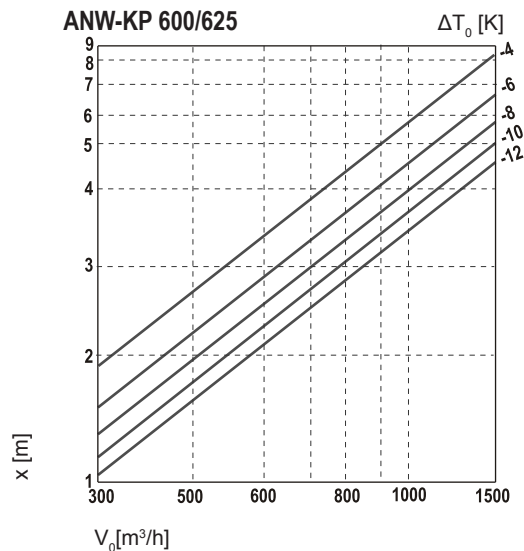
ANW-KP 400



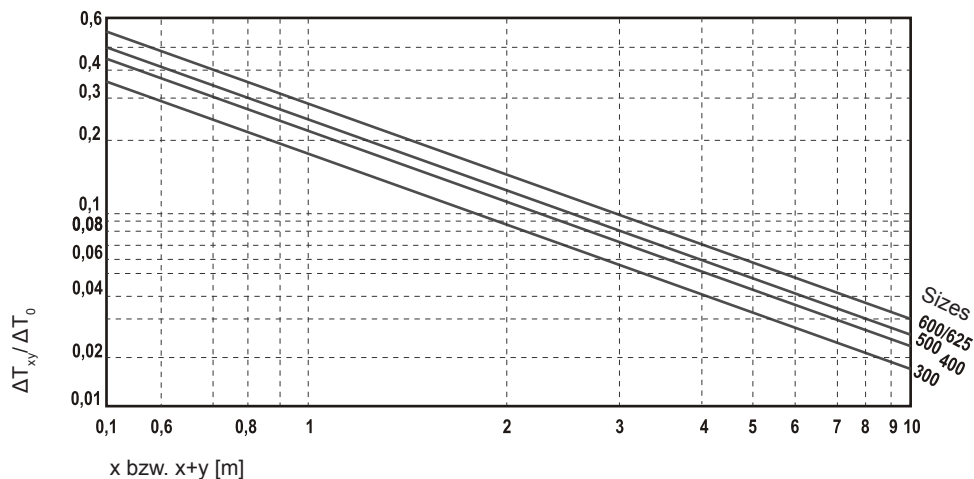
ANW-KP 500



ANW-KP 600/625



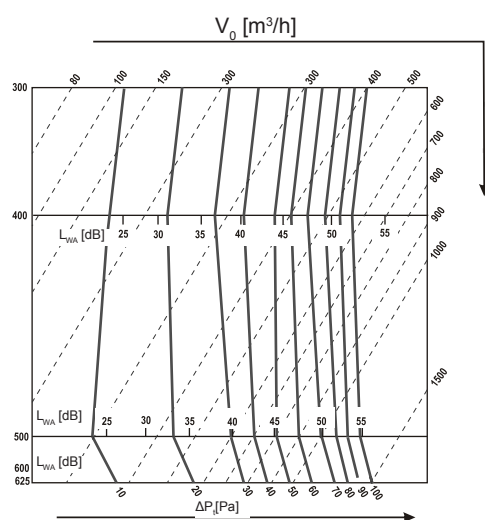
ANW-KP



4.1 ANW, AWW

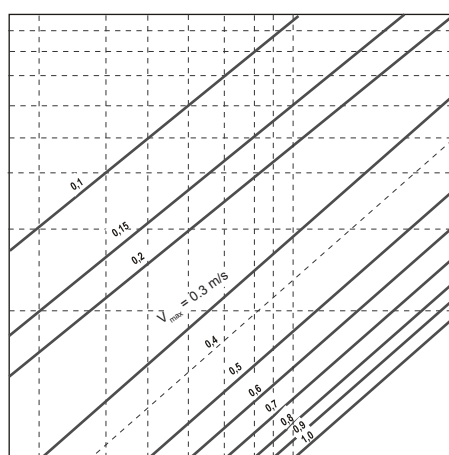
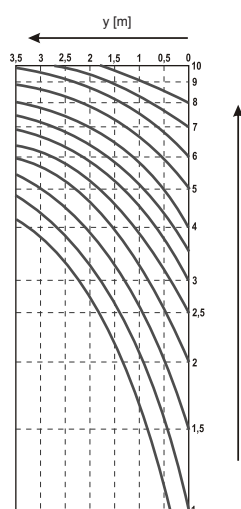
swirl diffusers with adjustable blades

ANW-KP

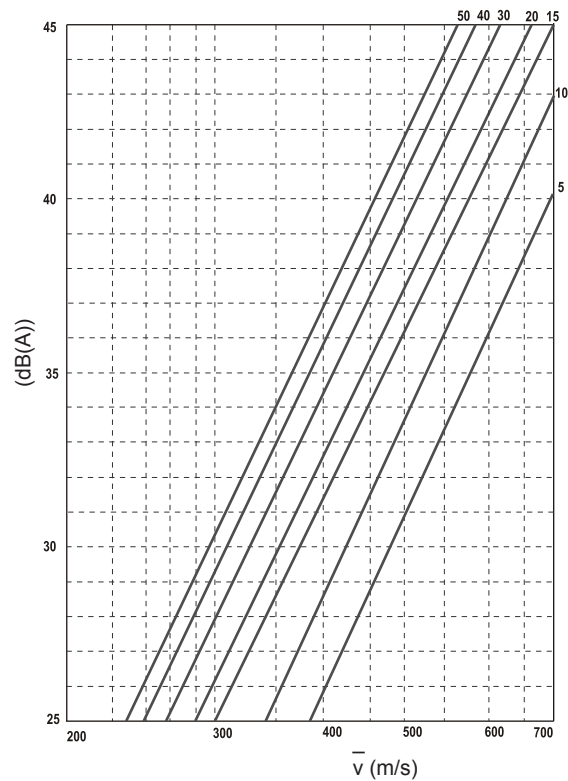
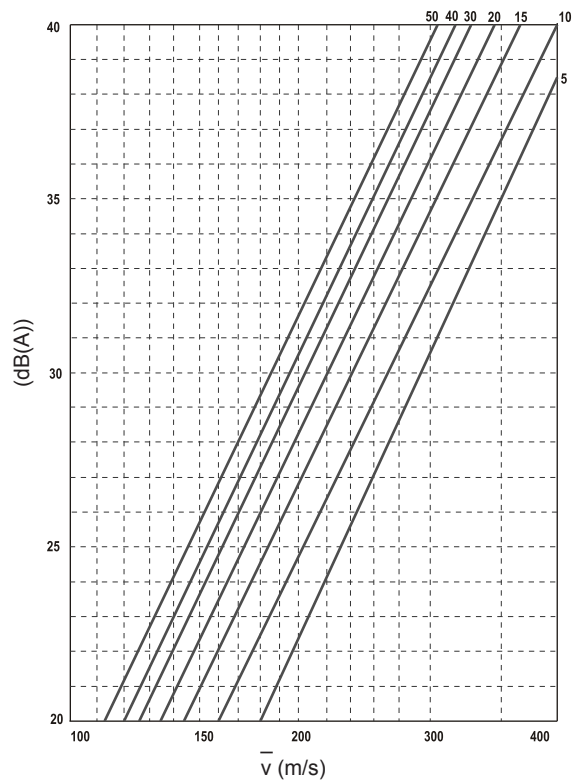
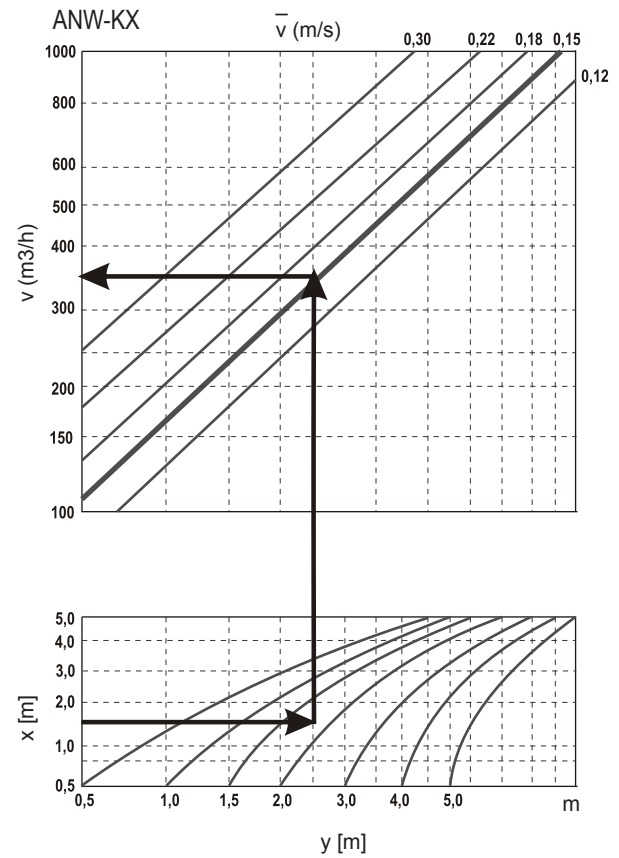
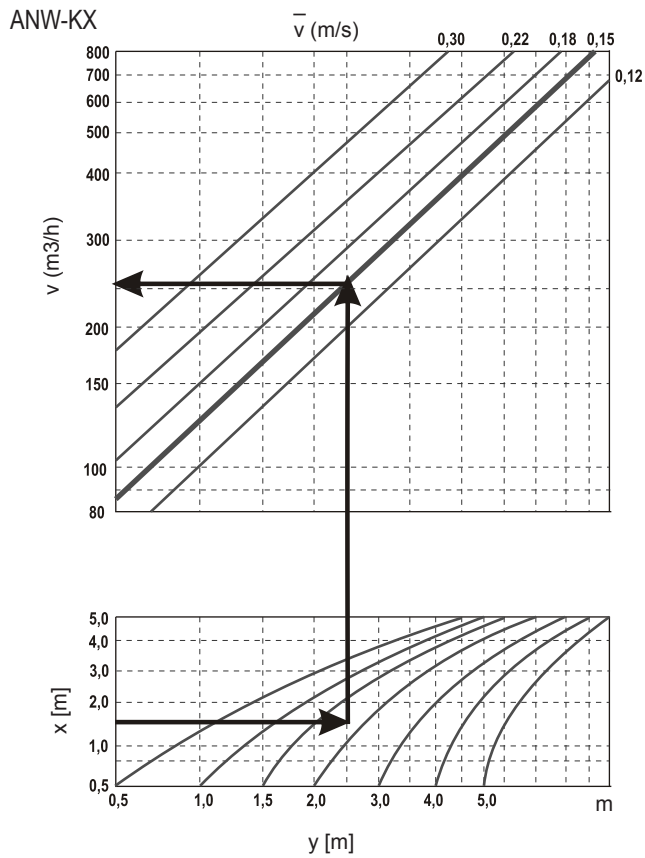


ANW-KP

ANW-KP



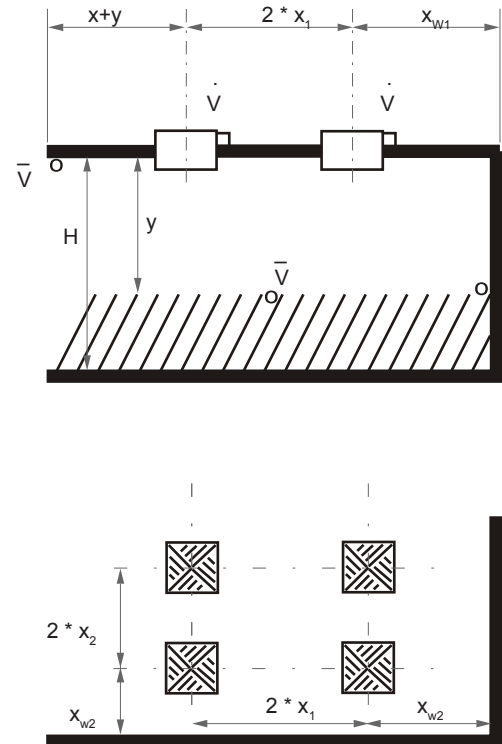
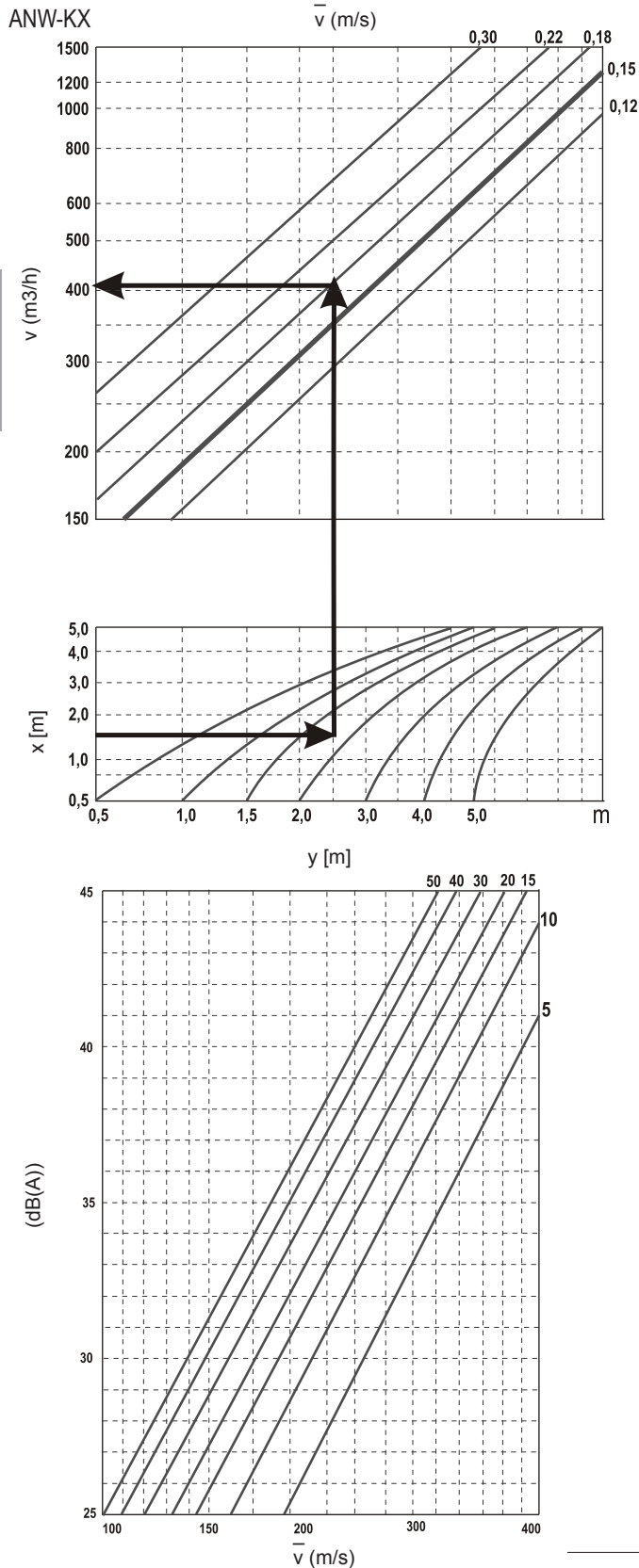
ROTATIONAL DIFFUSER CEILING



4.1 ANW, AWW

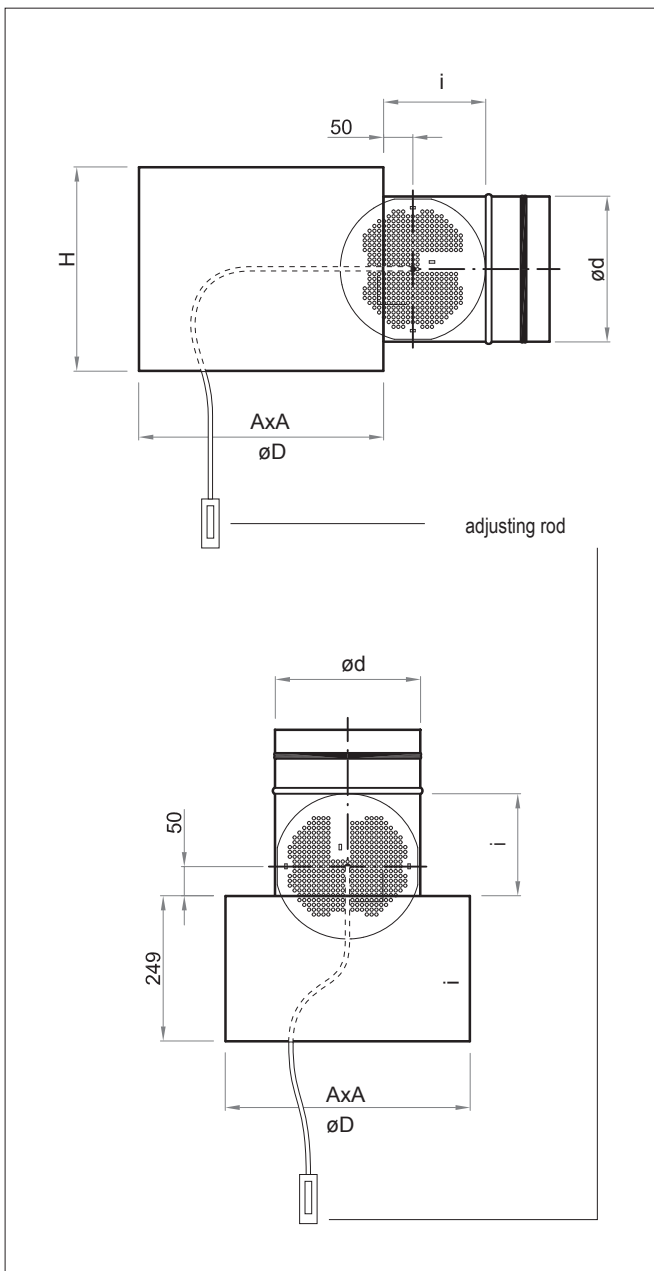
swirl diffusers with adjustable blades

ROTATIONAL DIFFUSER CEILING



ROTATIONAL DIFFUSER CEILING

V_{zu} (m³/h)	= amount of air blown
V_{zu} [l/s]	= amount of air blown
V_{AB} (m³/h)	= amount of exhaust air
V_{AB} [l/s]	= amount of exhaust air
V_{max} (m/s)	= max. speed
YH (m)	= max. the vertical range of air flow for heating
x (m)	= levels reach the stream
y (m)	= vertical reach the stream
$x+y$	= horizontal & vertical coverage
i (-)	= factor induction
TV (-)	= coefficient of temperature difference
NW (mm)	= diameter
x_{kr} (m)	= critical range
ΔT_o (K)	= temperature difference between air and the temperature of the room <i>nawiewany</i> m
t_{ZU} (st.C)	= temperature of the airflow
t_R (st.C)	= room temperature
V (m/s)	= average speed
Δp_t (Pa)	= pressure drop
LWA [dB(A)]	= sound power level by A
ρ (kg/m³)	= Density



DESCRIPTION

SR/ANW and SR/AWW are expansion boxes for diffusers ANW and AWW. They stabilize the airflow and ensure uniform air supply to the diffuser. Expansion boxes connect diffusers with ventilation installation. They are made of zinc-coated sheet, joint by non-welded Click-Clock connection. In standard expansion boxes are equipped on the ferrule with machine crimped rubber gasket. The expansion box may be provided with a mounting bar, which allows the diffuser assembly with a single bolt through the hole placed in the central part of the diffuser.

Expansion boxes can be connected to the ventilation installation through the side or top.

Boxes can be thermally and acoustically insulated from the inside by K-Flex rubber mat.

Upon customer's request we can make other types of expansion boxes accordingly to provided drawings.

ORDER REFERENCE

SR/ANW - K - 200 - P - I - g — **p**

Additional accessories
P - mounting crossbar

b side connection
g top connection

— non-insulated
I insulated

— no throttle
P perforated damper
with adjusting rod

size

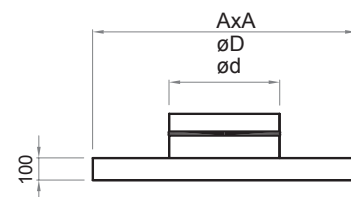
diffuser type

SR expansion box
PS spiro transition

STANDARD SIZES

size	300	400	500	600	625	825
A [mm]	293	393	493	593	620	820
H [mm]	260	300	300	350	420	500
Ød [mm]	158	198	198	248	313	398
ØD [mm]	295	395	495	595	620	820
i [mm]	130	150	150	175	175	200

PS - spiro transition



4.1 SR/ANW, SR/AWW

expansion boxes for diffusers ANW i AWW

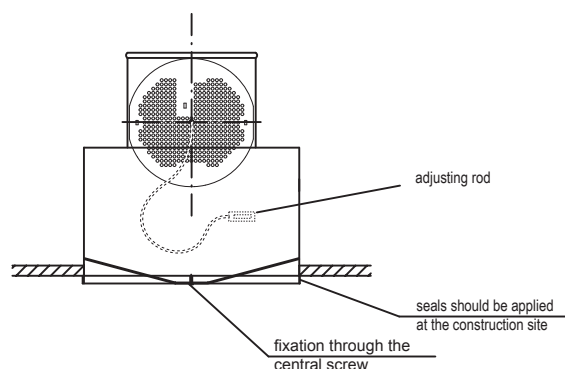
INSTALLATION

Expansion boxes SR/ANW and SR/AWW are designed for installation between the ceiling and underslung ceiling. Prepare an installation hole of a size of ØD or AxA. The box can be mounted onto the ceiling by appropriate hangers (bars, pins...) and installation slings. If installing in the full underslung ceiling, the box should be mounted so that edges stick out by approx. 12 mm from the ceiling panel.

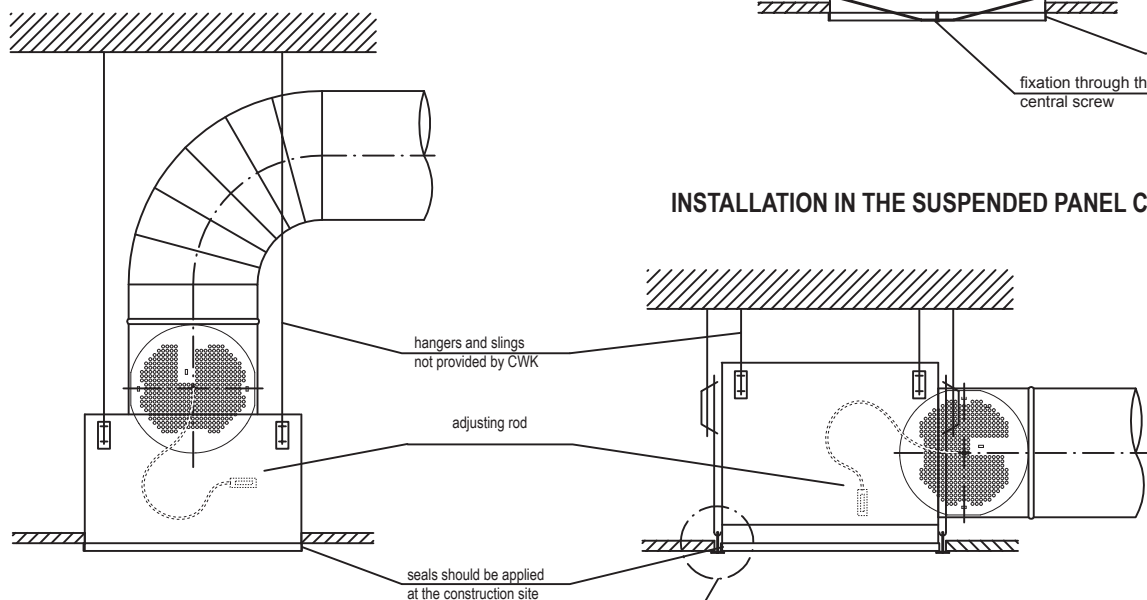
Upon customer's request, boxes can be equipped with

1. factory slings
2. a crossbar that allows for installation of the front panel with one central screw

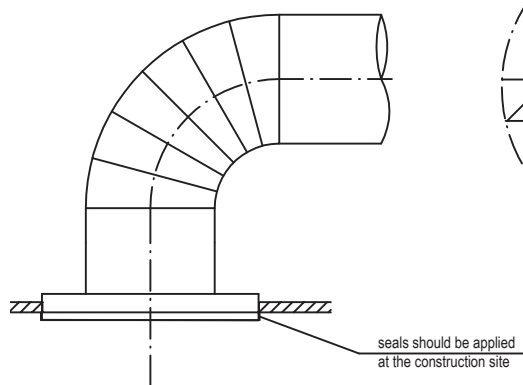
INSTALLATION WITH THE CROSSBAR AND THE SCREW

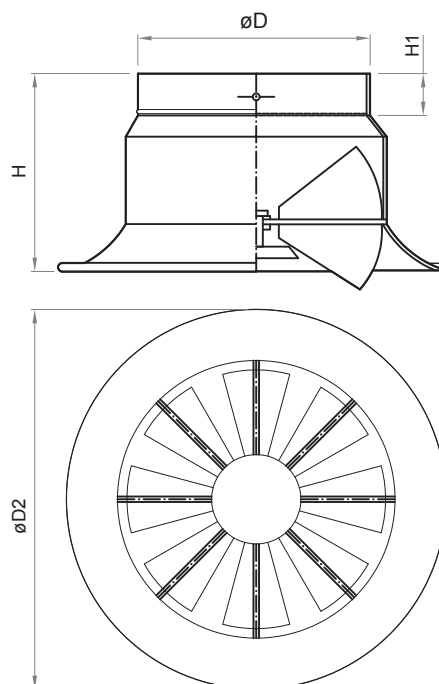


INSTALLATION IN THE SUSPENDED PANEL CEILING



WITH ADAPTER FOR SPIRO





DESCRIPTION

NNW i NNW-P is an adjustable swirl air vent for rooms with a considerable difference between the temperature of the air present in the room and the temperature of supplied air. They can be used with constant and variable airflow in rooms of height from 3 to 12m. Thanks to movable blades which make it possible to select a proper air-supply angle, NNW, NNW-P can be used both for room cooling and heating. It is recommended to install these devices on the ceiling surface.

FEATURES

- high induction factor;
- movable blades make it possible to adjust the air-supply angle;
- internal part of the air vent moulded in order to achieve the Coanda effect;
- easy installation;
- possibility to mount with SR/NWZG plenum box;
- air vent made of steel sheet;
- robust structure;
- standard painted in RAL 9003;
- customized items can be painted in any colour from the RAL palette;
- NNW diffusers are also available with electric or wax actuator
- NNW-P diffusers are also available with electrical servo

STANDARD SIZES

Size	ϕD [mm]	$\phi D2$ [mm]	H [mm]	H1 [mm]
NNW, NNW-P				
200	198	310	180	40
250	248	400	200	40
315	313	480	240	40
400	398	610	270	55
500	498	610	270	-

*size 500 without diffuser

ORDER REFERENCE

NNW-P - 400	E	RAL9003
type	size	colour
		E - electrical servo
		W - wax actuator
		- manual adjustment
		P - plastic blade mechanism

4.2 NNW, NNW-P

adjustable swirl diffusers

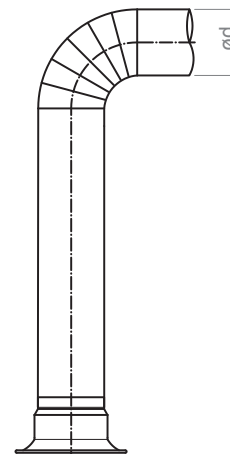
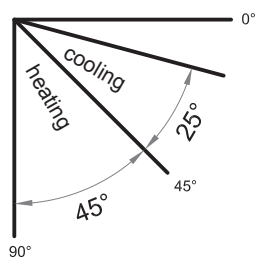
FEATURES

The figure shows airflow capacity V (m³/h), pressure loss p (Pa), opening angle of the diffuser shutter (°), level of loudness [dB(A)] and maximum final speed of air stream V_{ef} (m/s).

ASSEMBLY

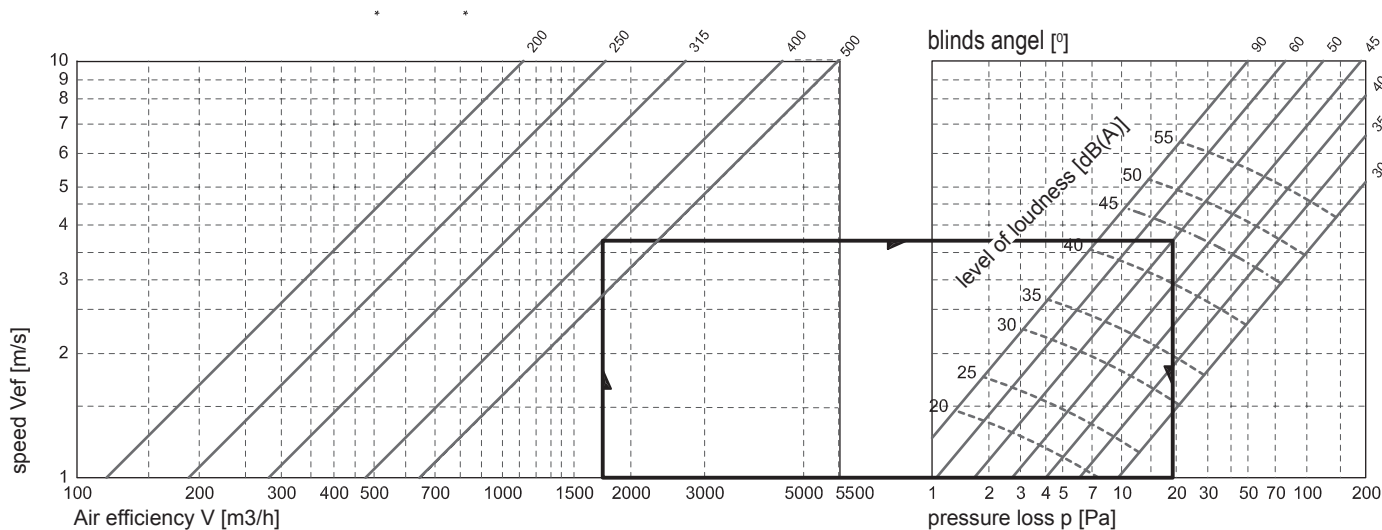
NW and NNW-P diffusers can be connected to the ventilation directly to the corresponding circular duct or installed with expansion box SR / NNW. In both cases, connection can be achieved using rivets or screws

blinds angel in the heating and cooling function



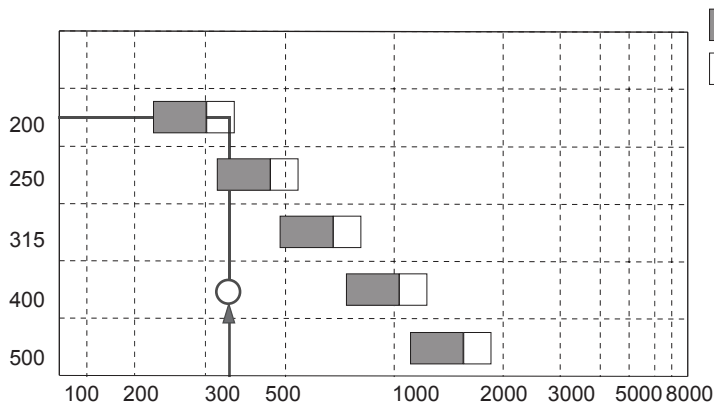
EXAMPLE

function: heating
 $V = 1750$ m³/h
 $La = 43$ dB(A)
 $p = 19$ Pa
blinds angel = 50°
 $V_{ef} = 3,7$ m
size = 400

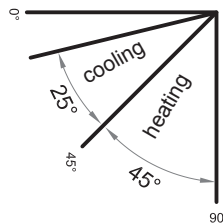


*Sizes 125 and 160 only available in NNW diffusers.

RAPID SELECTION TABLE



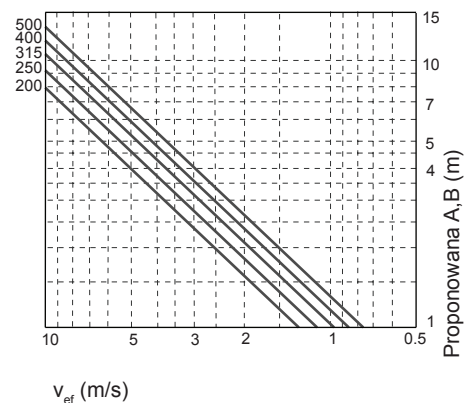
Rapid selection sample 1,2:
look on next pages



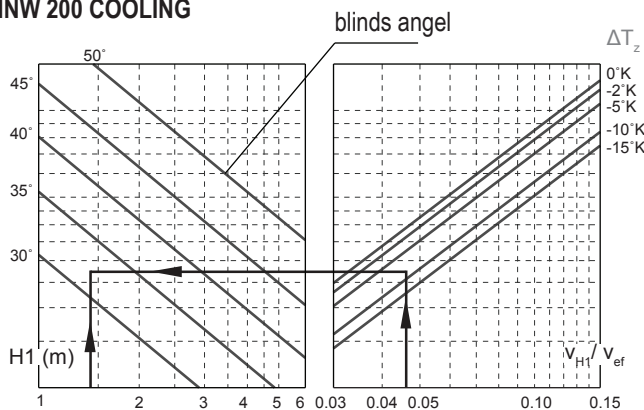
THE CORRECTION FACTOR

If the diffuser is installed in the wall, the velocity V_h at the height of the $A/2 + H1$ should be multiplied by factor 1.4 (due to the Coanda effect. This applies to both heating and cooling, when the shutter angle is less than 30°

Diffuser size because spacing
and final speed stream



NNW 200 COOLING



Example 2 (cooling)

$Q = 350 \text{ m}^3/\text{h}$

$H1 = 1,4\text{m}$

$v_{H1} = 0,15\text{m/s}$

$\Delta T_z = -8^\circ\text{K}$

proposed size 200

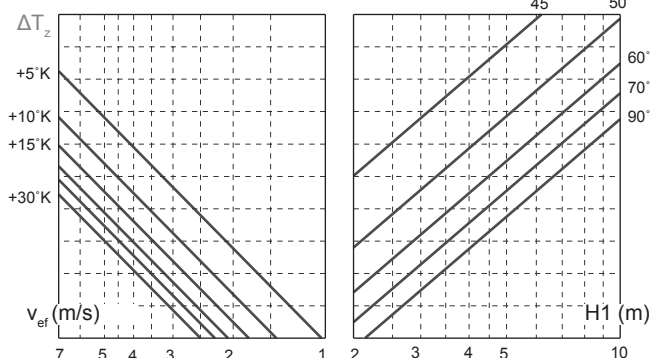
$$v_{ef} = Q/A_{ef} \times 3600 = 350/0,031 \times 3600$$

$$v_{ef} = 3,13\text{m/s}$$

$$v_{H1}/v_{ef} = 0,15/3,24 = 0,046$$

blinds angle 32°

NNW 200 HEATING



(blinds angle $32^\circ \rightarrow$ effect Coanda)

$$H1 = 1,4 \times 1,4 = 1,96\text{m}$$

$$H = H1 + 1,8 = 1,96 + 1,8 = 3,67\text{m}$$

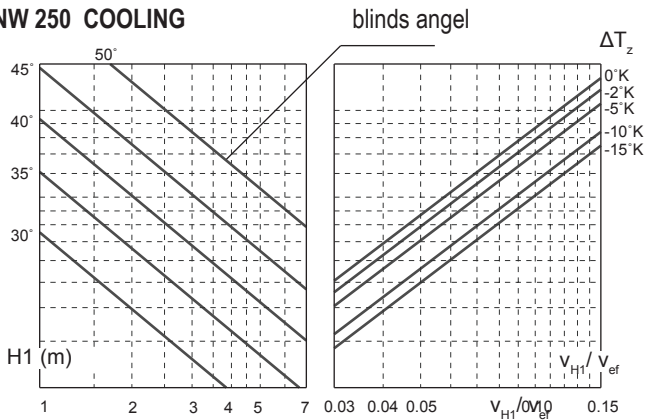
$$\text{or } H = 1,4 \rightarrow v_{H1} = 0,15 \times 1,4 = 0,25\text{m/s}$$

4.2 NNW, NNW-P

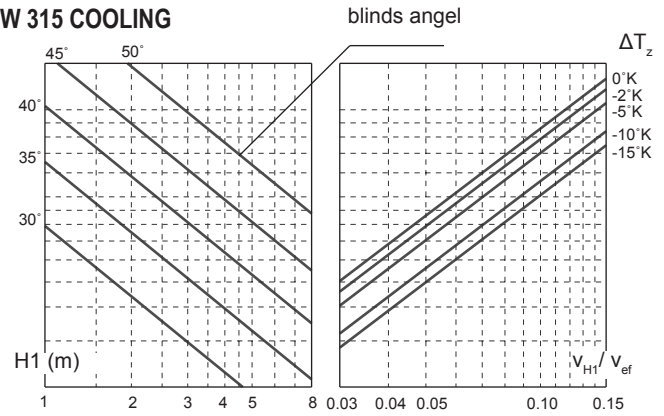
adjustable swirl diffusers

SHUTTER OPENING ANGLE FOR COOLING AND HEATING VERSION:

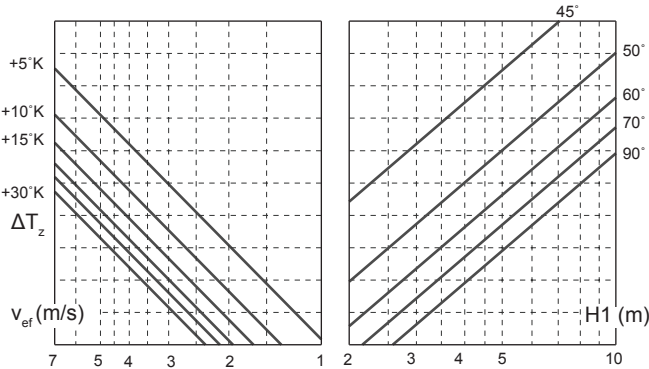
NNW 250 COOLING



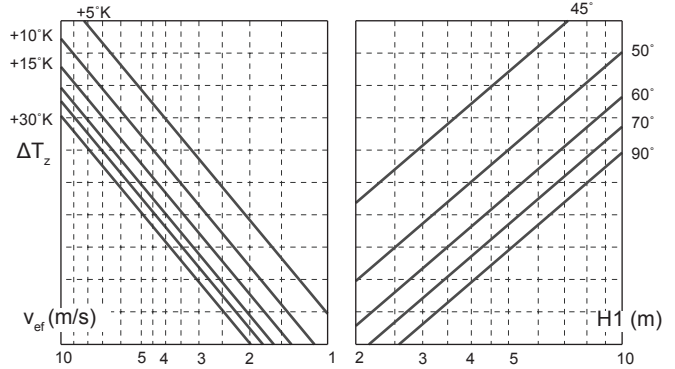
NNW 315 COOLING



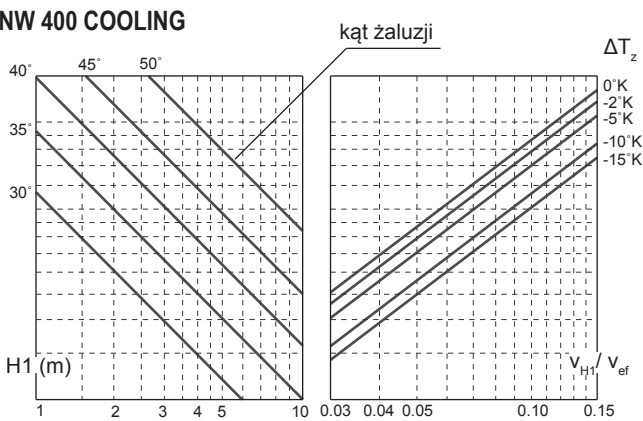
NNW 250 HEATING



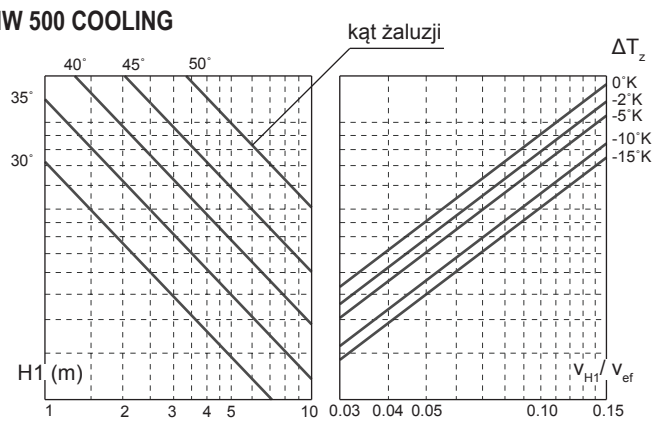
NNW 315 HEATING



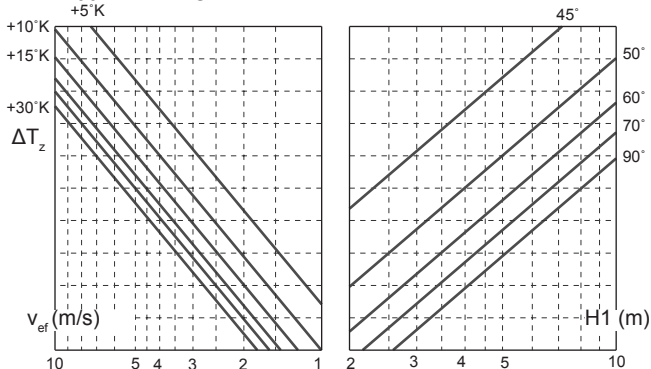
NNW 400 COOLING



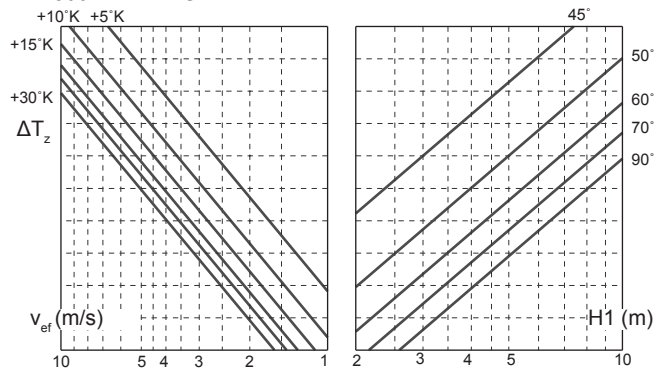
NNW 500 COOLING

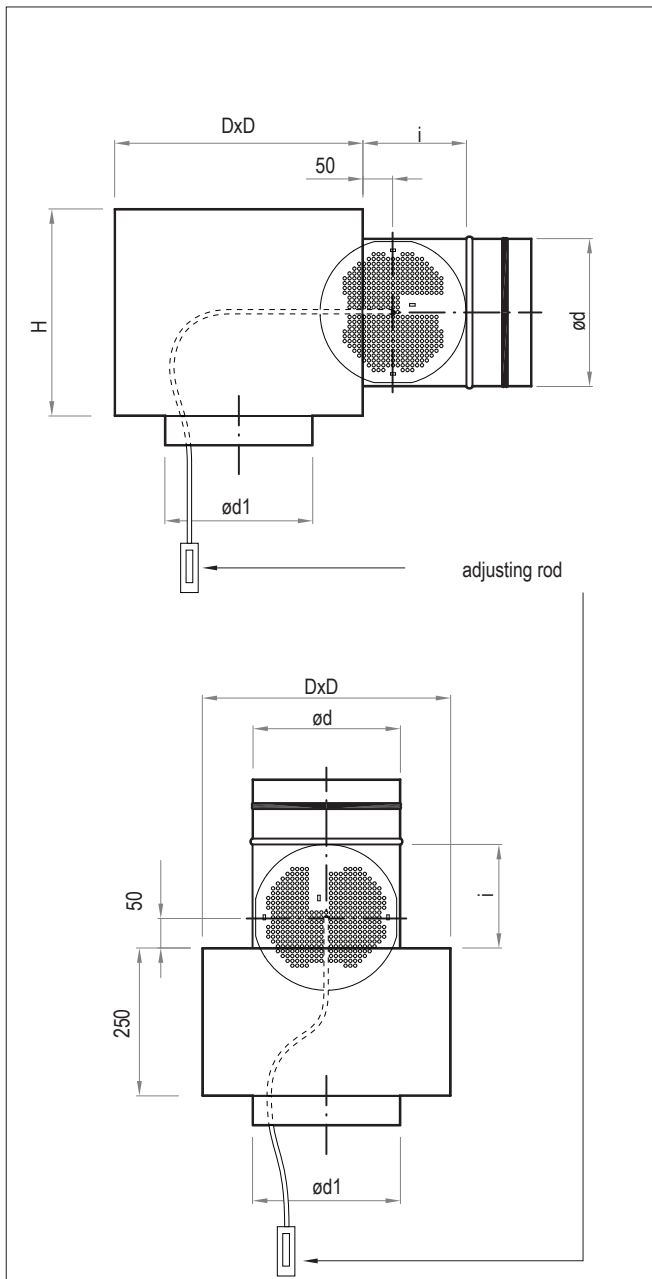


NNW 400 HEATING



NNW 500 HEATING





Expansion boxes can be connected to the ventilation installation through the side or top. Boxes can be thermally and acoustically insulated from the inside by K-Flex rubber mat. Upon customer's request we can make other types of expansion boxes accordingly to provided drawings.

ORDER REFERENCE

SR / NNW - 250 - P - I - g

SR / NNW - diffuser type
 250 - size
 P - no throttle
 P perforated damper with adjusting rod
 I - non-insulated
 I insulated
 g - top connection
 b side connection

STANDARD SIZES

Size	200	250	315	400	500
D [mm]	300	350	420	500	600
H[mm]	300	350	420	500	500
Ød [mm]	158	198	248	313	398
Ød1 [mm]	200	250	315	400	500
i [mm]	150	175	200	250	250

DESCRIPTION

SR/NNW are expansion boxes for diffusers NNW. They stabilize the airflow and ensure uniform air supply to the diffuser. Expansion boxes connect diffusers with ventilation installation. They are made of zinc-coated sheet, joint by non-welded Click-Clock connection.

4.2 SR/NNW

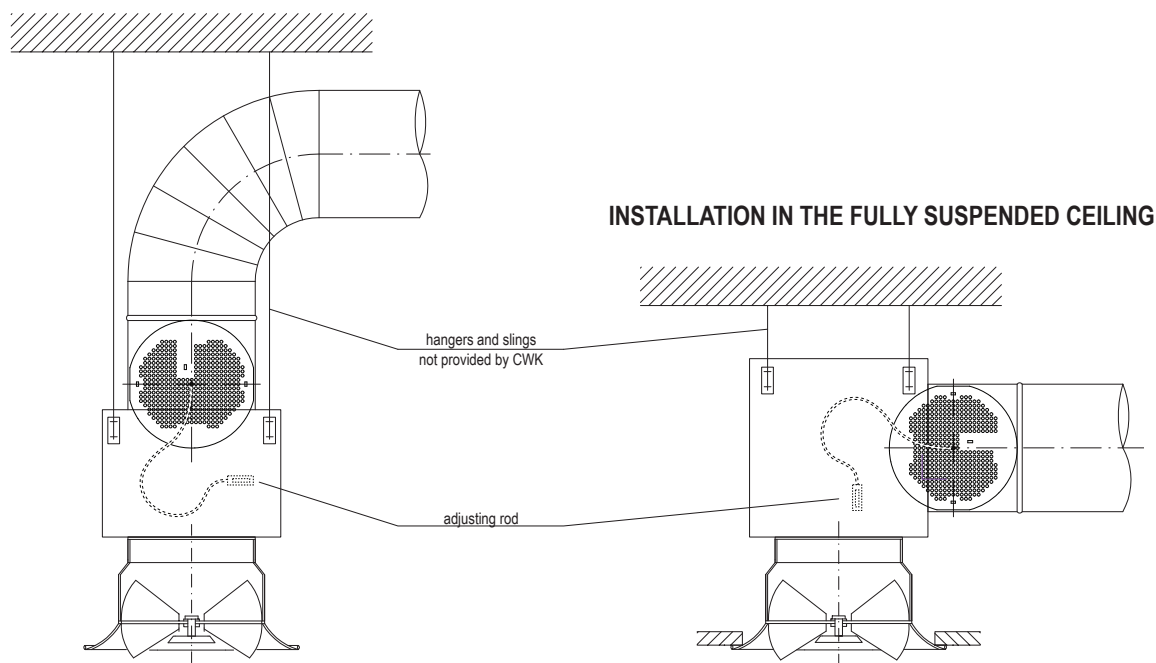
expansion boxes for diffusers NNW

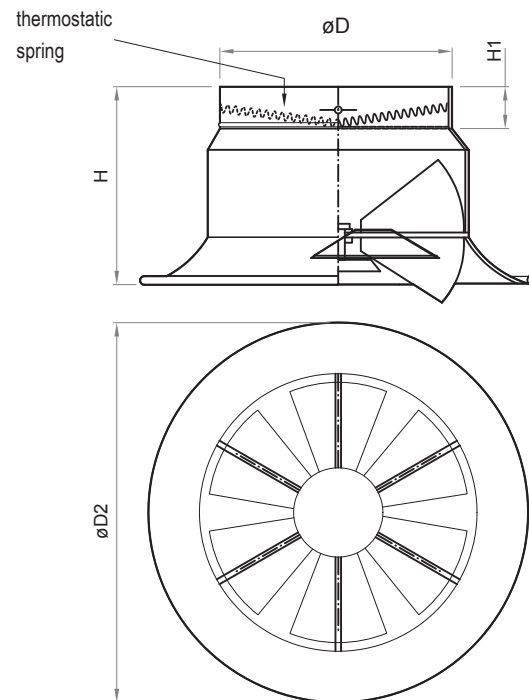
INSTALLATION

Expansion boxes SR/NNW are designed for installation into the underslung ceiling or for free suspension under the genuine ceiling. If installing in between the ceiling and underslung ceiling, a hole should be left of a size of $l \times l$ for the chosen air grate (hole size $\varnothing D2 - 20\text{mm}$ for the given diffuser). The air grate should be connected to the expansion box with rivets or screws. The box can be mounted on the ceiling by appropriate hangers (bars, pins...) or installation slings. Upon customer's request, boxes can be equipped with factory slings.

4

MOUNTED ON THE CEILING





DESCRIPTION

NNW-P SMART is an adjustable swirl air vent for rooms with a considerable difference between the temperature of the air present in the room and the temperature of supplied air. They can be used with constant and variable airflow in rooms of height from 3 to 12m. Thanks to movable blades which make it possible to select a proper air-supply angle, NNW-P SMART can be used both for room cooling and heating. It is recommended to install these devices on the ceiling surface. Diffusers of this type work as a function of supply of warm and cold air. Control takes place by means of an actuator in the form of the thermostatic spring.

FEATURES

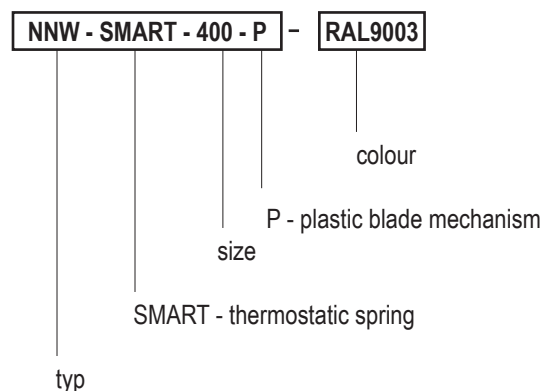
- high induction factor;
- movable blades make it possible to adjust the air-supply angle;
- internal part of the air vent moulded in order to achieve the Coanda effect;
- easy installation;
- possibility to mount with SR/NNW-P SMART plenum box;
- air vent made of steel sheet, blades made of ABS plastic
- robust structure;
- standard painted in RAL 9003;
- customized items can be painted in any colour from the RAL palette;
- transformation temperature range 24°C - 30°C

STANDARD SIZES

Size	Ø D [mm]	Ø D2 [mm]	H [mm]	H1 [mm]
NNW, NNW-P				
200	198	310	180	40
250	248	400	200	40
315	313	480	240	40
400	398	610	270	55
500	498	610	270	-

*size 500 without diffuser

ORDER REFERENCE



4.3 NNW-P SMART

swirl diffusers

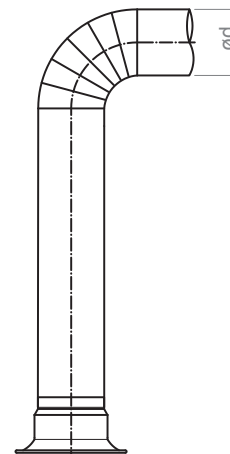
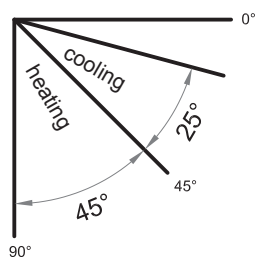
FEATURES

The figure shows airflow capacity V (m³/h), pressure loss p (Pa), opening angle of the diffuser shutter (°), level of loudness [dB(A)] and maximum final speed of air stream V_{ef} (m/s).

ASSEMBLY

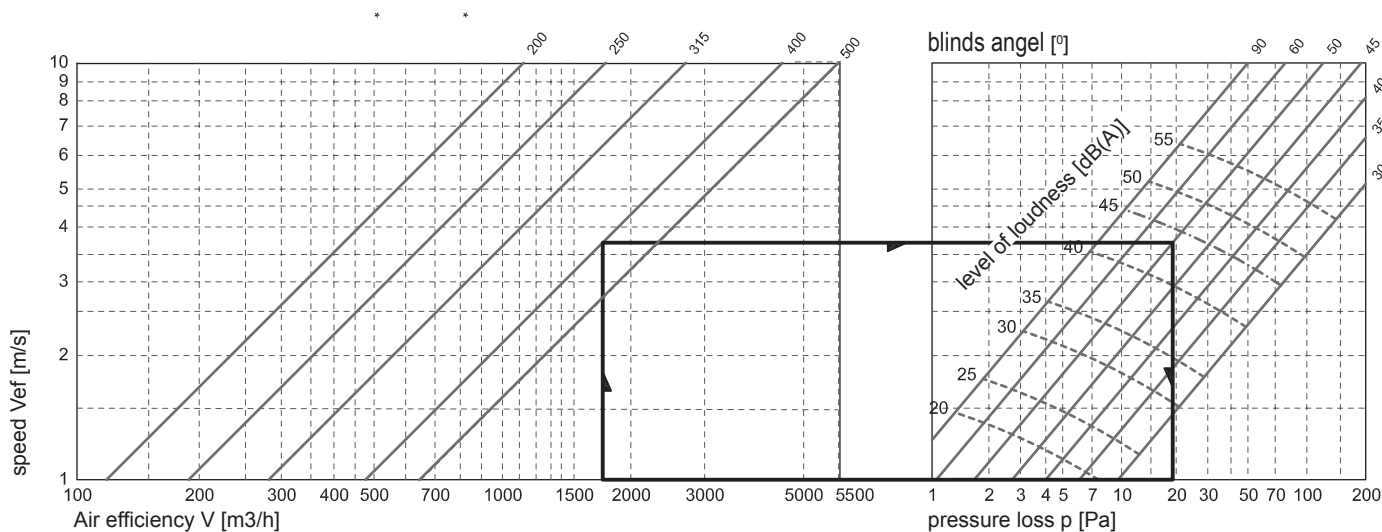
NW and NNW-P diffusers can be connected to the ventilation directly to the corresponding circular duct or installed with expansion box SR / NNW. In both cases, connection can be achieved using rivets or screws

blinds angel in the heating and cooling function



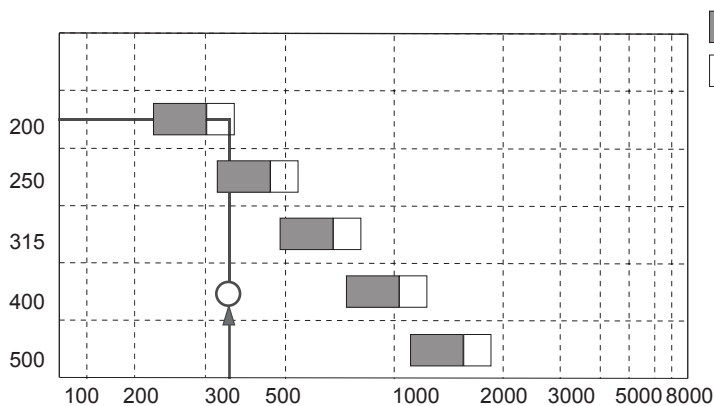
EXAMPLE

function: heating
 $V = 1750$ m³/h
 $La = 43$ dB(A)
 $p = 19$ Pa
blinds angel = 50°
 $V_{ef} = 3,7$ m
size = 400

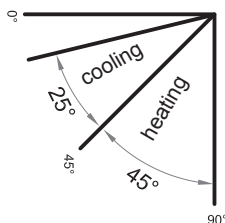


*Sizes 125 and 160 only available in NNW diffusers.

RAPID SELECTION TABLE



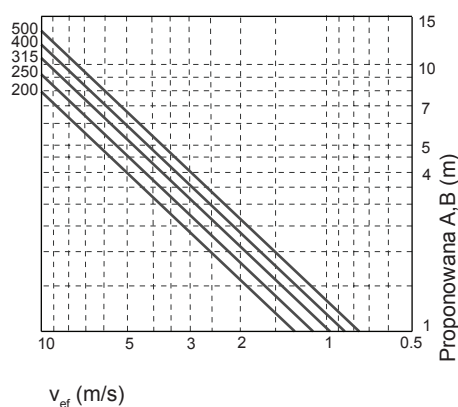
Rapid selection sample 1,2:
look on next pages



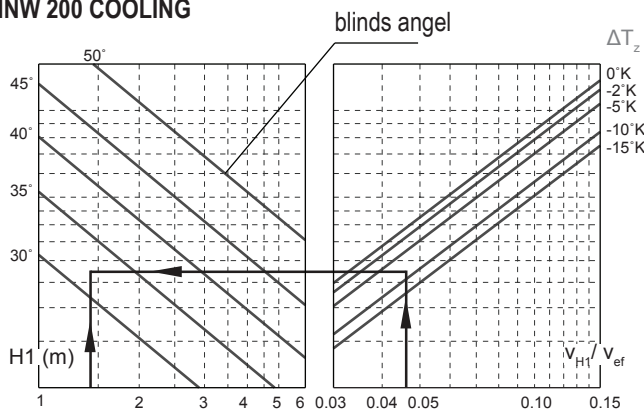
THE CORRECTION FACTOR

If the diffuser is installed in the wall, the velocity V_h at the height of the $A/2 + H1$ should be multiplied by factor 1.4 (due to the Coanda effect. This applies to both heating and cooling, when the shutter angle is less than 30°

Diffuser size because spacing
and final speed stream



NNW 200 COOLING



Example 2 (cooling)

$Q = 350 \text{ m}^3/\text{h}$
 $H1 = 1,4\text{m}$
 $v_{H1} = 0,15\text{m/s}$
 $\Delta T_z = -8 \text{ }^\circ\text{K}$
proposed size 200

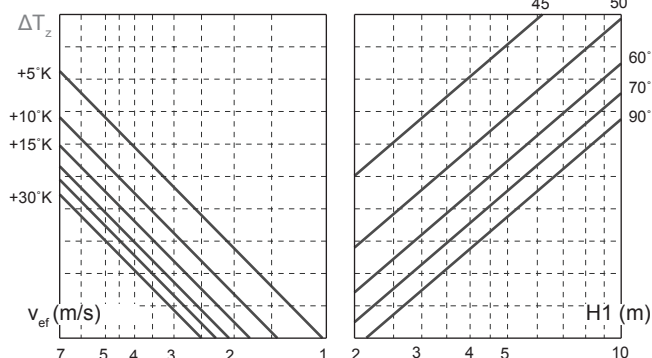
$$v_{ef} = Q/A_{ef} \times 3600 = 350/0,031 \times 3600$$

$$v_{ef} = 3,13\text{m/s}$$

$$v_{H1}/v_{ef} = 0,15/3,13 = 0,046$$

blinds angel 32°

NNW 200 HEATING



(blinds angel 32° → effect Coanda)

$$H1 = 1,4 \times 1,4 = 1,96\text{m}$$

$$H = H1 + 1,8 = 1,96 + 1,8 = 3,67\text{m}$$

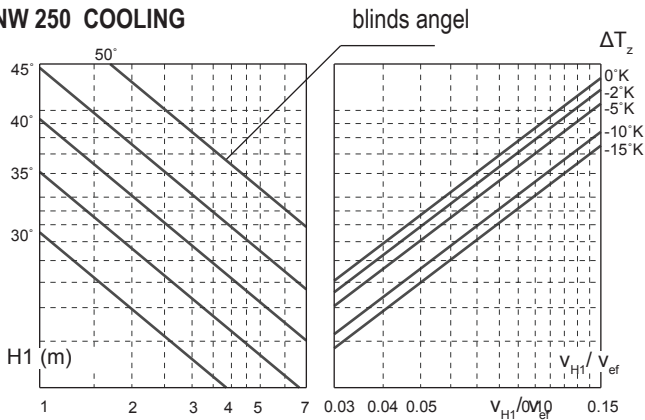
$$\text{or } H = 1,4 \rightarrow v_{H1} = 0,15 \times 1,4 = 0,25\text{m/s}$$

4.3 NNW-P SMART

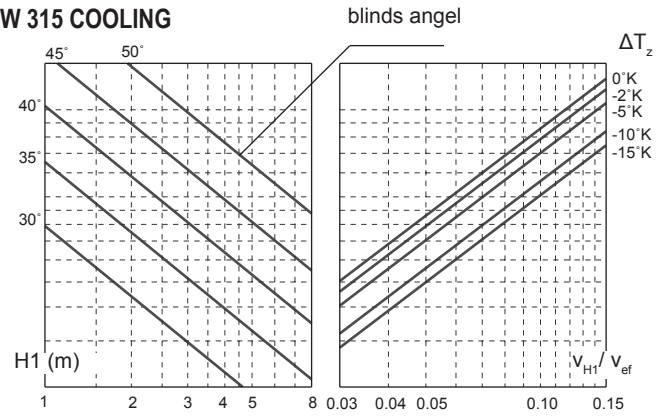
swirl diffusers

SHUTTER OPENING ANGLE FOR COOLING AND HEATING VERSION:

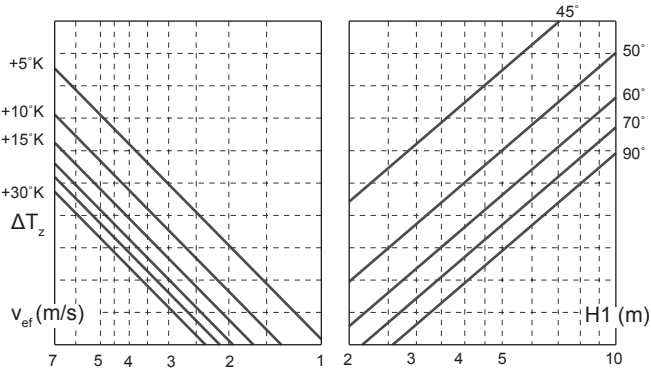
NNW 250 COOLING



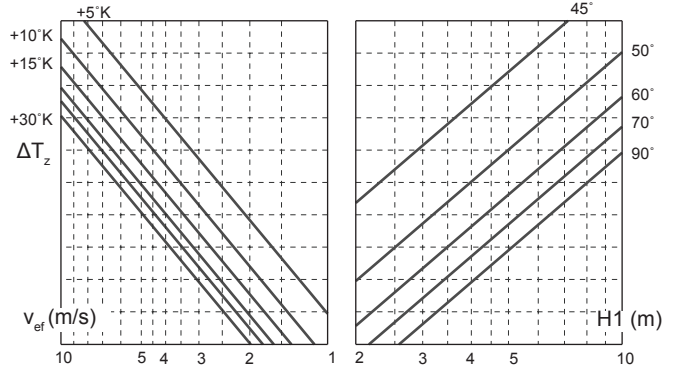
NNW 315 COOLING



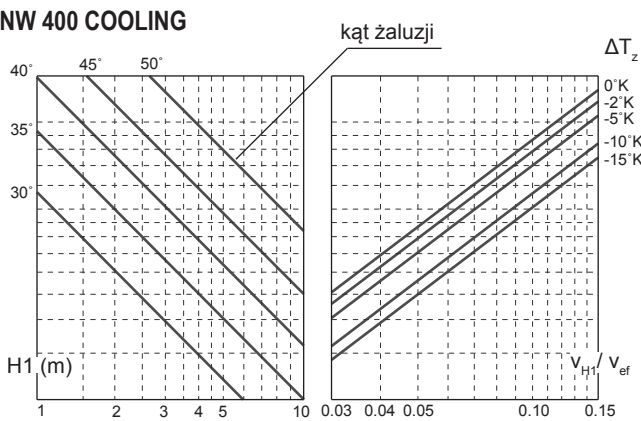
NNW 250 HEATING



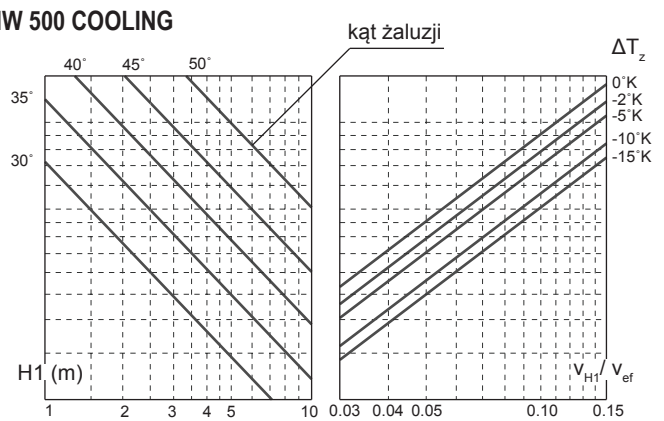
NNW 315 HEATING



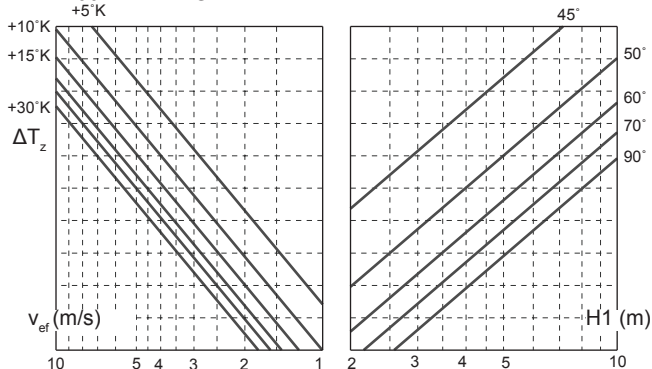
NNW 400 COOLING



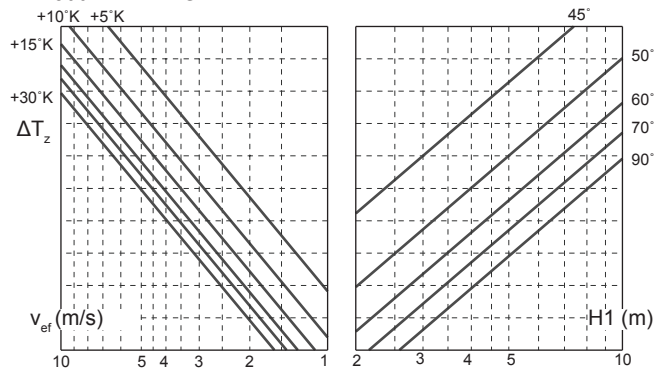
NNW 500 COOLING

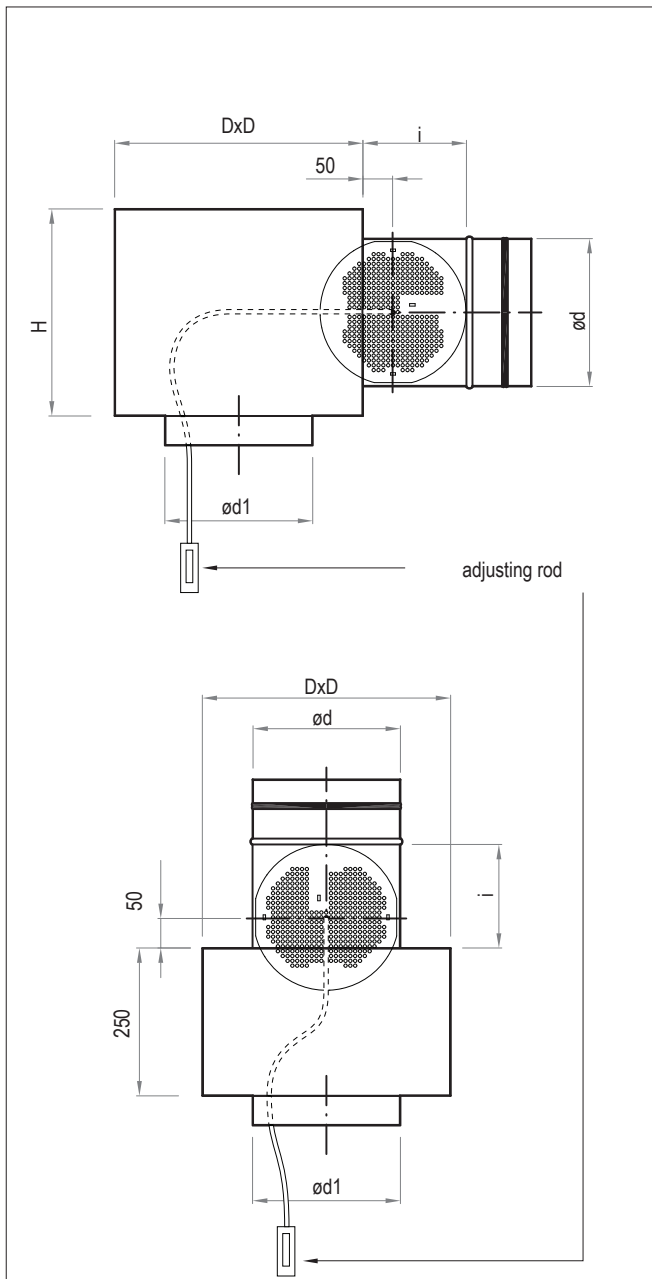


NNW 400 HEATING



NNW 500 HEATING





Expansion boxes can be connected to the ventilation installation through the side or top. Boxes can be thermally and acoustically insulated from the inside by K-Flex rubber mat. Upon customer's request we can make other types of expansion boxes accordingly to provided drawings.

ORDER REFERENCE

SR / NNW - 250 - P - I - g

b side connection
g top connection

_ non-insulated
I insulated

_ no throttle
P perforated damper
with adjusting rod

size

diffuser type

STANDARD SIZES

Size	200	250	315	400	500
D [mm]	300	350	420	500	600
H[mm]	300	350	420	500	500
Ød [mm]	158	198	248	313	398
Ød1 [mm]	200	250	315	400	500
i [mm]	150	175	200	250	250

DESCRIPTION

SR/NNW are expansion boxes for diffusers NNW. They stabilize the airflow and ensure uniform air supply to the diffuser. Expansion boxes connect diffusers with ventilation installation. They are made of zinc-coated sheet, joint by non-welded Click-Clock connection.

4.3 SR/NNW-P SMART

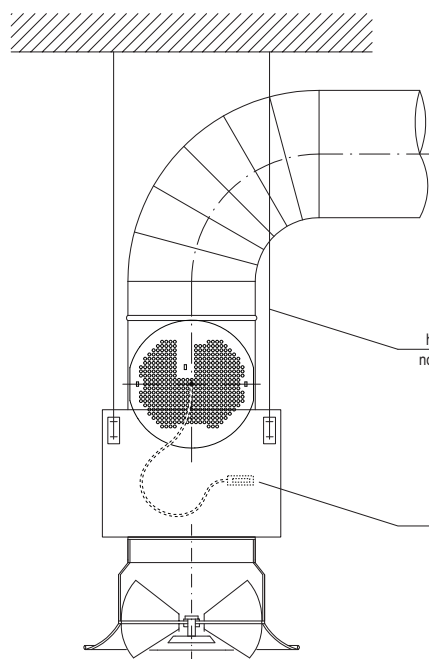
expansion boxes for swirl diffusers NNW-P SMART

INSTALLATION

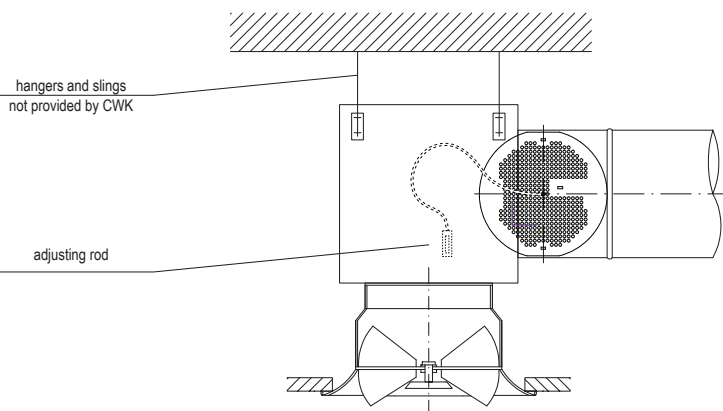
Expansion boxes SR/NNW are designed for installation into the underslung ceiling or for free suspension under the genuine ceiling. If installing in between the ceiling and underslung ceiling, a hole should be left of a size of $l \times l$ for the chosen air grate (hole size $\varnothing D2 - 20\text{mm}$ for the given diffuser). The air grate should be connected to the expansion box with rivets or screws. The box can be mounted on the ceiling by appropriate hangers (bars, pins...) or installation slings. Upon customer's request, boxes can be equipped with factory slings.

4

MOUNTED ON THE CEILING

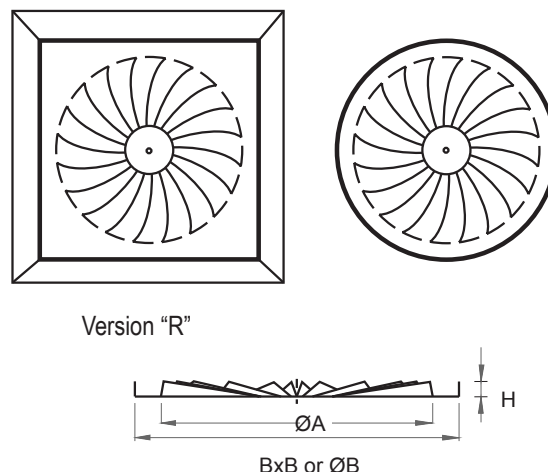
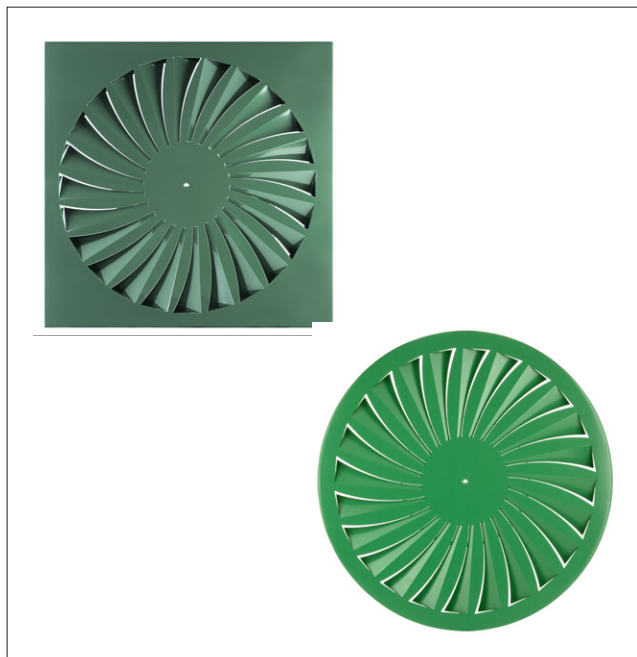


INSTALLATION IN THE FULLY SUSPENDED CEILING



FEATURES

- made of steel sheet and available in standard RAL 9003 colour
- can be installed with an expansion box SR/NV
- available square (K) and round (O)
- highly resistant
- upon customer's request, can be made in any colour from RAL palette



DESCRIPTION

NV are swirl diffusers designed for low- and medium-pressure installations. They can be used with constant and variable airflow. The air can be supplied at the temperature lower or higher than the temperature in the ventilated room. Therefore those diffusers can be used for both – heating and cooling. It is recommended to install NV diffusers in the ceiling.

Full airflow scope within small distance from the diffuser makes them ideal for rooms high as 2.2–4.5 m.

Diffusers NV are perfect for public buildings like offices, hotels, restaurants, conference halls and everywhere, where comfortable temperature conditions are required.

FEATURES

- R version is additionally equipped with decorative aluminium frame
- made of steel sheet and available in standard RAL 9003 colour
- can be installed with an expansion box SR/NV
- available square (K) and round (O)
- highly resistant
- upon customer's request, can be made in any colour from RAL palette
- the possibility of making each diffuser in the front panel of any size

STANDARD SIZES

Size	ØA [mm]	B [mm]	H [mm]
300	260	300	12
400	340	400	12
500	440	500	12
600	530	600	12
625	530	625	12

ORDER REFERENCE

NV - K - 300/600	R	RAL9003
type	version: O - round, K - square	colour
size	R frame (only version K)	
	in a plate $\varnothing$ 595	

swirl diffusers

INSTALLATION

NV are designed for installation with the expansion box SR/NV.

INSTALLATION IN THE FULL UNDERSLUNG CEILING: prepare an installation hole in the ceiling of a size of the expansion box. Put the expansion box in so that edges stick out by approx. 12 mm from the ceiling panel. Fix it with steel screws to the sides. Remember to seal joints.

INSTALLATION IN PANEL CEILING: diffuser together with the expansion box should be installed above the ceiling level so that the front panel of the diffuser sticks evenly to the ceiling panel.

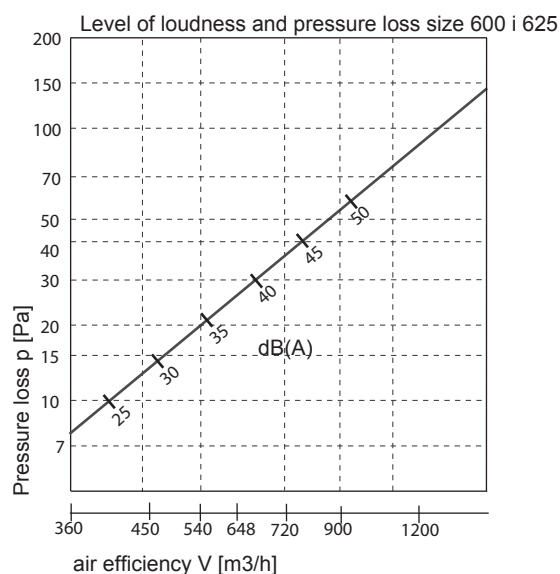
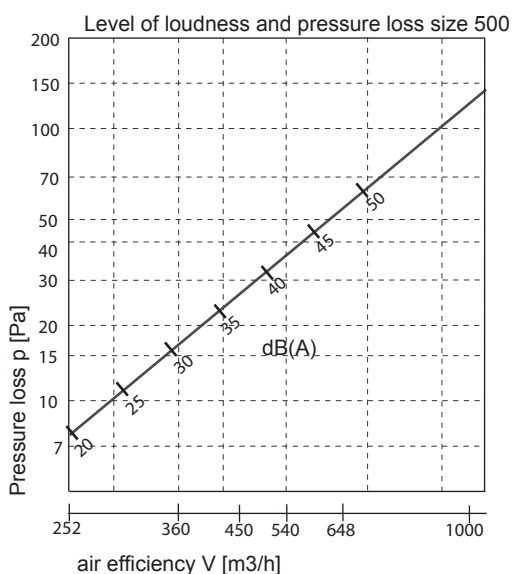
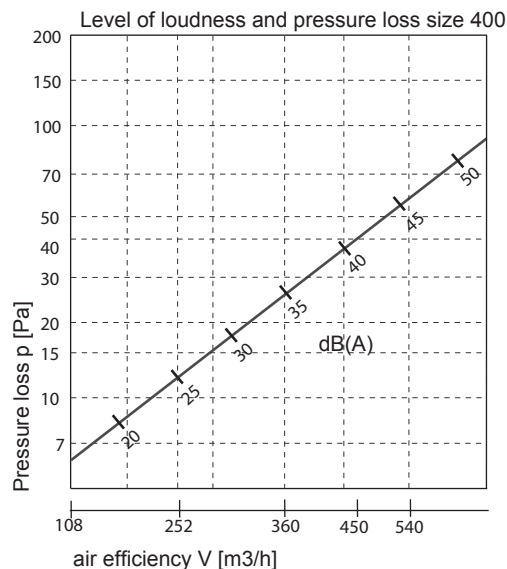
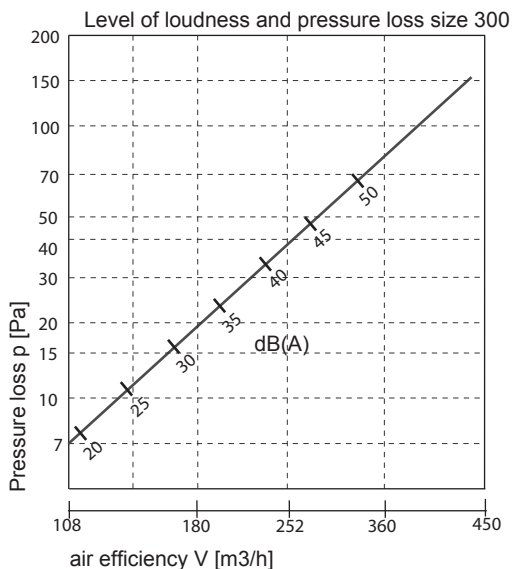
FEATURES

The figure shows airflow capacity V (m³/h), pressure loss p (Pa), airflow scope L (m) for end speed of 0.25 m/s, and volume level [dB(A)].

The airflow scope L relates to isothermal air supply.

4

NAWIEWNIKI NV



SELECTION OF TABULAR

Size	A _{ef} m ²	V (l/s) V m ³ /h	30		50		70		100		125		150		180		200		250	
			108		180		252		360		450		540		648					
300	0,0108	L _{0.5} /L _{0.3} m L _{WA} dB(A)	-	1.2	1.2	1.9	1.6	2.6	2.3	3.8										
		Δ p _t Pa v _{H1} 1.2 m m/s	7	<0.1	19	0.11	38	0.16	78	0.25	0.24									
400	0,0193	L _{0.5} /L _{0.3} m L _{WA} dB(A)					1.2	2.0	1.7	2.8	2.1	3.5	2.5	4.2						
		Δ p _t Pa v _{H1} 1.2 m m/s					13	0.12	27	0.18	40	0.23	60	0.28	0.25					
500	0,0280	L _{0.5} /L _{0.3} m L _{WA} dB(A)					-	1.6	1.4	2.3	1.7	2.9	2.1	3.5	2.5	4.2				
		Δ p _t Pa v _{H1} 1.2 m m/s					8	0.10	17	0.15	26	0.18	37	0.23	52	0.28	0.25			
600/625	0,0400	L _{0.5} /L _{0.3} m L _{WA} dB(A)							1.2	2.0	1.5	2.4	1.8	2.9	2.1	3.5	2.3	3.9	2.3	4.9
		Δ p _t Pa v _{H1} 1.2 m m/s							8	0.12	13	0.15	18	0.19	26	0.23	33	0.25	30	0.25

- L_{0.5}/L_{0.3} m - flow velocity range for the final 0,3 or 0,5 m/s
V l/s - diffuser efficiency
V m³/h - diffuser efficiency
A, B m - distance between two ventilators
X m - distance from the axis of the diffuser wall
H₁ m - distance from the ceiling area of human presence
V_{H1} m/s - average flow velocity at the time between the two ventilators in the distance H1
Δ t_Z K - difference between room temperature and ventilation
Δ t_L K - difference between room temperature and flux at a distance

$$L=A/2 +H1$$

$$L=B/2 +H1$$

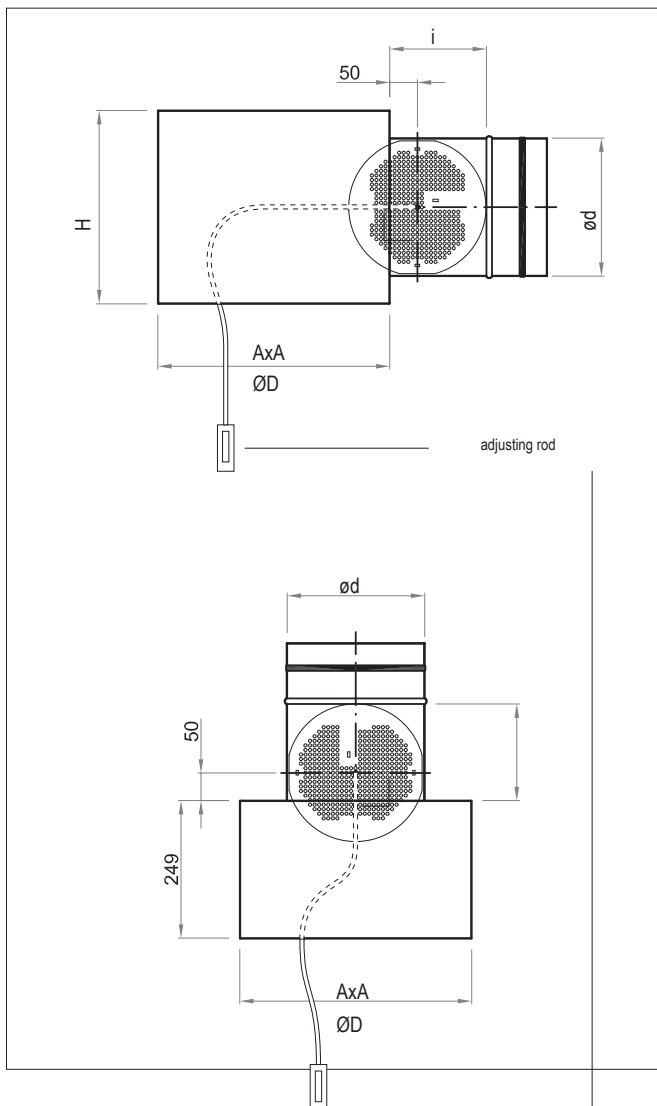
$$L=X +H1$$

- A_{eff} m² - effective surface outflow
Δ p_t Pa - total pressure loss (ventilation)
L_{WA} dB(A) - sound intensity in the level A
L_{W NC} - curve limit sound intensity spectrum
L_{W NC} = L_{WA} - 6 dB
L_{W NR} - L_{W NR} = L_{W NC} +2

- V_{H1} reference to A = L +H1, for B>= 4.00 m
L see table
H1 =1.2 m
L_{WA} or Δ p_t : TDF - Silent Air - ... -H

4.4 SR/NV

expansion boxes for swirl diffusers NV



DESCRIPTION

SR/NV are expansion boxes for NV diffusers. They stabilize the air-flow and ensure uniform air supply to the diffuser. Expansion boxes connect diffusers with ventilation installation. They are made of zinc-coated sheet, joint by non-welded Click-Clock connection.

Expansion boxes can be connected to the ventilation installation through the side or top. Boxes can be thermally and acoustically insulated from the inside by K-Flex rubber mat. Upon customer's request we can make other types of expansion boxes accordingly to provided drawings.

In standard expansion boxes are equipped on the ferrule with machine crimped rubber gasket.

ORDER REFERENCE

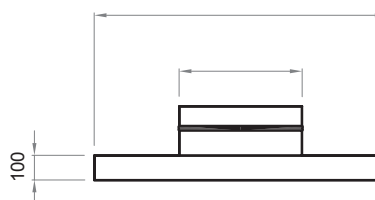
SR / NV - 300 - P - l - g - p

Additional accessories
P - mounting crossbar
b side connection
g top connection
_ non-insulated
l insulated
_ no throttle
P perforated damper with adjusting rod
size
diffuser type
SR expansion box
PS spiro transition

STANDARD SIZES

size	300	400	500	600	625
A [mm]	295	395	495	595	620
H [mm]	260	300	300	350	420
Ød [mm]	158	198	198	248	313
ØD [mm]	295	395	495	595	620
i [mm]	130	150	150	175	175

PS - SPIRO TRANSITION



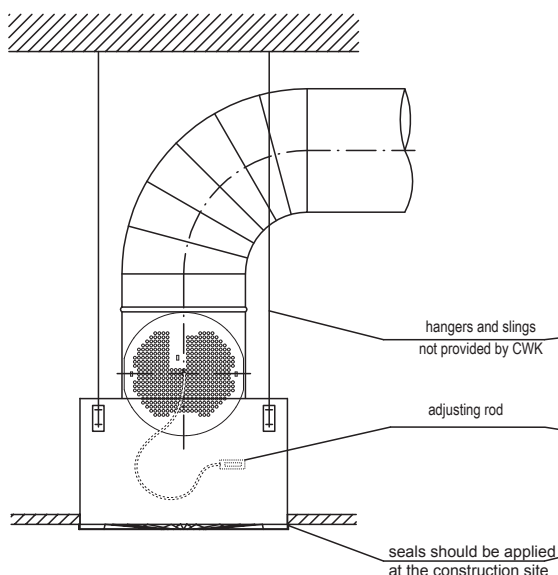
INSTALLATION

Expansion boxes SR/ KWRD are designed for installation between the ceiling and underslung ceiling. Prepare an installation hole of a size of ØD or AxA. The box can be mounted onto the ceiling by appropriate hangers (bars, pins...) and installation slings. If installing in the underslung ceiling, mount the expansion box in so that edges stick out by approx. 12 mm from the ceiling plane.

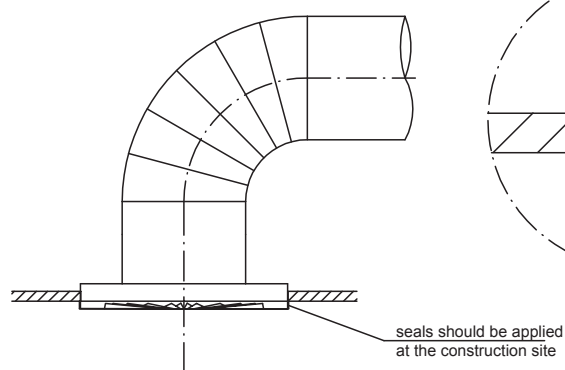
Upon customer's request, boxes can be equipped with

1. factory slings
2. a crossbar that allows for installation of the front panel with one central screw

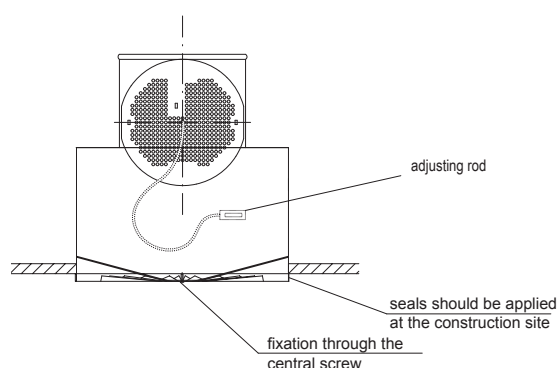
INSTALLATION IN THE FULL UNDERSLUNG CEILING



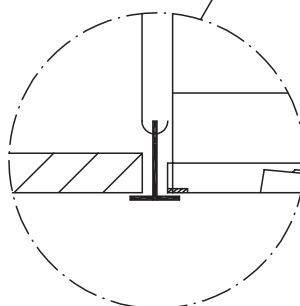
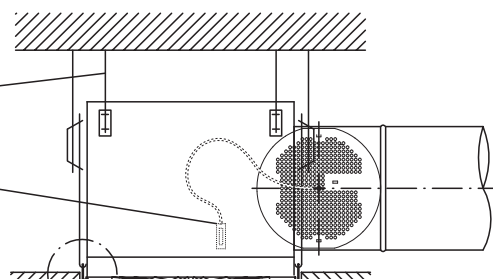
INSTALLATION WITH ADAPTER FOR SPIRO



INSTALLATION WITH THE CROSSBAR AND THE SCREW



INSTALLATION IN PANEL CEILING



notes

4



SWIRL DIFFUSER NV-M WITH ROUNDED FRONT PANEL

DESCRIPTION

NV-M are meant for usage in the low-, and medium –pressured ventilation systems. Diffusers allow to obtain the swirling air flow and are especially recommended for rooms from 2 to 5 m high. They are available with round or square front panels.

PERFORMANCE

NV-M are provided with the fixed handlebars generating swirling air flow. Front panel of the diffuser can be round or square. NV-M are made of white RAL 9003 powder coated steel. On request, it is possible to apply paint of any other RAL color and the usage of stainless steel.

VARIANTS

NV-MO – round front plate, a cylindric connection of handlebars with front plate

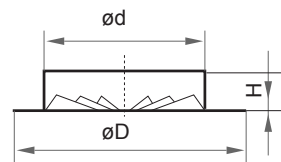
NV-MK - square front plate, a cylindric connection of handlebars with front plate

INSTALLATION

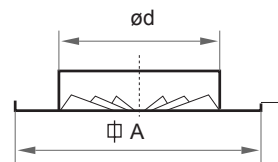
NV -M can be mounted with only one screw through the hole located in the central part of the diffuser

DIMENSIONS AND TYPES OF FRONT PANELS

NV-M-O



NV-M-K



ØD _N	A(mm)	ØD (mm)	Ød (mm)	H (mm)
100	200	145	95	40
125	250	170	120	40
160	250	205	155	40
200	300	245	195	40
250	300	295	245	40

SCOPE

Size	Variant NV-M-O: V min [m³/h]	Variant NV-M-K: V max [m³/h]
100	20	40
125	25	70
160	30	100
200	50	180
250	80	300

ORDER REFERENCE

NV - M - O - 200
type
size
version: O - round K - square

DESIGNATIONS:

V_L [m³/h] the total air flow

L [m] air stream range

V [m/s] the air speed in the distance L

Δt₂ [K] temperature difference of the supplied air and room air temperature

Δt₂ [K] air temperature difference in the room and supplied air temperature at the distance L,
where: L = A/2+H1
or L = B/2+H1
or L = X+H1

Δp [Pa] local pressure loss

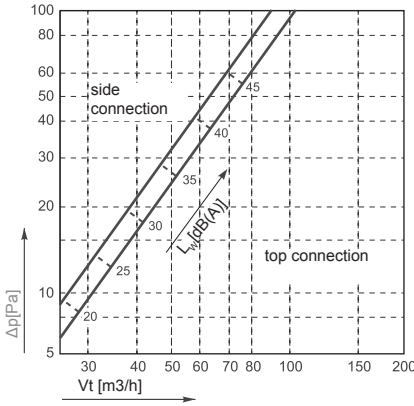
LW [dB(A)] sound power level

4.5 NV-M

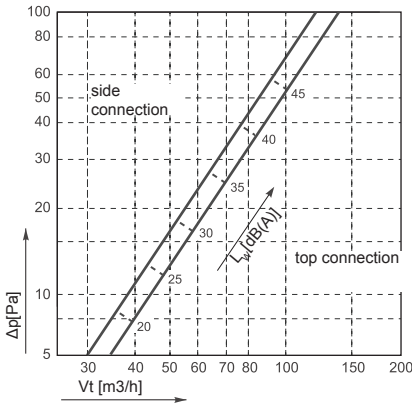
swirl diffusers

PRESSURE LOSS, SOUND POWER LEVEL

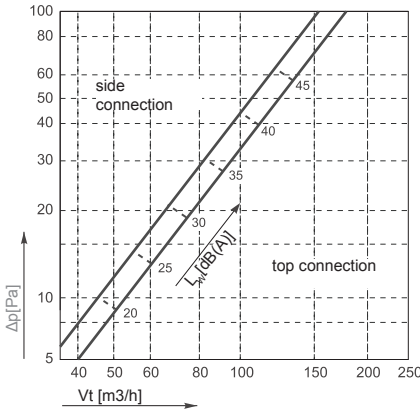
Size 100



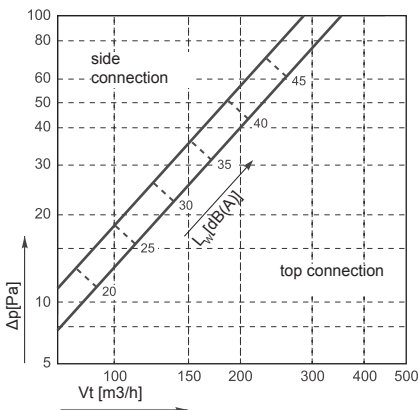
Size 125



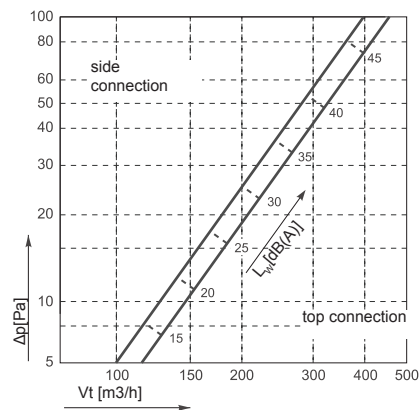
Size 160

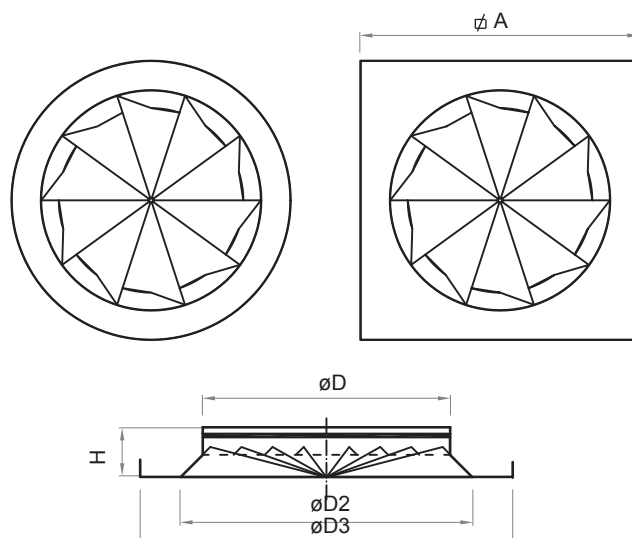


Size 200



Size 160





DESCRIPTION

NW are swirl diffusers designed for low- and medium-pressure installations. They can be used with constant and variable airflow. The air can be supplied at the temperature lower or higher than the temperature in the ventilated room. Therefore those diffusers can be used for both – heating and cooling. It is recommended to install NV diffusers in the ceiling.

Full airflow scope within small distance from the diffuser makes them ideal for rooms high as 2.2–4.5 m.

Diffusers NV are perfect for public buildings like offices, hotels, restaurants, conference halls and everywhere, where comfortable temperature conditions are required.

FEATURES

- made of steel sheet and available in standard RAL 9003 colour
- can be installed with an expansion box SR/NW
- highly resistant
- available square (K) and round (O)
- upon customer's request, can be made in any colour from RAL palette
- diffuser can be made with a square front panel
- upon customer's request the diffuser can be equipped with perforated sheet at the ending of connection socket
- K version occurs only in the plate 595x595

STANDARD SIZES

Size	ØD [mm]	ØD2 [mm]	D3 [mm]	H [mm]	A [mm]
125	123	155	177	50	595
160	158	190	227	50	595
200	198	235	276	70	595
250	248	300	368	55	595
315	313	375	453	55	595
355	353	420	507	65	595
400	398	470	586	65	595
450	448	535	662	80	595
500	498	600	752	86	595

ORDER REFERENCE

NW - O - P - 200 - K	—	RAL9003
type		colour
perforation on a connector pipe		
size		
K- acid-proof sheet		
version:		
O - round, K - square (595x595)		

4.6 NW

swirl diffusers

INSTALLATION

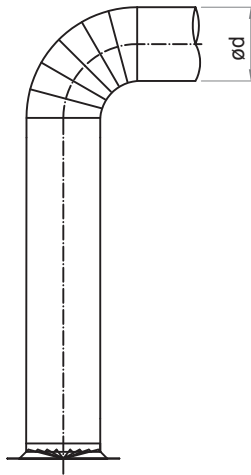
Diffusers NW can be connected directly to the round ventilation duct or through the expansion box SR/NW. In both cases use rivets or screws.

Installation with expansion box: see SR/NW.

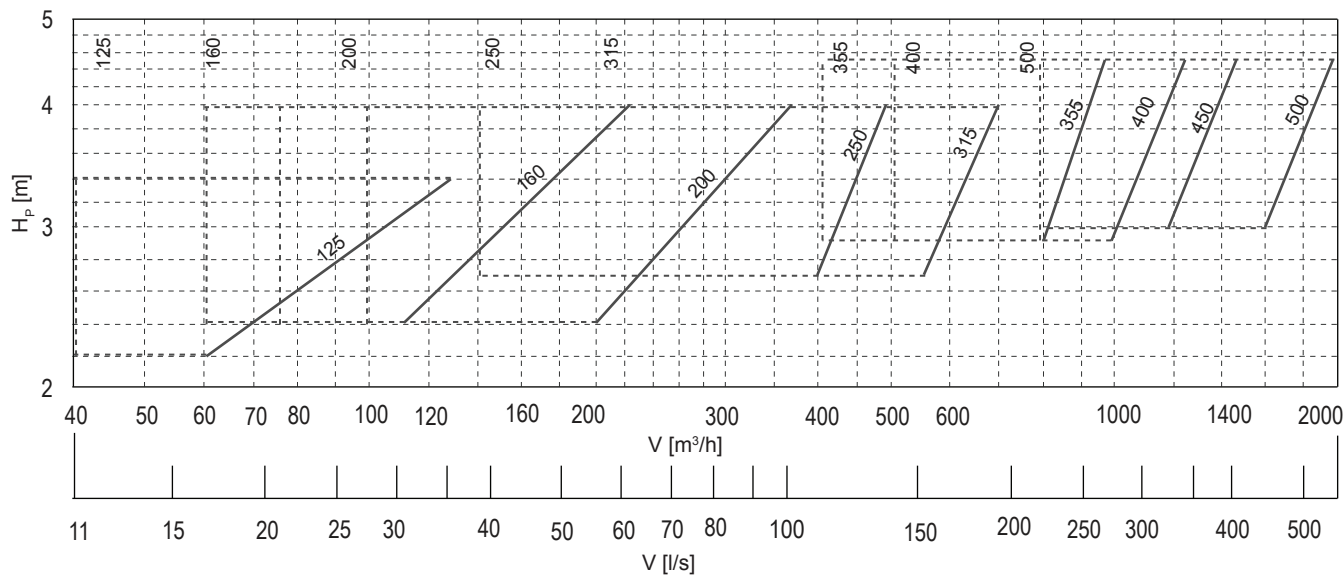
FEATURES

The figure shows airflow capacity V (m³/h), pressure loss p (Pa), air-flow scope L (m) for end speed of 0.25 m/s, and volume level [db(A)].

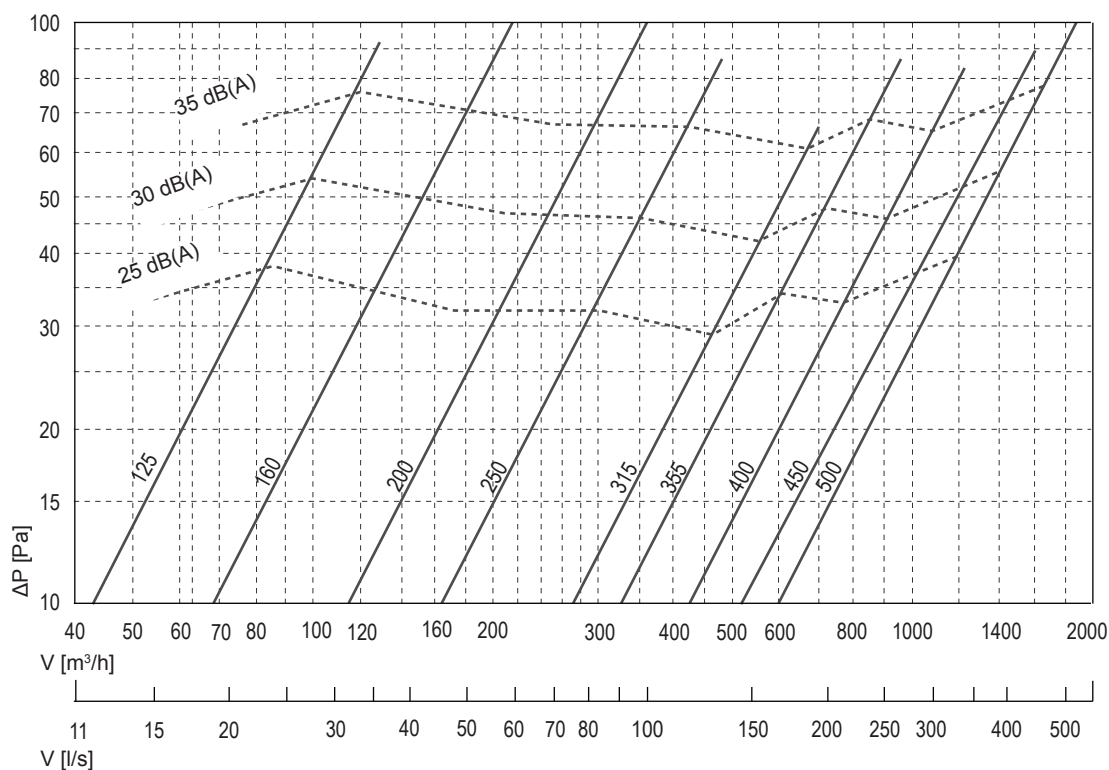
The airflow scope L relates to isothermal air supply.



CHOICE OF DIFFUSER



CHOICE OF DIFFUSER



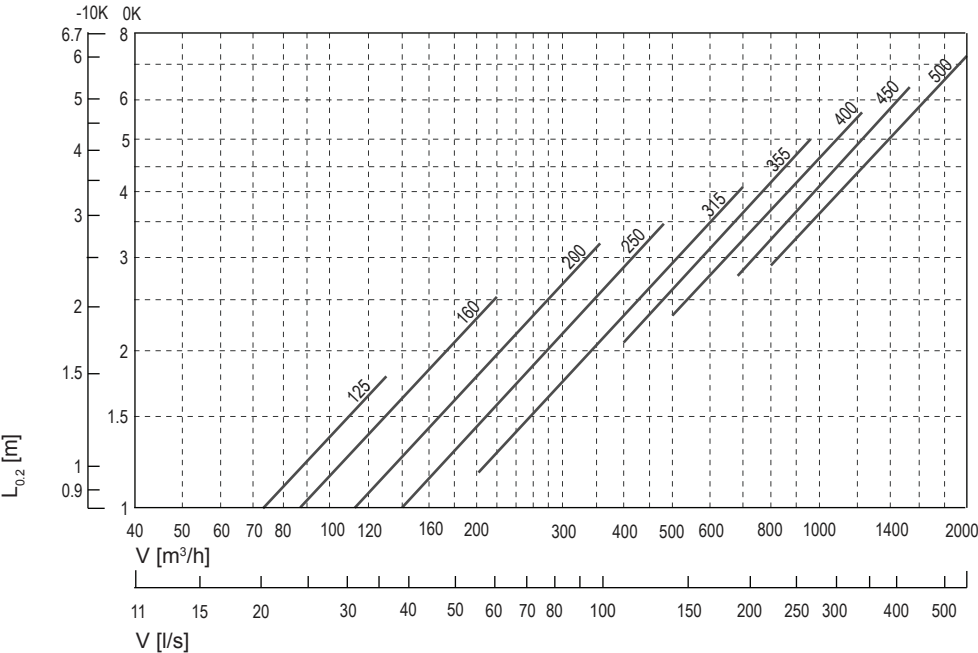
H_p - suspension of the diffuser height (distance from the plane of the outlet from the floor)

The graphs are given sound pressure level for L_{p10} room with an area of 10 m² and absorption attenuation 4dB

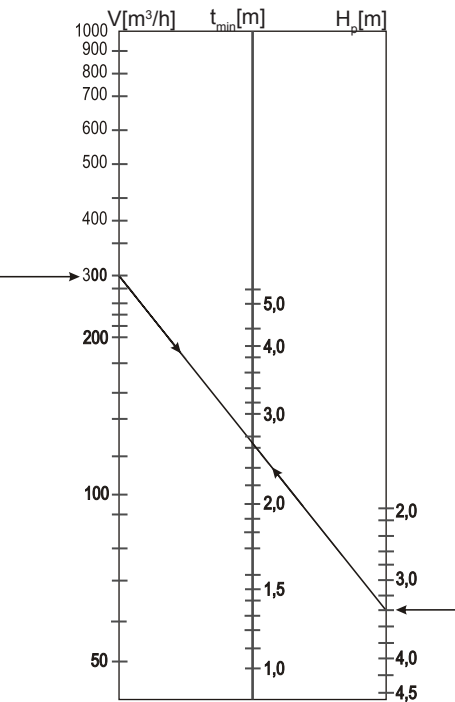
4.6 NW

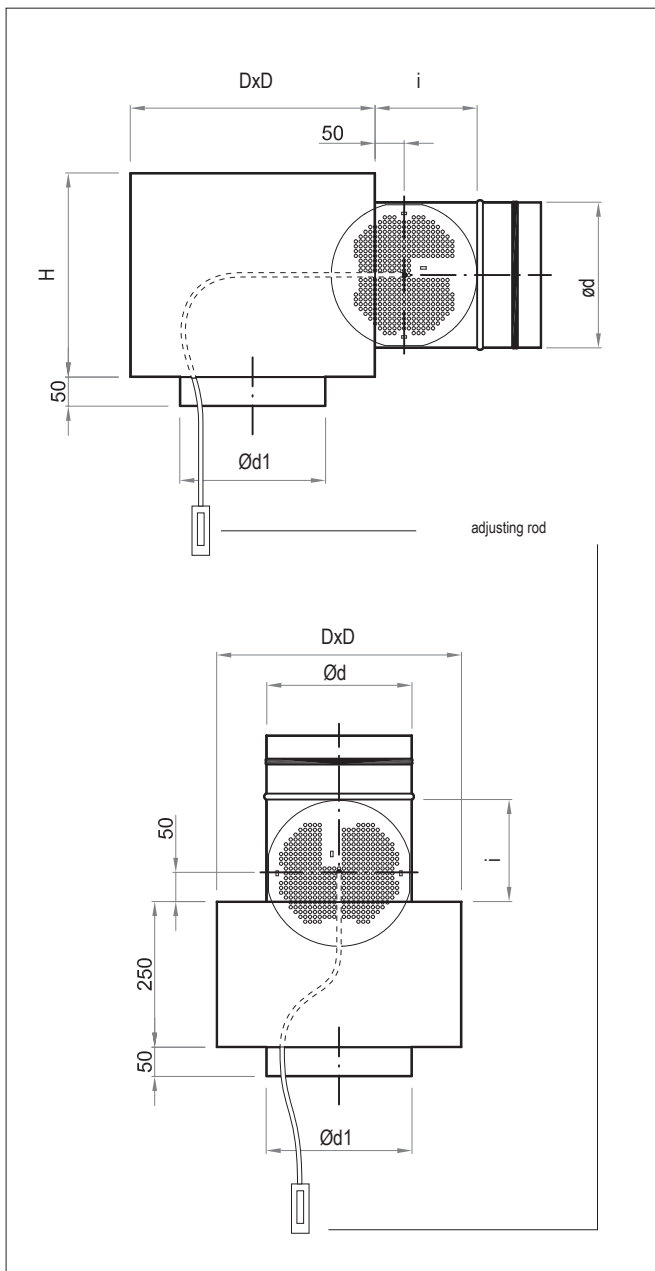
swirl diffusers

RANGE STREAM, CALCULATING THE SPACING OF VENTILATORS



CALCULATION OF SPACING DIFFUSER





DESCRIPTION

SR/NW are expansion boxes for NW diffusers. They stabilize the air-flow and ensure uniform air supply to the diffuser. Expansion boxes connect diffusers with ventilation installation. They are made of zinc-coated sheet, joint by non-welded Click-Clock connection. In standard expansion boxes are equipped on the ferrule with machine crimped rubber gasket. The expansion box may be provided with a mounting bar, which allows the diffuser assembly with a single bolt through the hole placed in the central part of the diffuser.

Expansion boxes can be connected to the ventilation installation through the side or top.

Boxes can be thermally and acoustically insulated from the inside by K-Flex rubber mat.

Upon customer's request we can make other types of expansion boxes accordingly to provided drawings

ORDER REFERENCE

SR / NW - 160 - P - l - g - p		
		Additional accessories
		P - mounting crossbar
		b side connection
		g top connection
		— non-insulated
		l insulated
		— no throttle
		P perforated damper with adjusting rod
	size	
	diffuser type	

STANDARD SIZES

Size	125	160	200	250	315	355	400	450	500
D [mm]	225	260	300	350	420	460	500	550	600
H[mm]	200	225	260	280	325	350	420	500	500
Ød [mm]	98	123	158	198	248	248	313	398	398
Ød1 [mm]	125	160	200	250	315	355	400	450	500
i [mm]	100	115	130	150	175	175	210	210	220

4.6 SR/NW

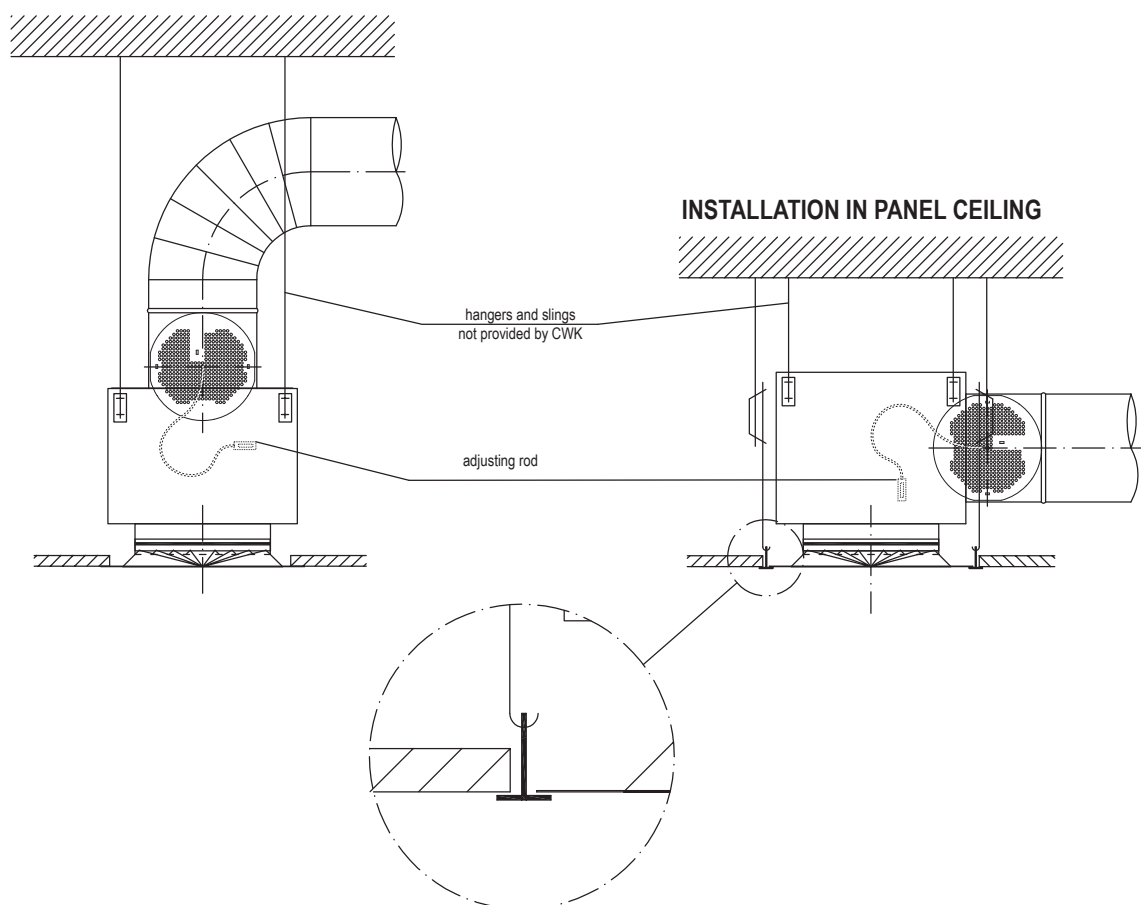
extension boxes for swirl diffusers NW

INSTALLATION

Expansion boxes SR/NW are designed for installation between the ceiling and underslung ceiling. Prepare an installation hole of a size of ØD2. The box can be mounted onto the ceiling by appropriate hangers (bars, pins...) and installation slings.

Upon customer's request, boxes can be equipped with factory slings.

INSTALLATION IN THE FULL UNDERSLUNG CEILING





DESCRIPTION

NWQ-1 series swirl air vents are especially useful in comfort air-conditioning installations, e.g. in offices and commercial buildings, where they are provided as air-supply and air-exhaust vents. The swirl horizontal air supply ensures the high induction level, fast temperature equalization and fast stream speed drop.

The air vents may supply air with temperature differences between +10 and -10 °K and room height exceeding 2.8 m. The NWQ-1 series swirl air vents include a square front plate, and radial immovable elements directing the airflow. In order to obtain a low level of acoustic power at high efficiency, the triangular parts directing the air reach up to the corners of the square air vent.

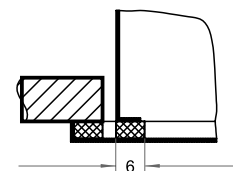
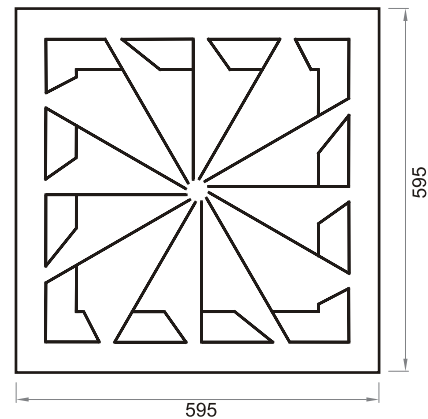
MATERIAL

Air vents are made of galvanised steel sheet. The external surfaces are powder-coated (white – RAL 9003).

ORDER REFERENCE

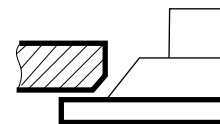
NWQ	–	600 x 148	–	RAL9003
		600 x 148		
		600 x 198		
		600 x 248		
		600 x 298		
		600 x 348		
			colour	

Swirl air vent (NWQ series)

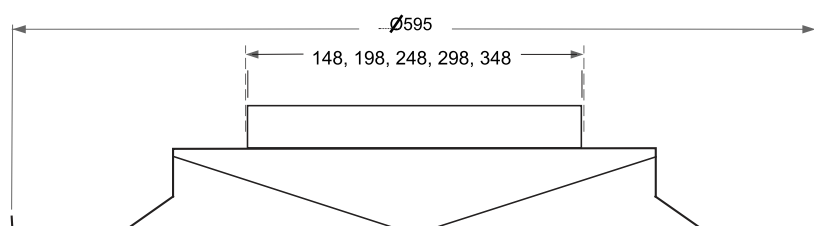
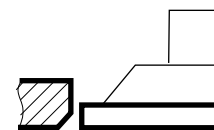


assembly of faceplate
using a central screw

assembly in excision of the
roof



flush mounting in suspended
ceiling



4.7 NWQ-1

Swirl air vents with round connections

4

Size	Speed m/s	1,52	2,03	2,54	3,05	3,56	4,06	4,57	5,08	6,10	7,11	8,10
	Velocity pressure	.006	.010	.016	.023	.032	.041	.051	.063	.090	.122	.160
148	Total compr. (Pa)	3,49	6,48	10,21	14,45	19,68	25,41	32,63	40,35	52,81	78,46	102,87
	m3/h	102	136	170	204	238	272	306	340	400	468	536
	Range	1-1-3	1-2-4	2-3-5	2-3-6	2-4-7	3-4-8	3-5-9	4-5-10	1-6-11	5-7-11	5-8-12
	dB	-	-	-	-	-	16	20	24	30	35	38
198	Total compr.	.015	.027	.042	.060	.082	.107	.136	.168	.242	.329	.430
	m3/h	179	238	298	357	417	479	536	595	716	833	952
	Range	2-3-5	2-4-7	3-5-9	4-5-10	4-6-11	5-7-11	5-8-12	6-9-12	7-10-14	8-10-15	9-11-16
	dB	-	-	-	-	17	22	25	29	34	38	40
248	Total compr.	.016	.028	.043	.062	.085	.111	.140	.173	.266	.340	.443
	m3/h	281	374	459	561	646	740	833	927	1114	1301	1479
	Range	3-5-9	4-5-10	5-7-11	6-8-12	6-9-13	7-10-14	8-10-16	8-11-18	9-11-19	10-12-20	12-16-22
	dB	-	-	-	16	22	27	31	34	39	44	48
298	Total compr.	.016	.028	.043	.063	.086	.113	.142	.176	.280	.346	.451
	m3/h	400	536	663	799	935	1071	1199	1335	1683	1870	2134
	Range	4-6-10	5-7-12	6-8-14	7-10-16	8-11-18	9-12-18	10-13-20	11-14-21	13-17-24	15-20-27	17-23-30
	dB	-	-	-	20	25	30	34	37	43	48	53
348	Total compr.	.016	.028	.043	.064	.088	.113	.142	.176	.280	.346	.451
	m3/h	544	723	901	1080	1267	1445	1624	1802	2159	2533	1882
	Range	5-7-12	7-9-15	8-10-17	9-12-18	10-14-21	12-16-22	13-17-24	15-21-27	17-24-31	19-28-35	21-31-40
	dB	-	17	24	30	34	38	41	44	50	54	57

*Range – the values given are applicable with the following speeds: 0.254 m/s – 0.508 m/s – 0.762 m/s.



DESCRIPTION

Swirl air vents of the NWQ-2 series are especially useful as air-supply vents and air-exhaust vents in comfort conditioning systems in places such as office and commercial spaces. Swirl, horizontal air-supply assures a high level of induction, fast balancing of temperature and fast decrease of the stream speed.

These air vents are best for supplying air with the temperature difference from +10 to -10K in rooms higher than 2.80m. Swirl air vents of the NWQ-2 series are made of a square front plate with a sealing tape and fixed air-directing elements, placed radially. In order to archive a low level of acoustic power, especially at high efficiency, triangular air-directing elements reach the corners of the square air vent.

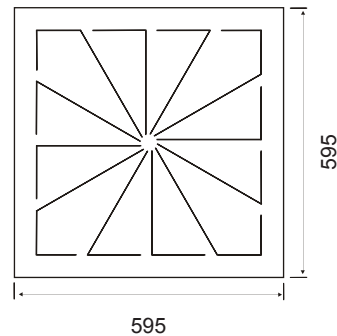
MATERIAL

Air vents made of galvanised steel sheet. Their external surface is covered with white powder veneer (RAL 9003)

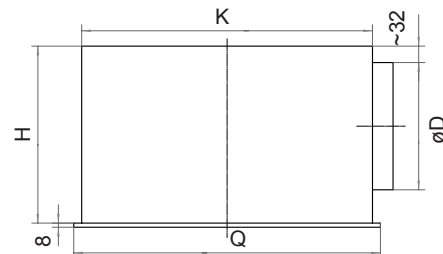
ORDER REFERENCE

NWQ2	—	600	—	RAL9003
		size: 600 i 625		colour

SWIRL AIR VENT OF THE NWQ-2 SERIES



NWQ-2 WITH AN EXPANSION BOX



WLK	ØD	H	K	Q
600	248	345	593	595
625	313	410	623	625

ORDER REFERENCE

SR/NWQ2-200-P-I-g	—	p
SR	expansion box	
PS	spiro transition	
	diffuser type and version	
	size	
	— no throttle	
	P perforated damper with adjusting rod	
	— non-insulated	
	I insulated	
	g top connection	
	b side connection	
	P - mounting crossbar	Additional accessories

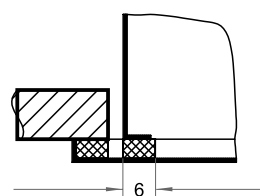
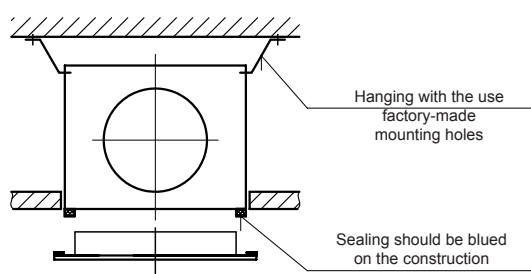
4.8 NWQ-2

square air vents with plenum box

INSTALLATION

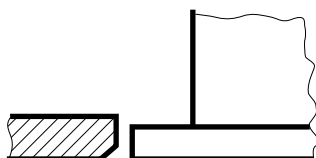
NWQ-2 air vents can be installed fused into the ceiling. The expansion box may be hung on cord or steel tape, using mounting holes in the box. The sealing, which is supplied with the air vent, should be glued to the edges of the expansion box. The front plate is fixed to the expansion box with a central screw and a crosspieces. The head of the screw is covered a decorative cap or is placed on the side part of the air vent.

Installation in a ceiling

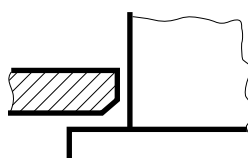


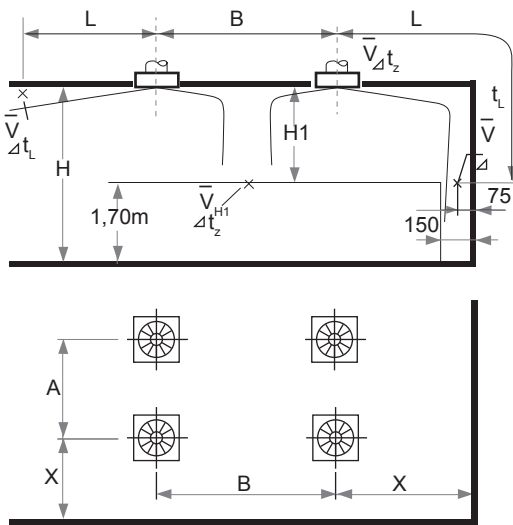
Fixing the front plate using the
central screw

Installation fused into a false ceiling



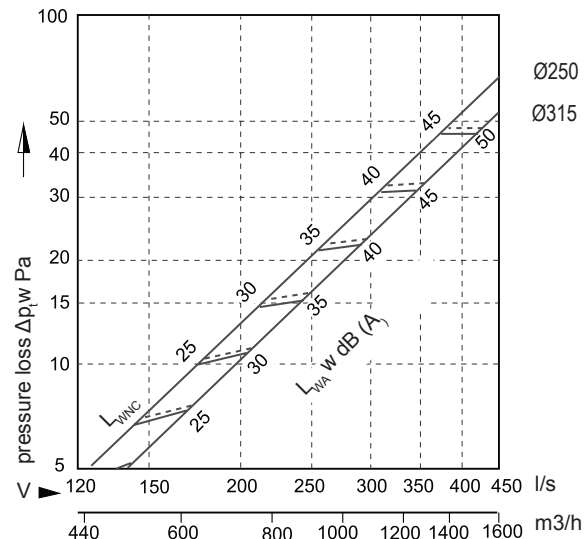
Installation in the ceiling opening





- V w l/s (m³/h): diffuser efficiency
 A, B w m: Distance between two diffusers
 L w m: Horizontal and vertical distance ($X+H_1$) of the air flow towards the wall
 X w m: distance from the center of diffuser to the wall
 H_1 w m: Distance between the ceiling and the area occupied by people
 A_{eff} w m²: Effective outflow surface 0,04467 m² (supplied air flow)
 V_L w m/s: the maximum air flow velocity by the wall (average time)
 V_{H1} w m/s: the maximum air flow velocity between two diffusers at the distance from the ceiling H_1 (average time)
 Δt_z w K: Temperature difference between room air and supplied air
 Δt_z w K: temperature difference between the room and the stream in the distance $L=A/2$ or $B/2 + H_1$ or $L = X + H_1$
 Δp_t w Pa: Total pressure loss
 L_{WA} W dB(A): sound power level with A scale
 L_{WNC} : limit curve spectrum of the acoustic power
 L_{WNR} : $L_{WNR} = L_{WNC} + 2$
 L_{pA}, L_{pNC} : The acoustic pressure level in the A scale or NC curve in the room
 $L_{pA} \sim L_{WA} - 8$ dB
 $L_{pNC} \sim L_{WNC} - 8$ dB
 α w °: in o damper placement angle

1. Level of acoustic and pressure loss Type NWQ-A (air-exhaust)



2. Level of acoustic power and pressure loss Type NWQ-Z (air-supply)

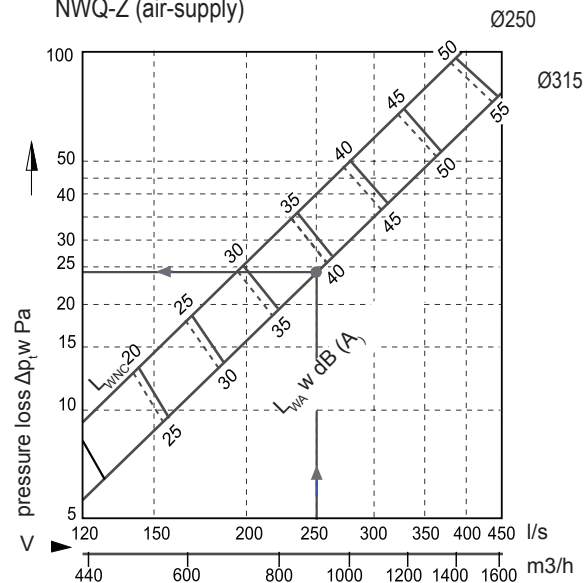


Diagram 1 update. Choek position
SR plenum box denotation

NWQ-A	45°	90°
ΔP_t	x 2	x 5.2
L_{WA}	+2	+11
L_{WNC}	+5	+10

4.8 NWQ-2

square air vents with plenum box

EXAMPLE

There are 4 units of NWQ-2/625 x 313 (square with a 5 metre-long side, 2.5 m away from the wall) to be installed in a room (10x10m). Air vents are hung at the height of 3.6m, i.e. 1.9m over the human activity zone. 10 cycles of air exchange should be provided in the room. Natural sound damping of the room equals 8 dB. In the case of cooling, the air is supplied at a temperature difference of -10K.

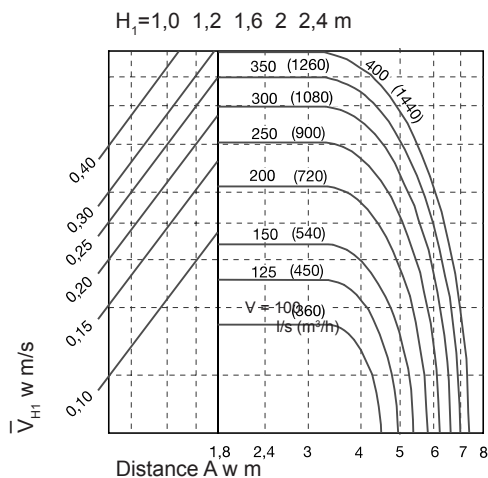
QUESTIONS:

Is it possible to achieve acceptable acoustics and in comfortable conditions?

What pressure loss do air vents cause?

$V_{\text{total}} = 10\text{m} \times 10\text{m} \times 3,6\text{m} \times 10\text{ h}^{-1} = 3600\text{ m}^3/\text{h}$
for 1 air vent = $900\text{ m}^3/\text{h}$ (250 l/s)

3. Air stream velocity for multi-row positioning of air vents, when $B=4,0\text{m}$



4. Air stream velocity for one- or multi-row positioning of air vents, when $B = 6,0\text{ m}$

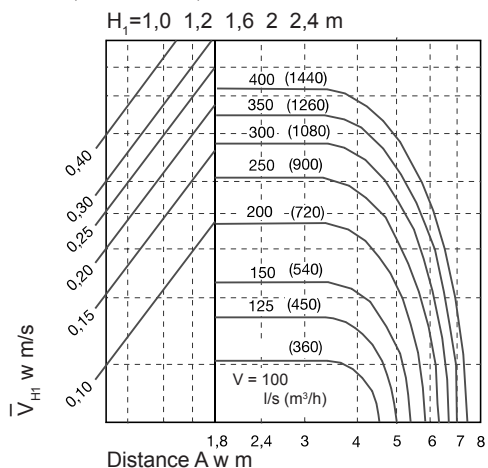


DIAGRAM 2

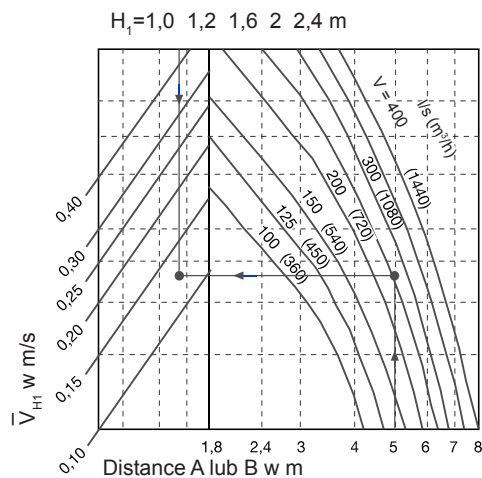
$L_{WA} = 39\text{ dB(A)}$, $\Delta p_t = 24\text{ Pa}$
Acoustic pressure level in a room $L_{pA} = 39\text{ dB(A)}$
+6 dB(A) (increase for 4 air vents)
-8 dB(A) (natural dampening of a room) = 37 dB(A)
Acoustic requirements have been met

DIAGRAM 5:

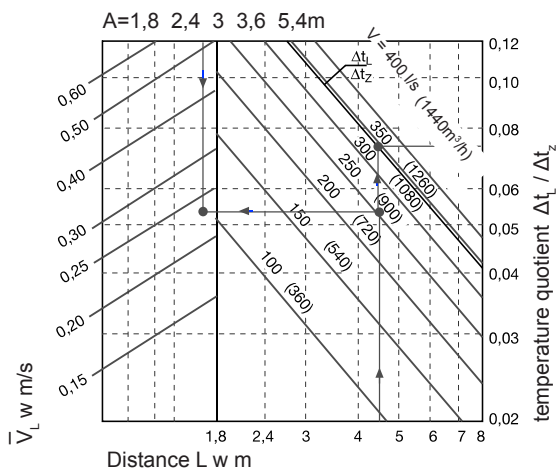
$A = 5\text{ m}$ i $V = 900\text{ m}^3/\text{h}$
 $H_1 = 3,6\text{ m} - 1,7\text{ m} = 1,9\text{ m}$
 $V_{H1} = 0,12\text{ m/s}$
Comfort criteria are met

DIAGRAM 6:

$L = X + H_1 = 2,5\text{ m} + 1,9\text{ m} = 4,4\text{ m}$
 $V_L = 0,23$
 $\Delta t_L / \Delta t_z = 0,072$
 $\Delta t_L = 0,072 \cdot (-10\text{K}) = -0,72\text{K}$
Air velocity in the human activity zone, in the 0,5 m distance from the wall, equals about $0,5 \cdot V_L = 12\text{ m/s}$
5. Air stream velocity for square positioning of air vents ($A=B$)



6. Air stream velocity along the wall and the temperature quotient





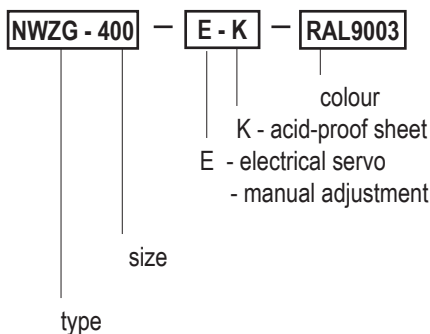
DESCRIPTION

NWZG is an adjustable swirl air vent for rooms with a considerable difference between the temperature of the air present in the room and the temperature of supplied air. It is designed to operate on constant or variable airflow in 3 – 12 m high rooms. Thanks to movable blades which make it possible to select a proper air-supply angle, NWZG can be used both for room cooling and heating. It is recommended to install these devices on the ceiling surface.

SHORT CHARACTERISTIC

- high induction factor;
- movable blades make it possible to adjust the air-supply angle;
- internal part of the air vent moulded in order to achieve the Coanda effect;
- easy installation;
- possibility to mount with SR/NWZG plenum box;
- air vent made of steel sheet;
- robust structure;
- standard painted in RAL 9003;
- customized items can be painted in any colour from the RAL palette;
- diffusers are also available with wax actuator

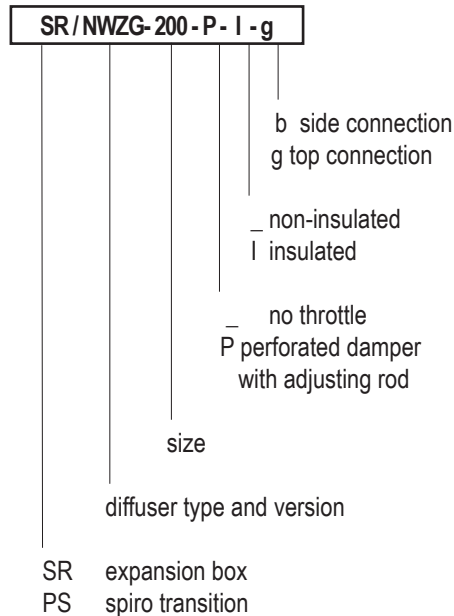
ORDER REFERENCE



AIR OUTFLOW PARAMETERS

Size					
DN	Vmin m3/h	Vmax m3/h	H m	cooling mode K	heating mode K
250	300	1400	2.8-6	-12	+12
315	400	2200	3-8		
355	600	3000	3-9		
400	800	3800	3-12		
500	1000	5000	4-12		
630	2500	9000	5-13		
710	3500	11000	5-14		

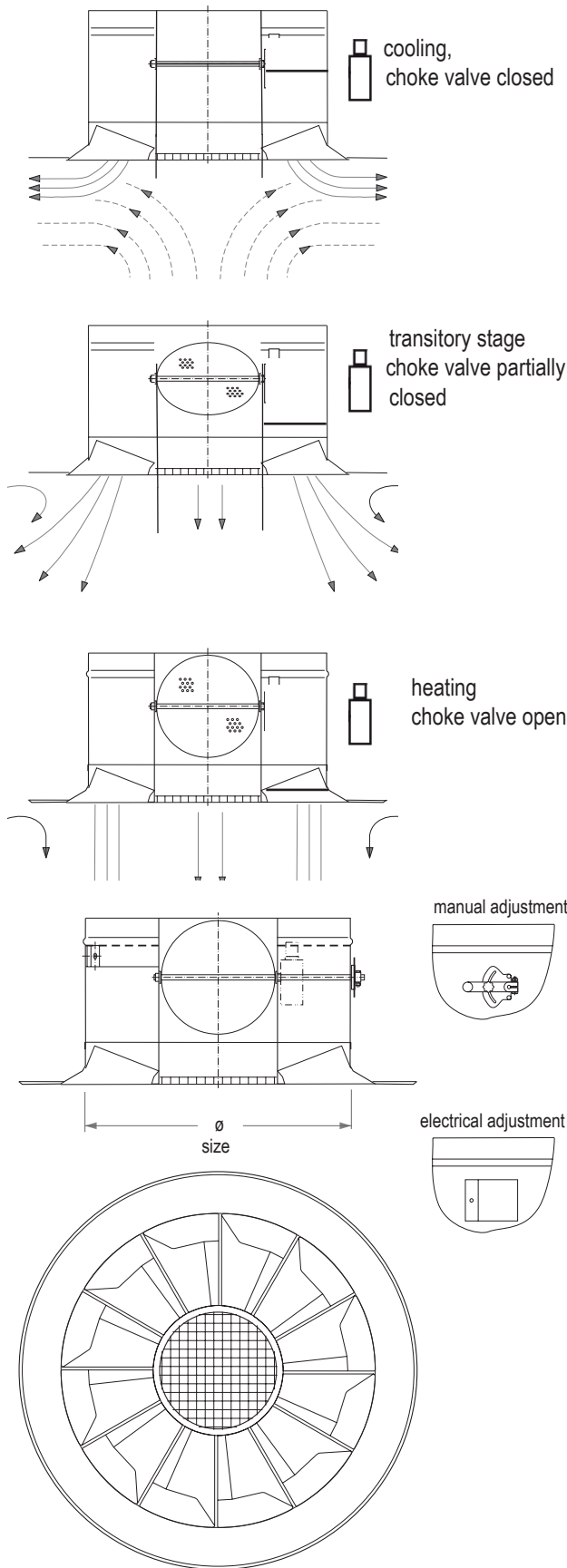
ORDER REFERENCE



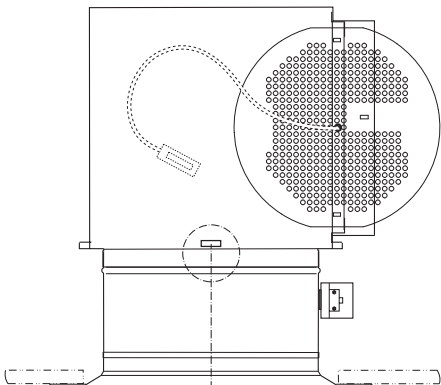
4.9 NWZG

variable geometry swirl air vents

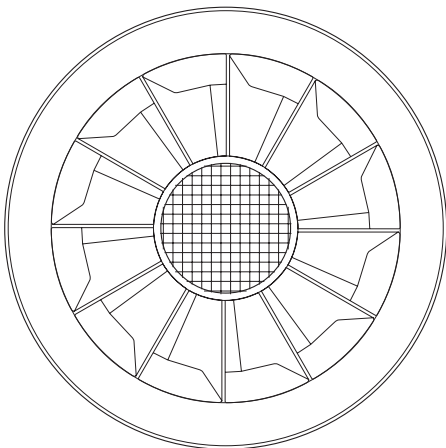
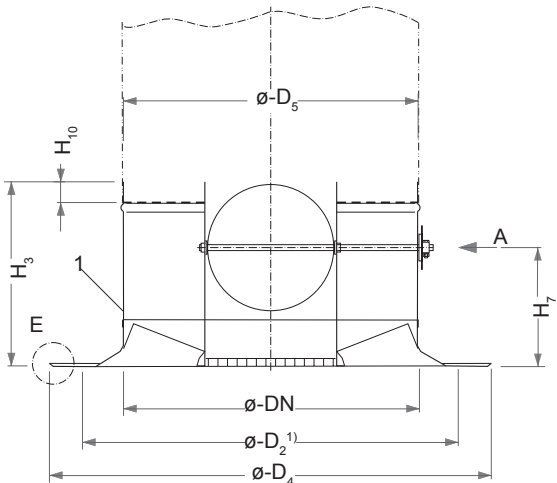
4



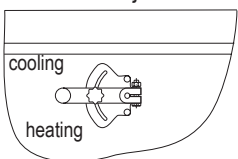
CONNECTION TO THE BOX



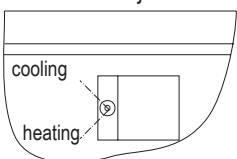
CONNECTION TO THE DUCT



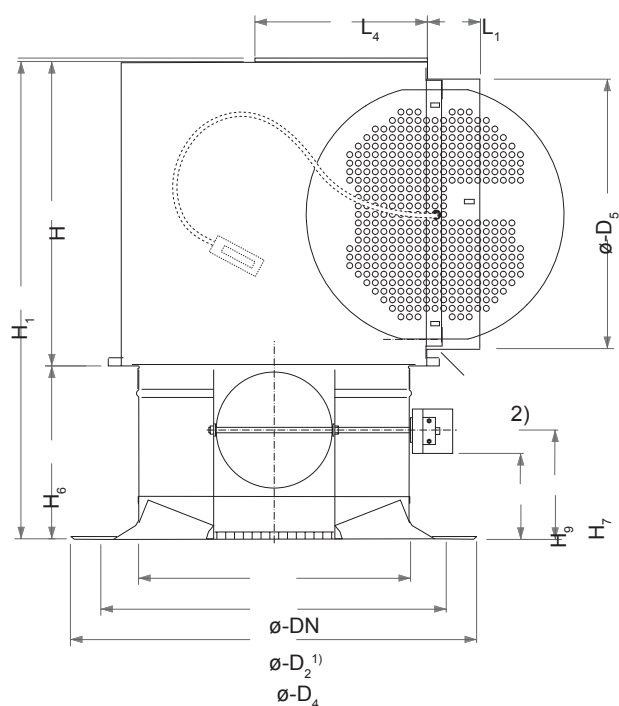
manual adjustment



electrical adjustment



connection to the box

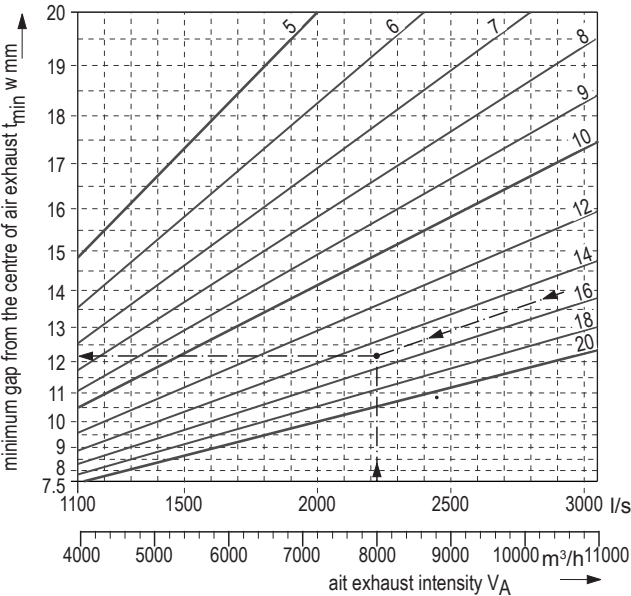
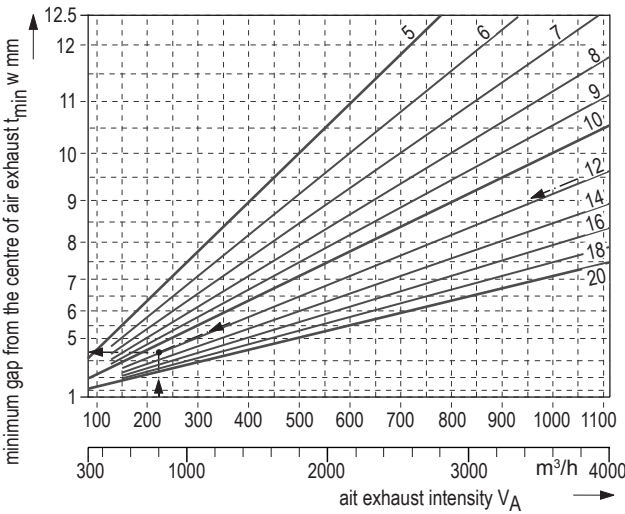


Size	Dimensions w [mm]															Weight w [kg]		
	D2	D4	D5	H	H1	H3	H6	H7	H9	H10	L	B	B1	L1	L3	L4	1	2
DN 250	325	368	249	300	505	200	205	127	94	30	350	375	298	60	135	180	3,8	8,0
DN 315	420	453	314	365	587	217	222	141	108	30	415	445	357	60	168	213	5,2	11,2
DN 355	460	507	354	405	640	230	235	151	118	30	455	485	390	60	188	233	6,2	13,5
DN 400	502	586	399	450	705	250	255	161	128	35	500	535	432	80	210	255	7,5	16,6
DN 500	602	752	499	550	849	294	299	183	150	40	600	645	525	80	260	305	10,6	23,9
DN 630	758	927	628	680	1035	350	355	211	178	50	730	785	642	80	325	370	16,0	35,3
DN 710	854	1047	708	760	1150	385	390	229	196	50	810	870	713	100	365	410	19,8	44,8

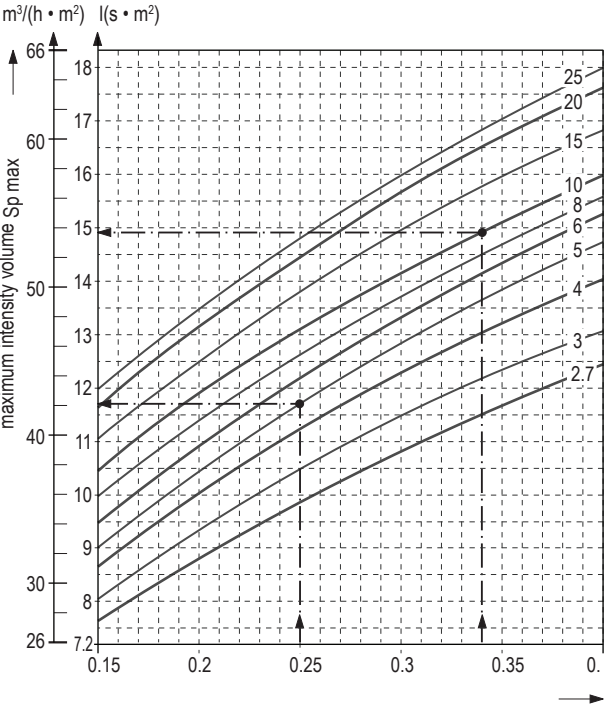
4.9 NWZG

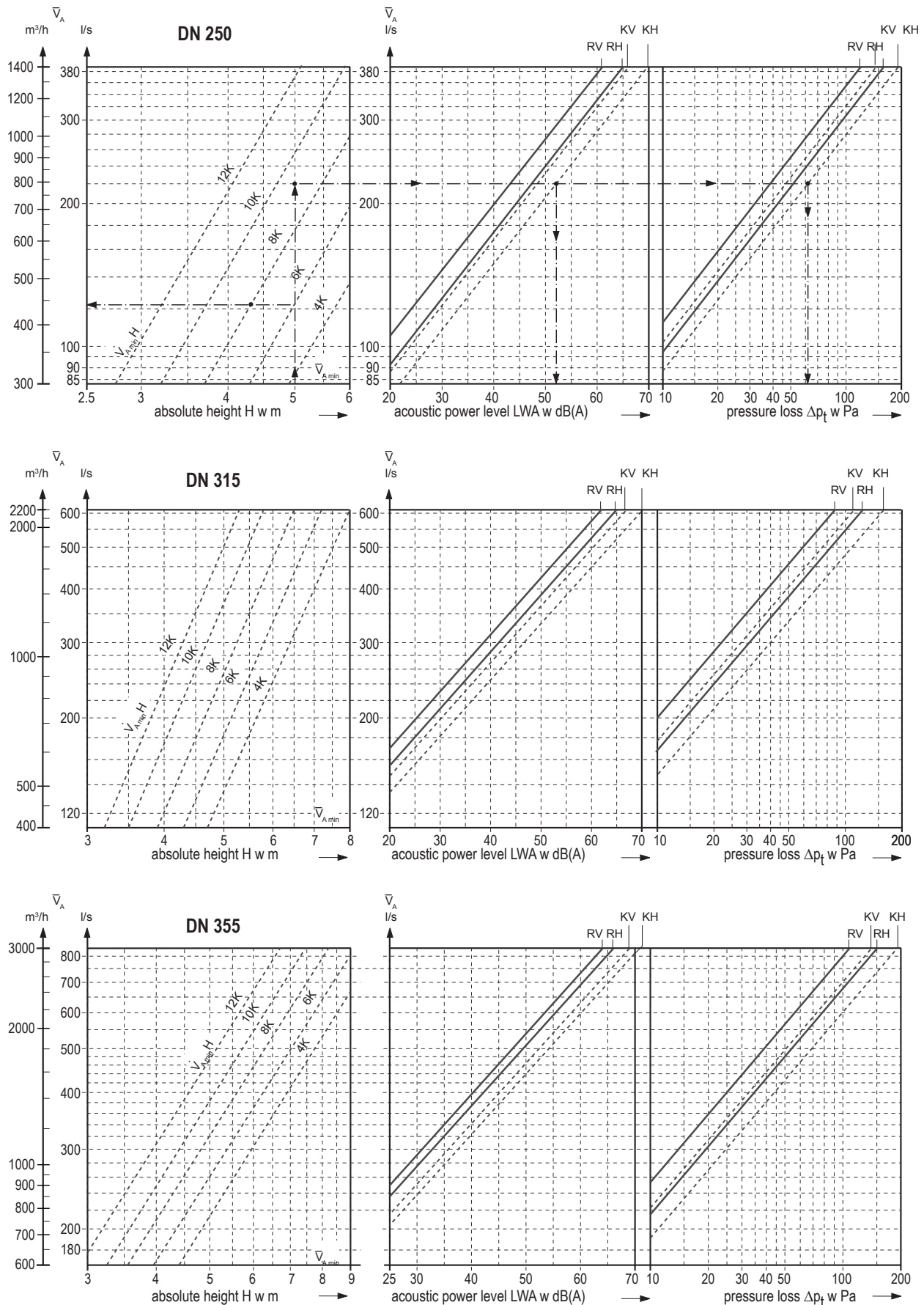
variable geometry swirl air vents

MINIMUM GAP FROM THE CENTRE OF AIR EXHAUST



MAXIMUM CONSTANT AIR SPEED IN ROOMS

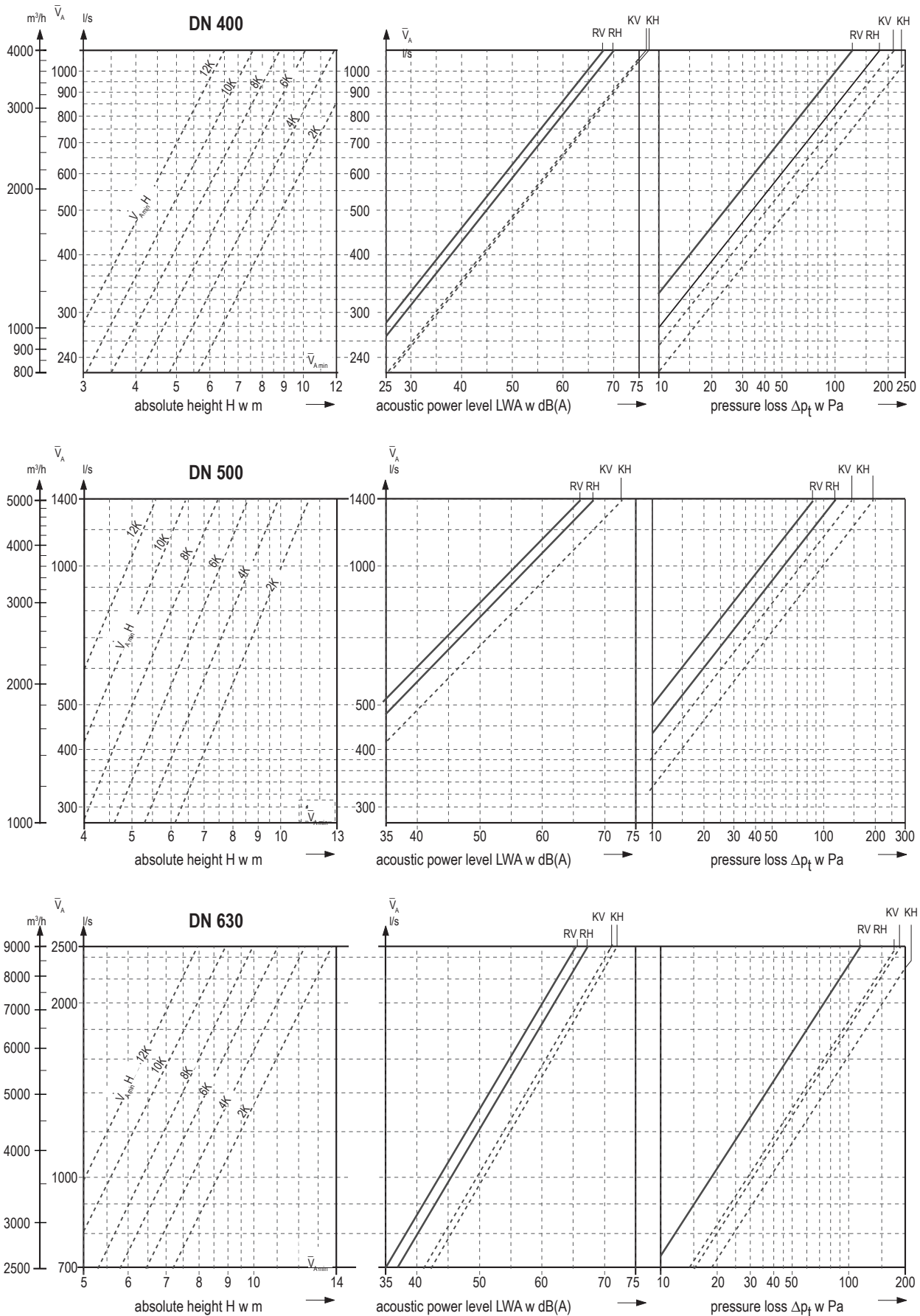


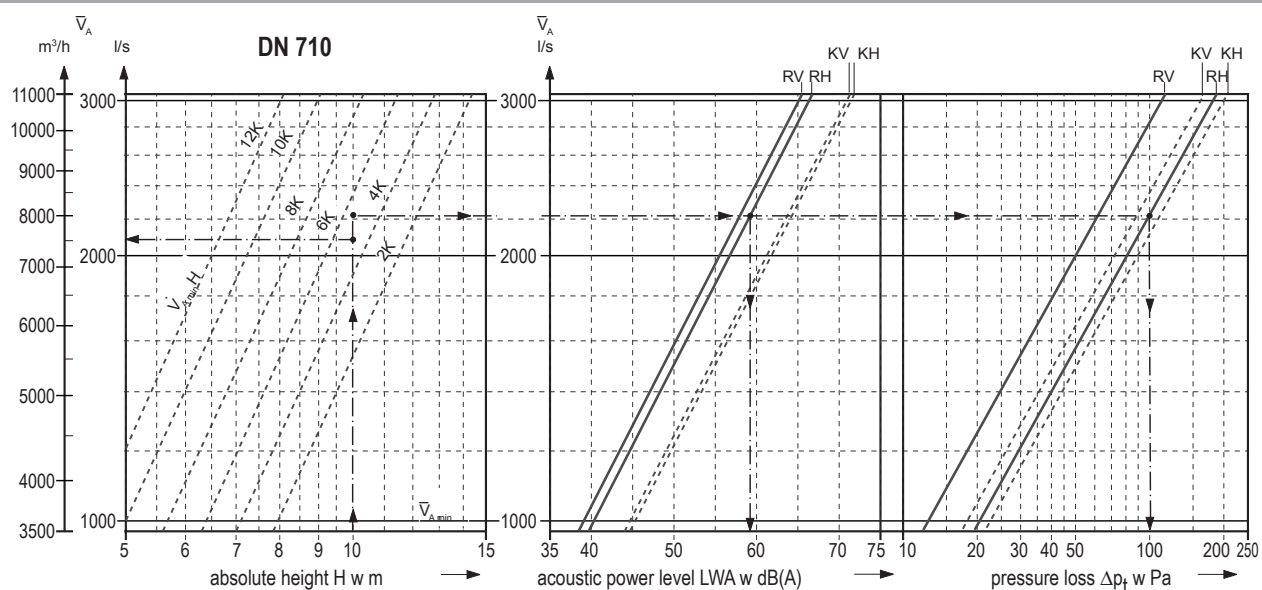


4.9 NWZG

variable geometry swirl air vents

4





Correction table: radial adjustable NWZG exhaust from its own automatic thermostatically-operated unit.

Size	LWA acoustic power level increase (dB(A))	Pressure loss increase – ΔPt factor
DN 250	+1 do 5	1.4
DN 315	+1 do 3	1.3
DN 355	+1	1.15
DN 400	0	1.05
DN 500	0	1.0
DN 630	0	1.0
DN710	0	1.0

Correction table: air-supply distance during heating operation and acoustic power level with pressure loss on the exhaust from perforated discs above the curved blades.

Size	Connection type	Absolute height – H factor	LWA acoustic power level increase (dB(A))	Pressure loss increase – ΔPt factor
DN 400	RH	-	2	1.45
	RV	1.4	2	1.45
	KH	-	0	1.20
DN 500	RH	-	2	1.45
	RV	1.4	2	1.45
	KH	-	0	1.20
DN 630	RH	-	2	1.25
	RV	1.4	2	1.25
	KH	-	0	1.20
DN 710	RH	-	2	1.25
	RV	1.4	2	1.25
	KH	-	0	1.20

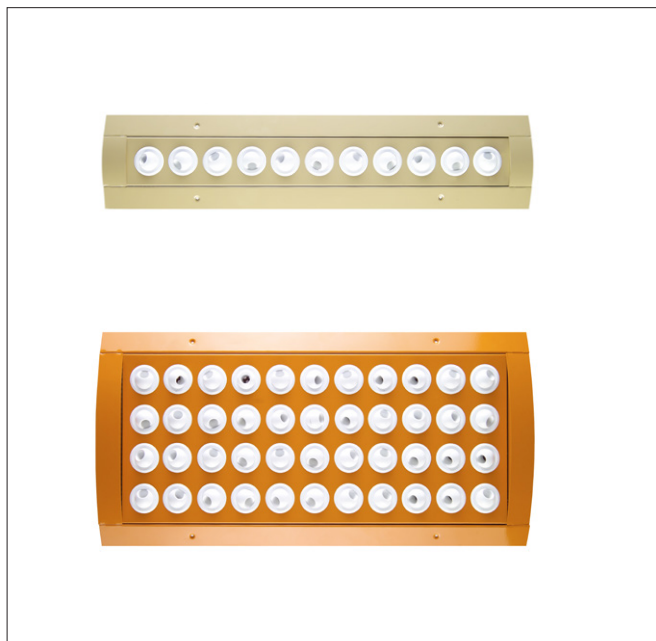
4.9 NWZG

variable geometry swirl air vents

4

VA air exhaust intensity		on connection duct	Total pressure loss ΔPt	Acoustic power level LW in dB									with a box	Total pressure loss Δpt											
				LWA	octave frequency band in Hz										LWA	octave frequency band in Hz									
l/s	m³/h		Pa	dB(A)	63	125	250	500	1 K	2 K	4 K	8 K		Pa	dB(A)	63	125	250	500	1 K	2 K	4 K	8 K		
DN 250																									
167	600	RH RV	30 22	38 35	36 30	40 38	38 36	37 33	32 29	27 27	17 25	- 10	KH KV	36 27	43 40	41 35	46 42	43 41	43 39	37 35	32 30	22 20	12 10		
278	1000	RH RV	82 61	54 51	52 44	55 49	53 48	52 47	49 45	45 45	41 42	34 30	KH KV	99 74	59 56	57 49	60 54	58 53	57 52	55 50	50 50	46 44	40 34		
389	1400	RH RV	160 120	65 61	62 52	64 56	62 55	60 56	60 55	57 56	75 53	51 42	KH KV	191 142	70 66	67 57	69 61	66 59	66 59	66 59	62 61	61 58	57 47		
DN 315																									
278	1000	RH RV	27 18	39 36	40 32	46 39	40 37	38 35	33 30	28 27	17 14	12 -	KH KV	34 23	44 41	45 37	51 44	45 42	43 40	38 36	33 31	22 17	13 -		
444	1600	RH RV	69 47	55 52	50 44	58 54	54 48	51 49	50 45	47 46	40 37	33 24	KH KV	86 60	60 57	56 49	63 58	59 53	57 54	55 51	52 51	45 41	37 28		
556	2200	RH RV	130 89	65 62	57 52	66 64	63 55	60 58	60 54	59 58	54 52	47 38	KH KV	160 116	70 67	62 56	71 67	67 60	65 63	66 60	64 63	60 57	52 42		
DN 355																									
278	1000	RH RV	17 12	30 28	42 38	38 35	30 29	29 27	23 21	18 18	16 12	- -	KH KV	22 16	35 33	46 42	43 39	35 33	34 32	30 27	21 20	19 11	10 -		
556	2000	RH RV	67 48	53 51	60 55	56 51	52 48	49 46	48 46	45 44	41 41	31 30	KH KV	86 63	58 56	64 60	61 56	55 53	54 52	53 52	50 49	45 43	39 34		
833	3000	RH RV	150 108	66 64	69 64	65 50	63 57	60 56	61 60	60 58	54 56	47 46	KH KV	190 139	71 69	73 68	70 65	66 62	65 61	66 64	66 63	60 61	55 51		
DN 400																									
556	2000	RH RV	43 30	48 46	51 48	50 48	48 45	46 44	44 41	39 39	30 29	19 17	KH KV	67 51	55 54	58 57	52 51	51 50	54 54	51 49	46 45	37 38	27 26		
833	3000	RH RV	97 69	61 59	62 58	60 57	57 56	56 55	56 54	55 52	48 48	39 38	KH KV	157 118	68 67	68 67	61 61	62 62	65 64	63 62	62 62	55 54	45 45		
1055	3800	RH RV	156 111	68 66	67 64	65 63	62 62	63 61	64 61	63 60	58 58	51 50	KH KV	256 192	75 75	74 73	66 67	67 68	70 70	69 68	70 71	65 63	56 56		
DN 500																									
833	3000	RH RV	40 30	52 50	57 58	54 50	50 48	51 48	47 46	44 43	37 36	26 22	KH KV	71 53	57 57	61 62	55 54	55 54	55 54	53 53	49 49	39 41	28 29		
1111	4000	RH RV	73 54	61 59	64 65	61 56	56 55	58 56	56 54	55 54	50 49	39 33	KH KV	125 94	66 66	67 69	61 61	61 61	62 62	63 62	60 59	51 53	42 45		
1389	5000	RH RV	116 85	68 66	69 70	65 60	61 59	63 60	63 60	63 62	59 59	48 41	KH KV	194 147	73 73	71 75	66 65	66 65	68 68	70 49	67 66	60 63	53 57		
DN 630																									
1111	4000	RH RV	36 23	48 46	56 57	49 50	45 45	45 44	43 42	40 37	31 29	26 22	KH KV	38 47	53 52	61 63	55 56	50 51	50 49	48 47	45 43	36 35	31 28		
1667	6000	RH RV	81 51	57 56	63 61	57 56	53 52	54 51	52 51	50 59	46 44	41 36	KH KV	105 86	62 62	68 68	63 62	59 58	59 57	57 57	55 55	51 50	49 42		
2222	8000	RH RV	144 91	64 63	67 64	63 60	59 56	60 56	58 58	57 57	56 55	52 45	KH KV	187 152	69 69	72 70	68 66	64 62	65 62	63 64	62 62	61 60	57 51		
DN710																									
1389	5000	RH RV	35 24	48 47	63 57	52 50	48 45	44 44	41 43	41 38	34 29	23 20	KH KV	43 35	53 53	68 63	57 56	53 51	49 50	46 48	46 43	39 34	28 25		
2083	7500	RH RV	86 53	58 56	68 64	61 57	57 53	53 52	51 52	52 49	47 45	39 34	KH KV	98 79	63 62	73 70	66 63	62 59	58 58	57 58	57 55	52 51	44 39		
2778	10000	RH RV	152 93	65 63	71 69	67 62	53 58	59 58	58 58	59 56	56 56	50 43	KH KV	176 140	70 69	76 74	72 68	68 64	64 64	63 64	64 62	61 62	55 49		

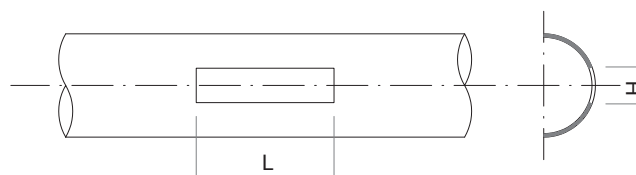
4.9.8



INSTALLATION

NK/DZ diffusers are designed for direct installation on the ventilation ducts. To install the diffuser, prepare an installation hole sized LxH for the chosen diffuser, slide the diffuser into the hole and fix it to the duct with steel bolts. Seal the connection between the duct and the diffuser.

Be careful when measuring the height of the diffuser in relation to the duct diameter. See the table with standard sizes.



DESCRIPTION

NK/DZ are air duct diffusers with long-throw nozzles designed for low- and medium-pressure installations directly in round ventilation ducts. Nozzles position can be adjusted to any direction so that shape of the air stream can be regulated. They can be used with constant and variable airflow. The air can be supplied at the temperature lower or higher than the temperature in the ventilated room.

FEATURES

- standard make includes one, two or three rows of long-throw nozzles
- adjustable angle for the outgoing air from nozzles
- possible simultaneous vertical and horizontal ventilation
- highly inductive
- nozzles are made of high-quality material, and painted standard white
- can be installed directly on the round ventilation ducts
- available in standard RAL 9003 colour
- upon customer's request, can be made in any size and any colour from RAL palette

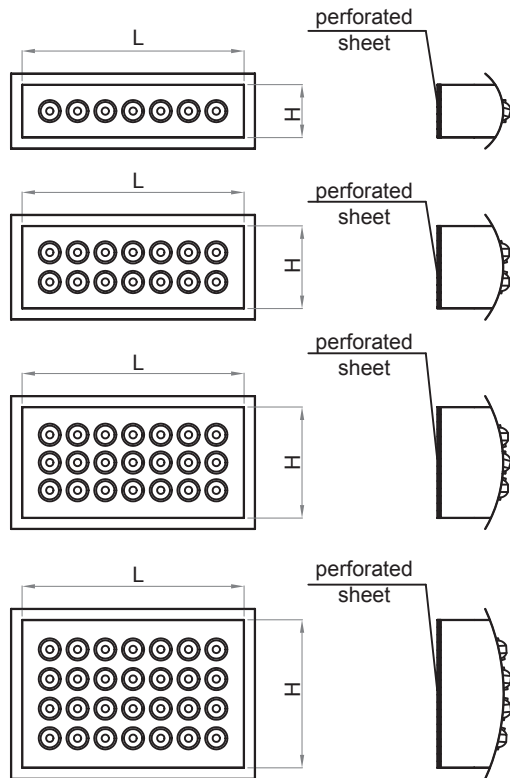
ORDER REFERENCE

NK / DZ - 525x160 / 2		-	RAL9003	
type	size	number of nozzles rows	colour	

5.1 NK/DZ

air duct diffusers with long-throw nozzles

DIFFUSERS NK/DZ



STANDARD SIZES

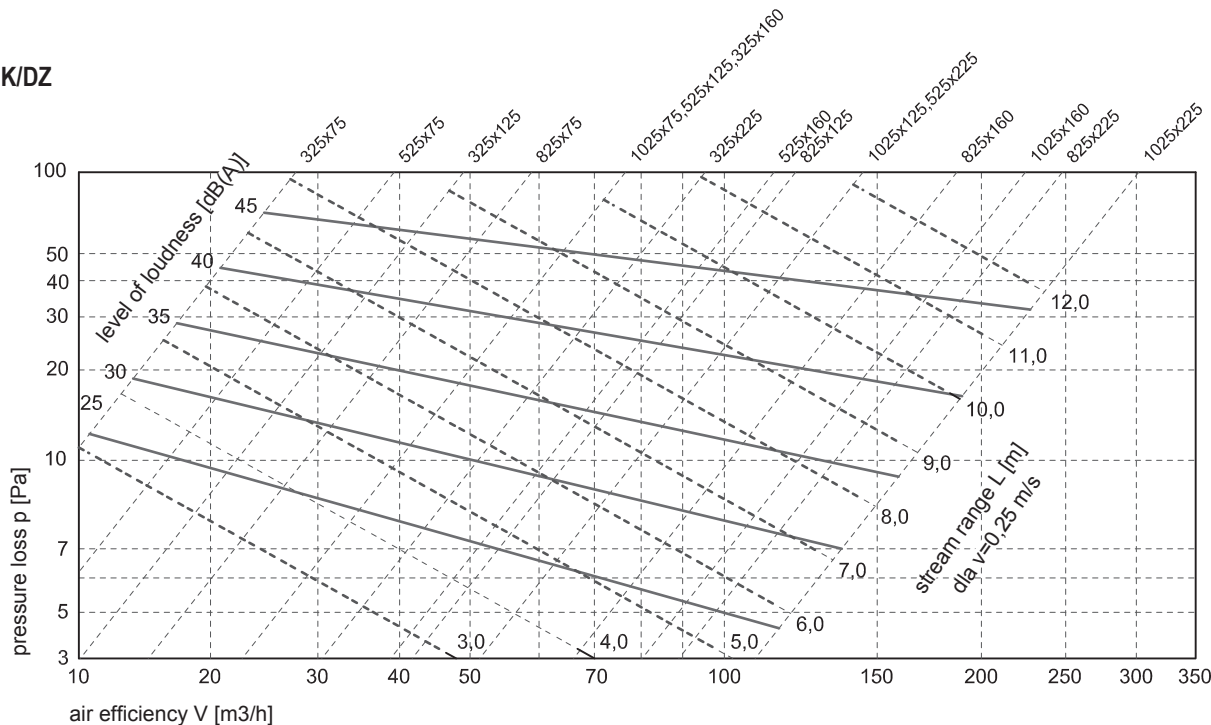
Size NK/DZ	Number of noz-zles rows	Number of nozzles	L [mm]	H [mm]	Air duct diameter [mm]
325x75	1	7	325	75	160-200-250
525x75	1	11	525	75	160-200-250
825x75	1	18	825	75	160-200-250
1025x75	1	22	1025	75	160-200-250
325x125	2	14	325	125	250-315-400
525x125	2	22	525	125	250-315-400
825x125	2	36	825	125	250-315-400
1025x125	2	44	1025	125	250-315-400
325x160	3	21	325	160	400-500-630
525x160	3	33	525	160	400-500-630
825x160	3	54	825	160	400-500-630
1025x160	3	66	1025	160	400-500-630
325x225	4	28	325	225	630-800-1000
525x225	4	44	525	225	630-800-1000
825x225	4	72	825	225	630-800-1000
1025x225	4	88	1025	225	630-800-1000

L - installation hole length
H - installation hole height

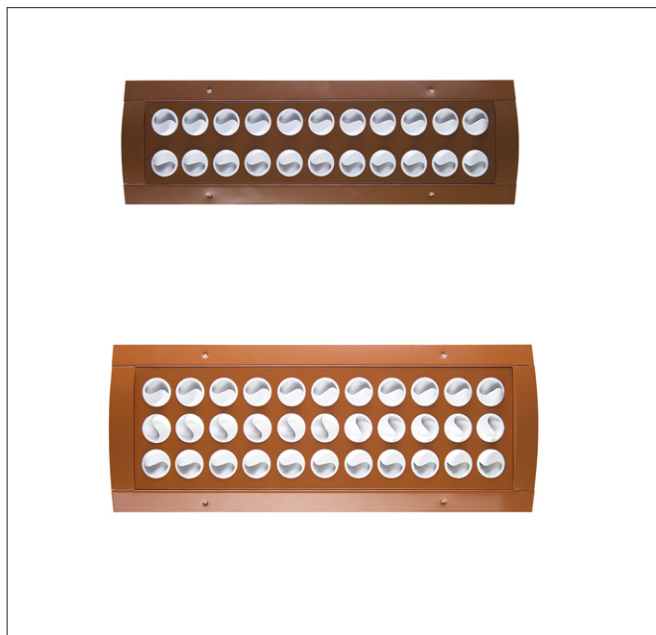
FEATURES

The figure shows airflow capacity V (m³/h), pressure loss p (Pa), airflow scope L (m) for end speed of 0.25 m/s, and volume level [db(A)]. The airflow scope L relates to isothermal air supply.

DIFFUSERS NK/DZ



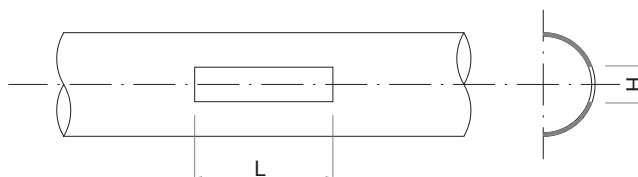
5.1.2



INSTALLATION

NK/RD and NK/RDM diffusers are designed for direct installation on the ventilation ducts. To install the diffuser, prepare an installation hole sized LxH for the chosen diffuser, slide the diffuser into the hole and fix it to the duct with steel bolts. Seal the connection between the duct and the diffuser.

Be careful when choosing the height of the diffuser in relation to the duct diameter. See the table with standard sizes.



ORDER REFERENCE

NK / RD - 525x160 / 2		RAL9003
type	size	colour
		number of nozzles rows
		RD nozzles of 57 mm diameter
		RDM nozzles of 35 mm diameter

DESCRIPTION

NK/RD and NK/RDM are air duct diffusers with adjustable round nozzles designed for low- and medium-pressure installations directly in round ventilation ducts. Nozzles of diameter sizes 57 (RD) and 35 (RDM) are ended with sinusoidal outlets that allows for high air diffusion. Nozzles position can be adjusted to any direction so that shape of the air stream can be regulated. They can be used with constant and variable airflow. The air can be supplied at the temperature lower or higher than the temperature in the ventilated room.

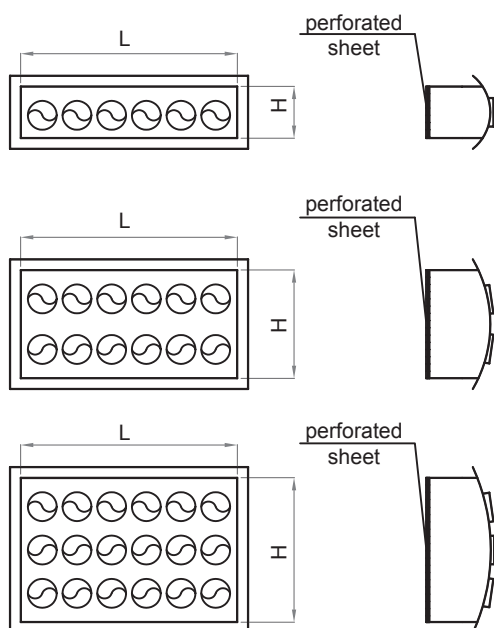
FEATURES

- standard make includes one, two or three rows of nozzles
- adjustable airflow stream shape (360°)
- easy dispersion of vertical stream
- possible to swirl the stream
- possible simultaneous vertical and horizontal ventilation
- high induction factor
- nozzles are made of high-quality ABS material, and painted standard white
- all diffusers use nozzles of 35mm (RDM) and 57 mm (RD) diameter; single nozzle capacity of 6 and 9 m³/h with acoustic pressure of 30 dB (A)
- can be installed directly on the ventilation ducts
- available in standard RAL 9003 colour
- upon customer's request, can be made available in any size and colour from RAL palette

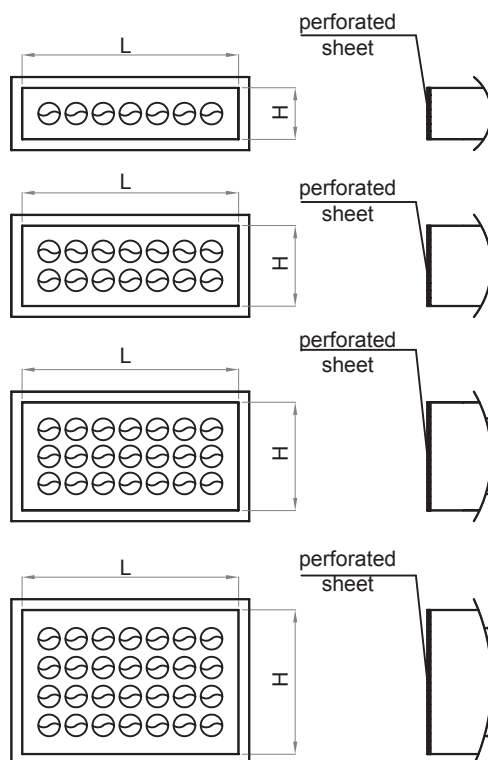
5.2 NK/RD(M)

air duct diffusers with adjustable nozzles

DIFFUSERS NK/RD



DIFFUSERS NK/RDM



STANDARD SIZES

Size NK/RD	Number of nozzles rows	Number of nozzles	L [mm]	H [mm]	Air duct diameter [mm]
325x75	1	4	325	75	160-200-250
525x75	1	7	525	75	160-200-250
825x75	1	12	825	75	160-200-250
1025x75	1	15	1025	75	160-200-250
325x160	2	8	325	160	400-500-630
525x160	2	14	525	160	400-500-630
825x160	2	24	825	160	400-500-630
1025x160	2	30	1025	160	400-500-630
325x225	3	12	325	225	630-800-1000
525x225	3	21	525	225	630-800-1000
825x225	3	36	825	225	630-800-1000
1025x225	3	45	1025	225	630-800-1000

L - installation hole length
H - installation hole height

STANDARD SIZES

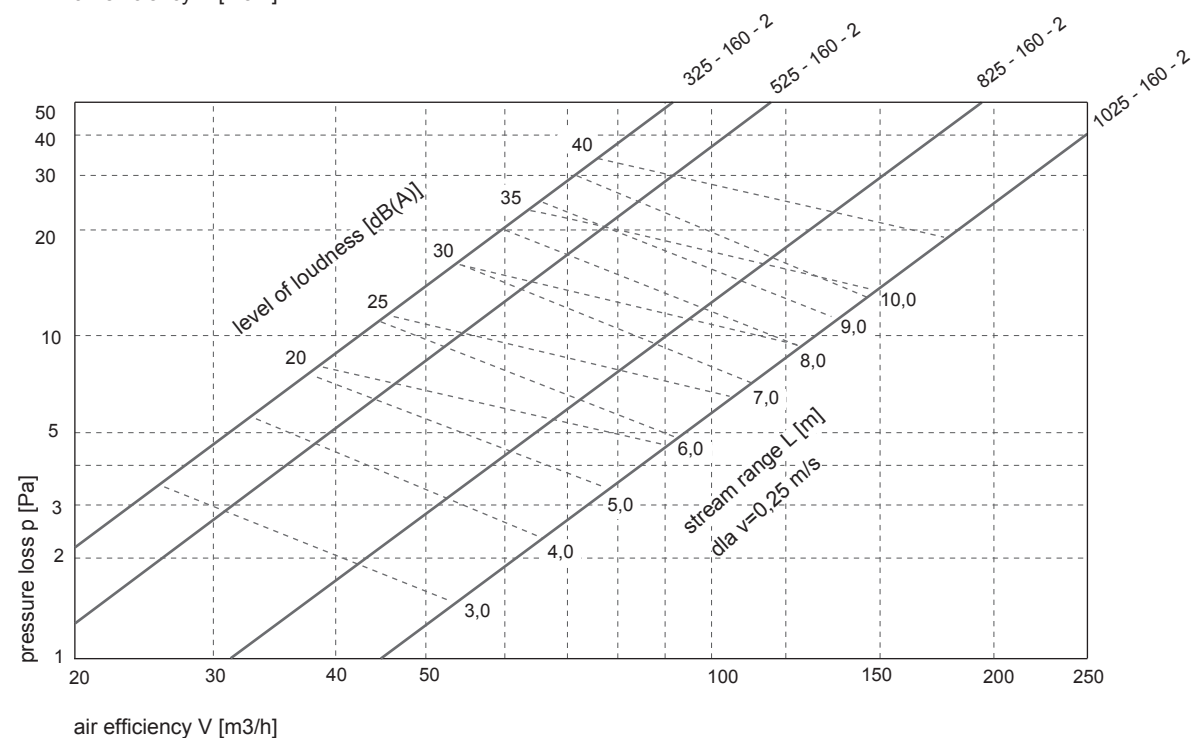
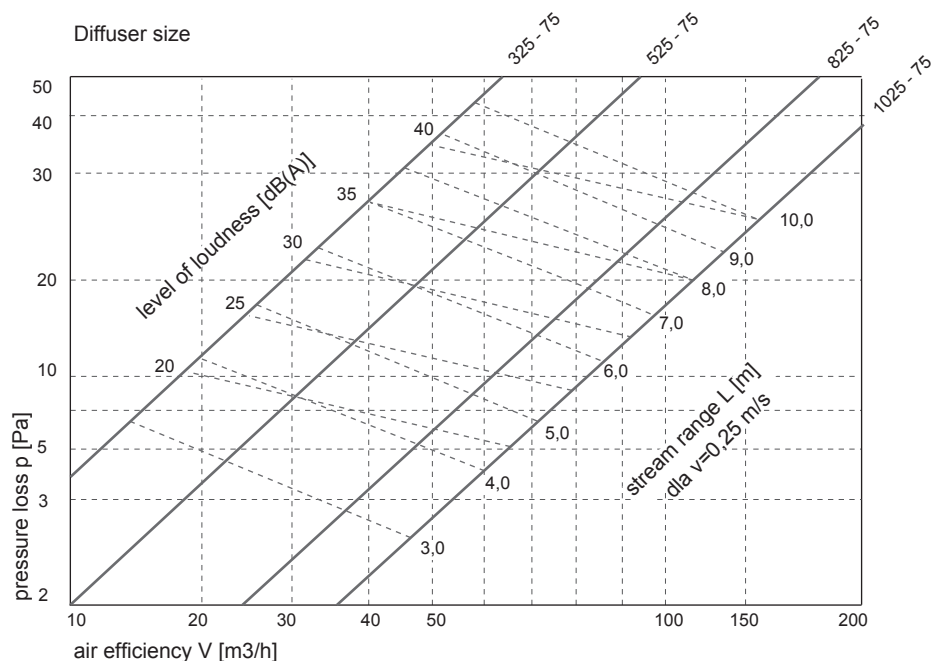
Size NK/RDM	Number of nozzles rows	Number of nozzles	L [mm]	H [mm]	Air duct diameter [mm]
325x75	1	7	325	75	160-200-250
525x75	1	11	525	75	160-200-250
825x75	1	18	825	75	160-200-250
1025x75	1	22	1025	75	160-200-250
325x125	2	14	325	125	250-315-400
525x125	2	22	525	125	250-315-400
825x125	2	36	825	125	250-315-400
1025x125	2	44	1025	125	250-315-400
325x160	3	21	325	160	400-500-630
525x160	3	33	525	160	400-500-630
825x160	3	54	825	160	400-500-630
1025x160	3	66	1025	160	400-500-630
325x225	4	28	325	225	630-800-1000
525x225	4	44	525	225	630-800-1000
825x225	4	72	825	225	630-800-1000
1025x225	4	88	1025	225	630-800-1000

L - installation hole length
H - installation hole height

FEATURES

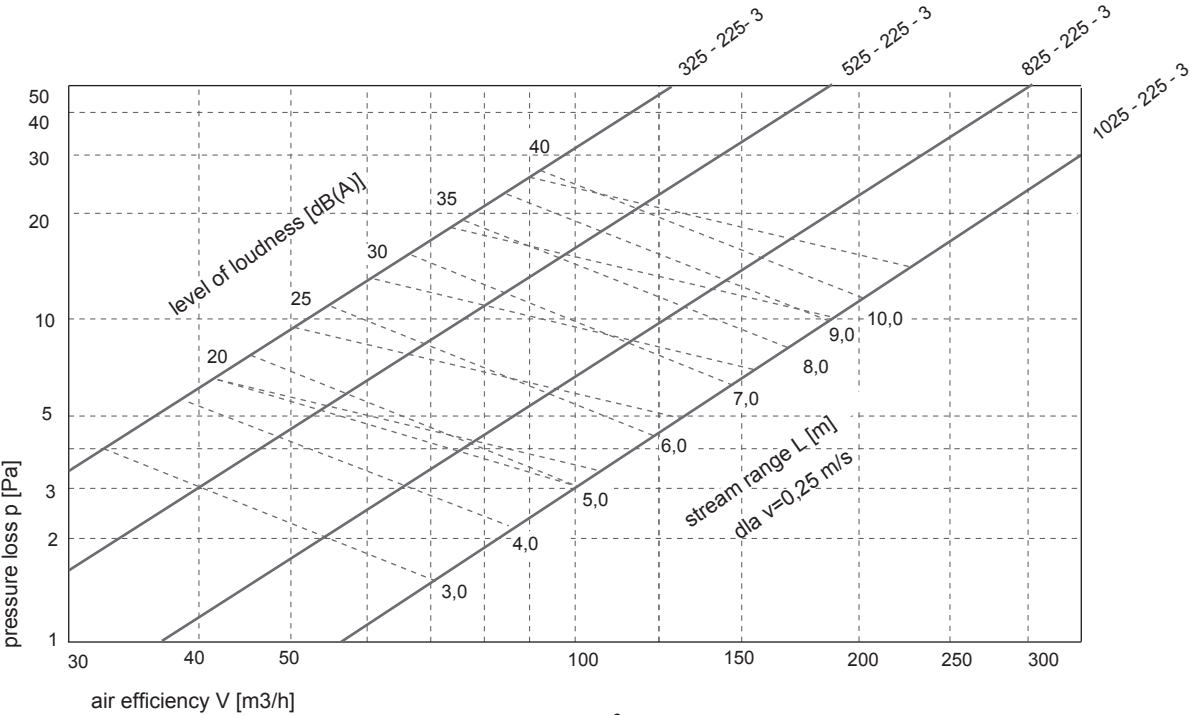
The figure shows airflow capacity V (m³/h), pressure loss p (Pa), air-flow scope L (m) for end speed of 0.25 m/s, and volume level [db(A)]. The airflow scope L relates to isothermal air supply.

DIFFUSERS NK/RD

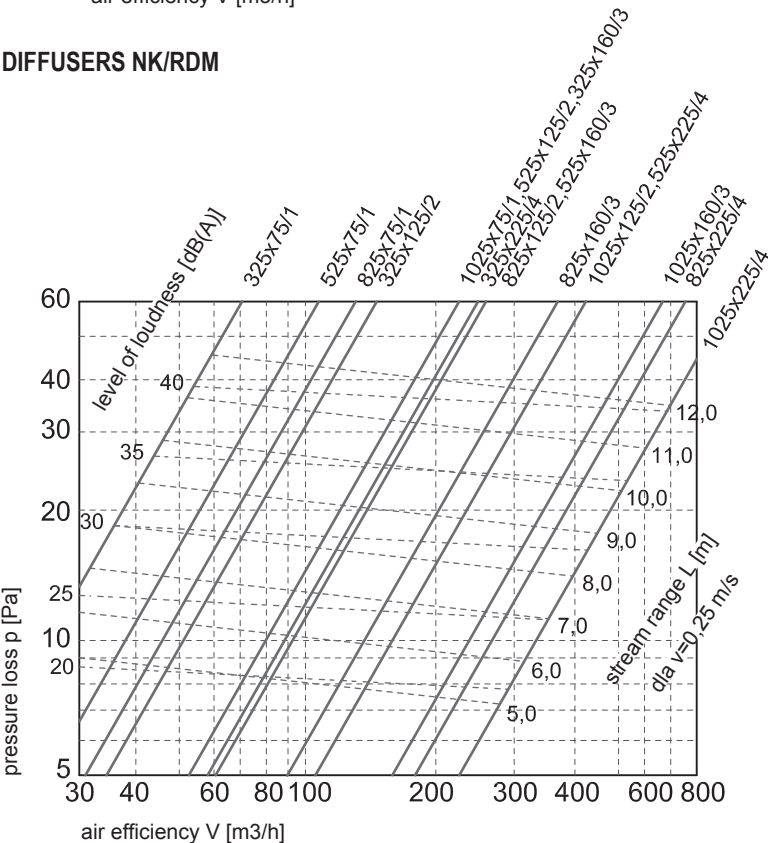


5.2 NK/RD(M)

air duct diffusers with adjustable nozzles



DIFFUSERS NK/RDM





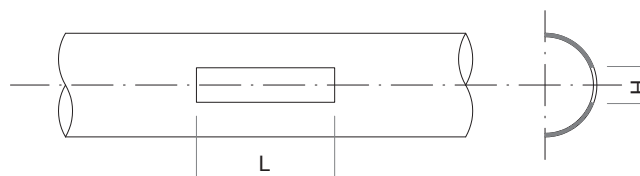
ORDER REFERENCE

NK / SDs - 525x75 / 1	RAL9003
type	colour
size (LxH)	number of nozzles rows

INSTALLATION

NK/RD and NK/RDM diffusers are designed for direct installation on the ventilation ducts. To install the diffuser, prepare an installation hole sized LxH for the chosen diffuser, slide the diffuser into the hole and fix it to the duct with steel bolts. Seal the connection between the duct and the diffuser.

Be careful when choosing the height of the diffuser in relation to the duct diameter. See the table with standard sizes.



DESCRIPTION

NK/SDs are air duct diffusers with cone-shaped nozzles designed for installation in round spiro channels in low- and medium-pressure installations. These diffusers were designed to keep construction places free from steaming: windows, walls etc. Due to stable air flow shape, these diffusers can work with constant or variable airflow. Standard make includes one (1), two (2) or three (3) rows of nozzles.

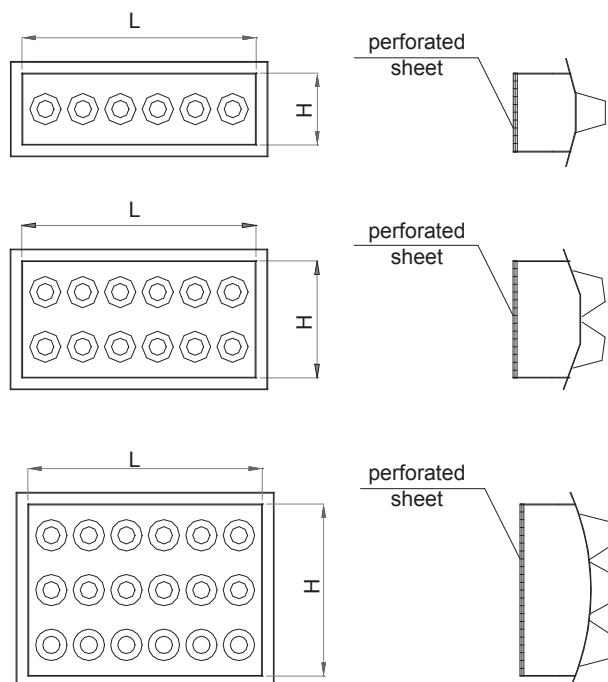
FEATURES

- standard make includes one, two or three rows of nozzles made of zinc-coated sheet
- possible to install individual diffusers in a row
- nozzles made with a high quality ABS materials
- available in standard RAL 9006 colour
- upon customer's request, can be made available in any size and colour from RAL palette

5.3 NK/SDs

air duct diffusers with cone-shaped nozzles for spiro pipes

DIFFUSERS NK/SDS



STANDARD SIZES

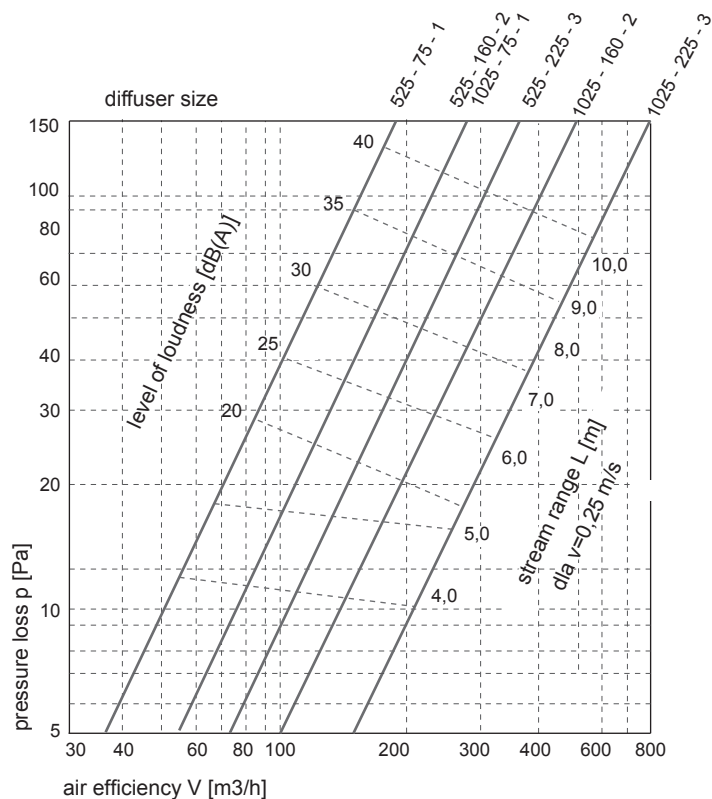
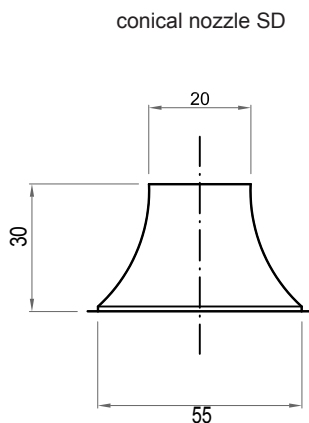
Size NK/SDs	Number of nozzles rows	L [mm]	H [mm]	Air duct diameter [mm]
525x75/1	1	525	75	160-200-250
1025x75/1	1	1025	75	160-200-250
525x160/2	2	525	160	400-500-630
1025x160/2	2	1025	160	400-500-630
525x225/3	3	525	225	630-800-1000
1025x225/3	3	1025	225	630-800-1000

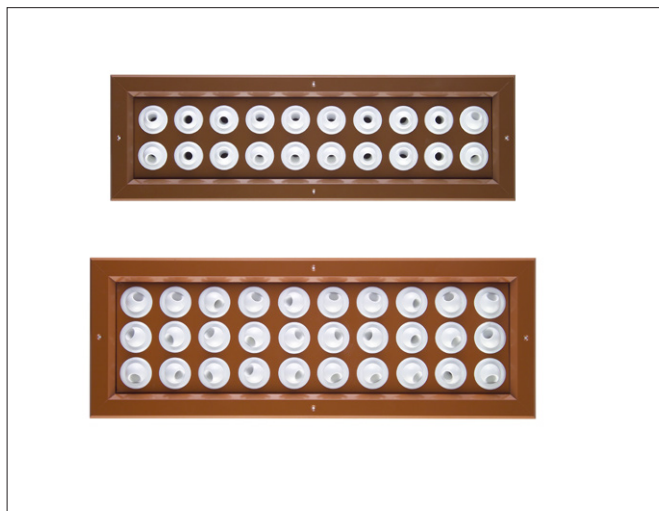
L - installation hole length
H - installation hole height

FEATURES

The figure shows airflow capacity V (m³/h), pressure loss p (Pa), airflow scope L (m) for end speed of 0.25 m/s, and volume level [dB(A)].

The airflow scope L relates to isothermal air supply.





DESCRIPTION

NSC/DZ are round rectangular diffusers with adjustable long-throw nozzles designed for low- and medium-pressure installations. They can be used with constant and variable airflow. The air can be supplied at the temperature lower or higher than the temperature in the ventilated room. Nozzles position can be adjusted to any direction so that shape of the air stream can be regulated. Possible simultaneous vertical and horizontal ventilation. Recommended installation in the wall.

FEATURES

- standard make includes three rows of long-throw nozzles and a decorative frame
- nozzles can be set up to ventilate air in any direction
- easy dispersion of vertical stream
- possible simultaneous vertical and horizontal ventilation
- high induction factor
- can be installed with the expansion box SR/NSC
- nozzles are made of high-quality material, and painted standard white
- available in standard RAL 9003 colour
- upon customer's request, can be made available in any size and colour from RAL palette

INSTALLATION

NSC/DZ can be installed directly in the wall, individually or with the expansion box SR/NSC.

To install the diffuser, prepare an installation hole of a size for the chosen diffuser, and slide the ventilation duct ended with curved sheet. Put diffuser into the hole and fix it to the wall with appropriate screws. Seal the connection between the duct and the diffuser.

For installation with the expansion box, see: SR/NSC.

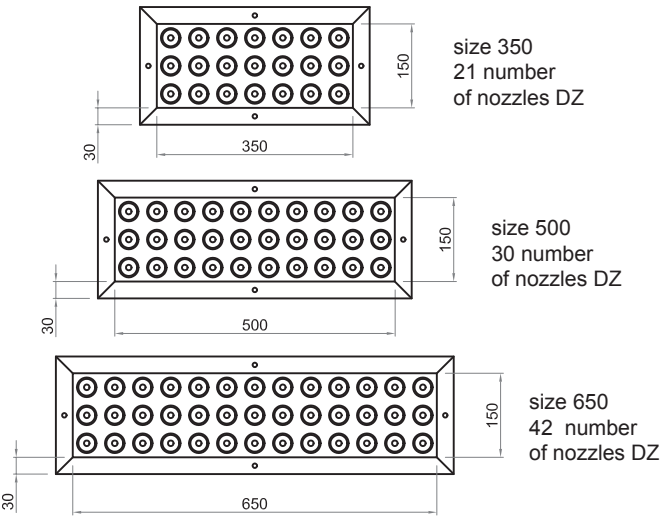
ORDER REFERENCE

NSC / DZ - 650 / 42	RAL9003
type	colour
diffuser size	number of nozzles

6.1 NSC/DZ

wall diffusers with long-throw nozzles

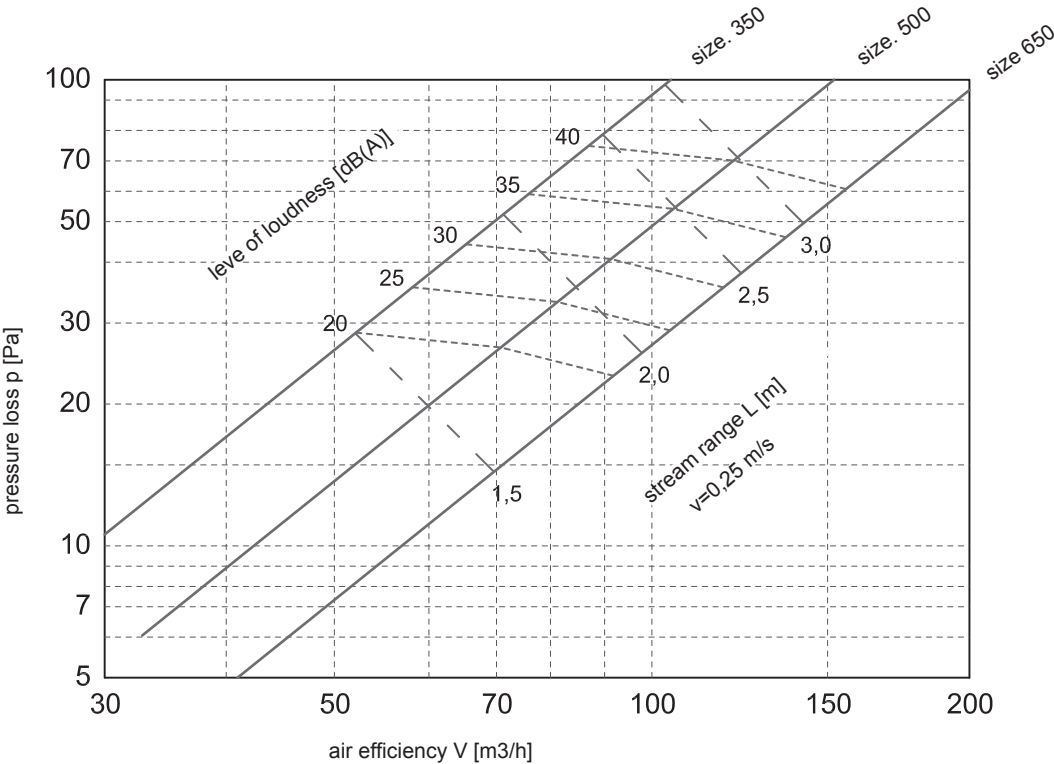
DIFFUSERS NSC/DZ

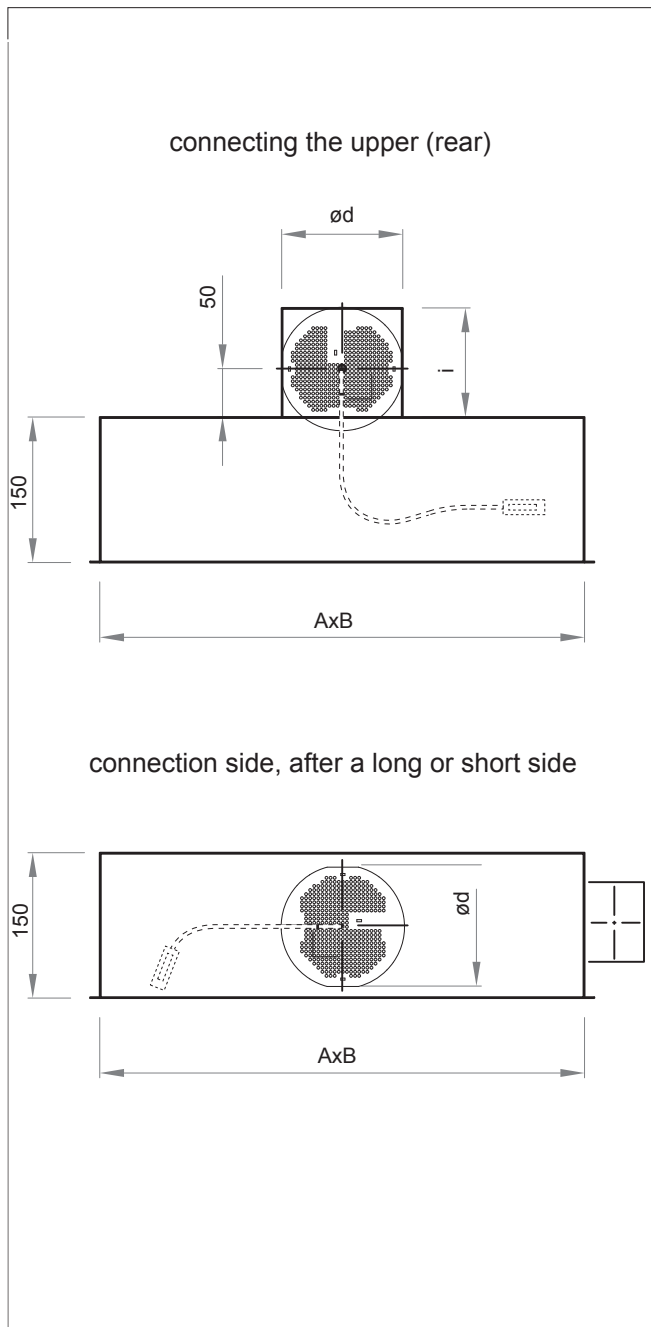


FEATURES

The figure shows airflow capacity V (m^3/h), pressure loss p (Pa), air-flow scope L (m) for end speed of 0.20 m/s, and volume level [dB(A)].

The airflow scope L relates to isothermal air supply.





Expansion boxes can be connected to the ventilation installation through the side or top.

Boxes can be thermally and acoustically insulated from the inside by K-Flex rubber mat.

Upon customer's request we can make other types of expansion boxes accordingly to provided drawings.

ORDER REFERENCE

SR / NSC - 350 - P - I - g

diffuser type

size

P no throttle
perforated damper
with adjusting rod

I non-insulated
insulated

g top connection
b side connection

STANDARD SIZES

	350	500	650
A [mm]	350	500	650
B [mm]	150	150	150
Ød [mm]	98	123	123
i [mm]	100	115	115

DESCRIPTION

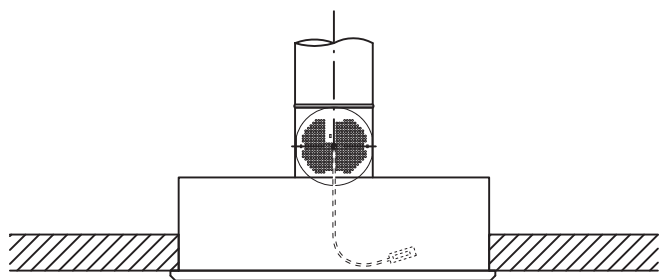
SR/NSC are expansion boxes for diffusers NSC/RD and NSC/RDM. They stabilize the airflow and ensure uniform air supply to the diffuser. Expansion boxes connect diffusers with ventilation installation. They are made of zinc-coated sheet, joint by non-welded Click-Clock connection. In standard expansion boxes are equipped on the ferrule with machine crimped rubber gasket.

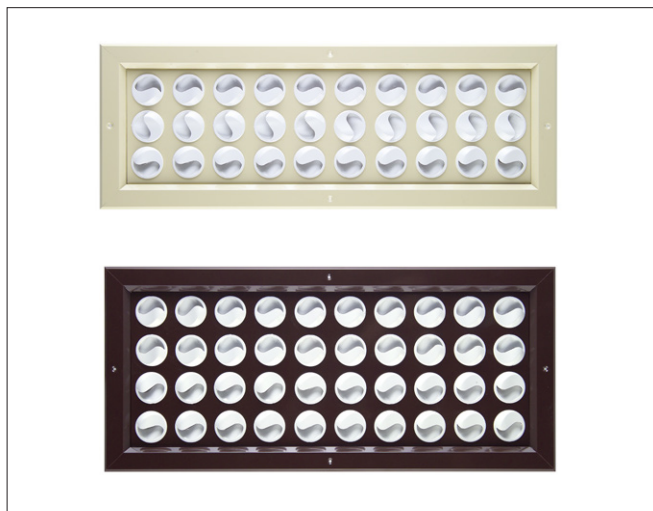
6.1 SR/NSC/DZ

extensions boxes for diffusers NSC/DZ

INSTALLATION

Expansion boxes SR/NSC are designed for installation in the wall. Prepare an installation hole of a size of AxB for the chosen diffuser. Slide to box in and fix it to the wall by screws. Slide the front panel of the diffuser onto the box and fix it to the wall with screws through installation holes. Remember to seal connection between the diffuser and the box.





DESCRIPTION

NSC/RD and NSC/RDM are air rectangular diffusers with adjustable round nozzles designed for low- and medium-pressure installations directly in round ventilation ducts. Nozzles of diameter sizes 57 (RD) and 35 (RDM) are ended with sinusoidal outlets that allows for high air diffusion. Nozzles position can be adjusted to any direction so that shape of the air stream can be regulated. They can be used with constant and variable airflow. The air can be supplied at the temperature lower or higher than the temperature in the ventilated room. Recommended installation in the wall.

FEATURES

- standard make includes two rows of nozzles, or three rows of nozzles and a decorative frame
- adjustable airflow stream shape (360°)
- easy dispersion of vertical stream
- possible to swirl the stream
- possible simultaneous vertical and horizontal ventilation
- high induction factor
- can be installed with the expansion box SR/NSC
- nozzles are made of high-quality ABS material, and painted standard white
- all diffusers use nozzles of 35mm (RDM) and 57 mm (RD) diameter; single nozzle capacity of 6 and 9 m³/h with acoustic pressure of 30 dB (A)
- available in standard RAL 9003 colour
- upon customer's request, can be made available in any size and colour from RAL palette

INSTALLATION

NSC/RD and NSC/RDM can be installed directly in the wall, individually or with the expansion box SR/NSC. To install the diffuser in the wall, prepare an installation hole of a size for the chosen diffuser, and slide the ventilation duct ended with curved sheet. Put diffuser into the hole and fix it to the wall with appropriate screws. Seal the connection between the duct and the diffuser.

For installation with the expansion box, see: SR/NSC.

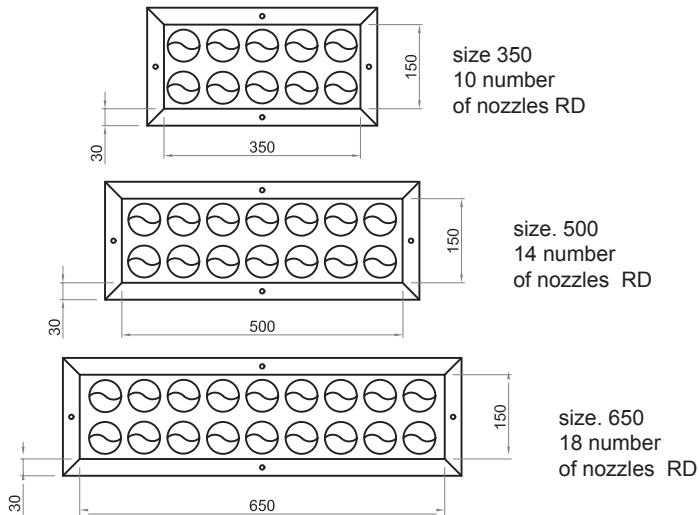
ORDER REFERENCE

NSC / RD - 650 / 18	RAL9003
typ	colour
RD	nozzles of 57 mm diameter
RDM	nozzles of 35 mm diameter
	diffuser size
	number of nozzles

6.2 NSC/RD, NSC/RDM

wall diffusers with adjustable nozzles

DIFFUSERS NSC/RD

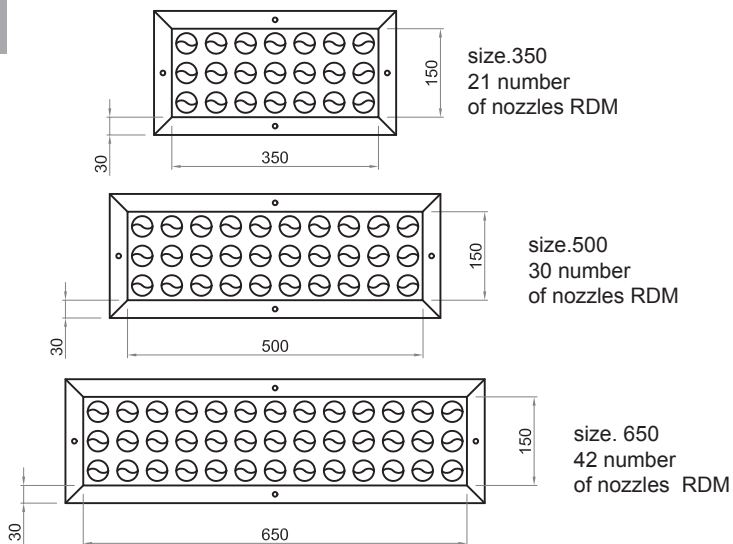


FEATURES

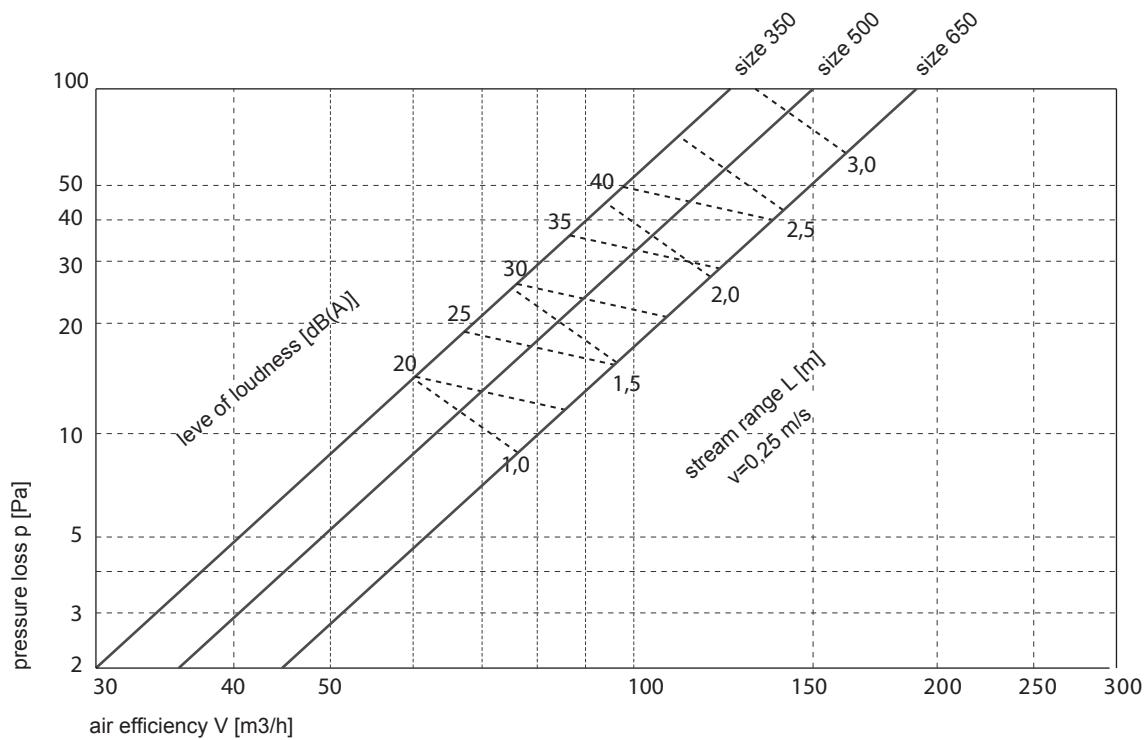
The figure shows airflow capacity V (m³/h), pressure loss p (Pa), airflow scope L (m) for end speed of 0.25 m/s, and volume level [db(A)].

The airflow scope L relates to isothermal air supply. .

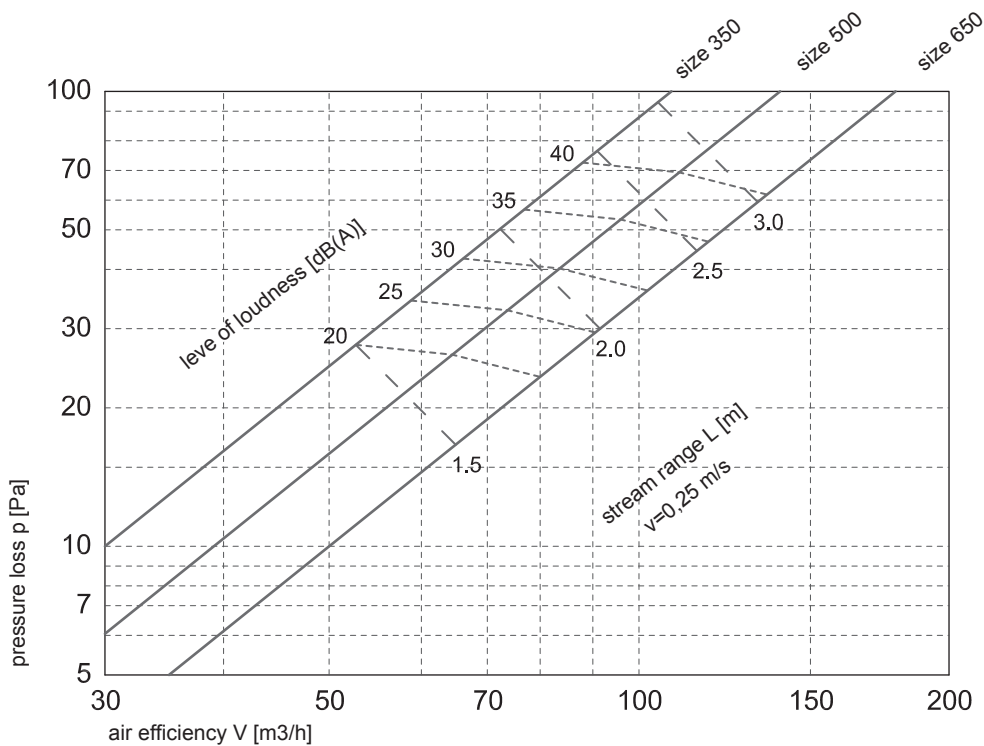
DIFFUSERS NSC/RDM



FEATURES NSC/RD

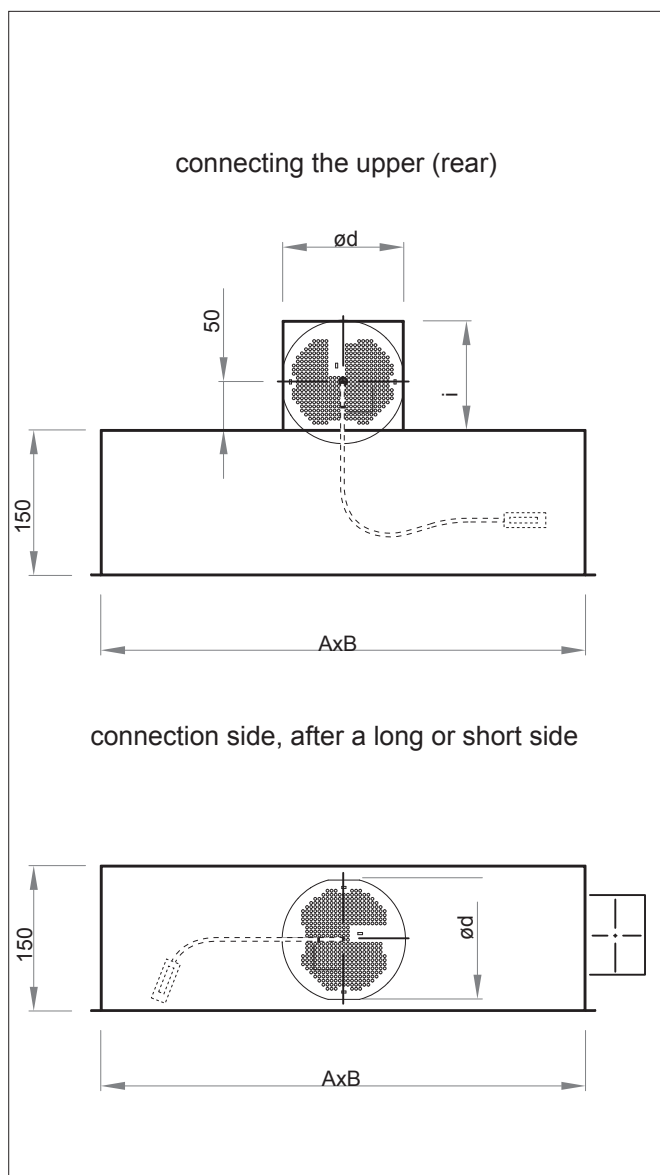


FEATURES NSC/RDM



6.2 SR/NSC/RD i NSC/RDM

expansion boxes for diffusers NSC/RD i NSC/RDM



ORDER REFERENCE

SR / NSC - 350 - P - I - g

SR / NSC - diffuser type
 350 - size
 P - no throttle
 P - perforated damper with adjusting rod
 I - insulated
 - non-insulated
 g - top connection
 b - side connection

STANDARD SIZES

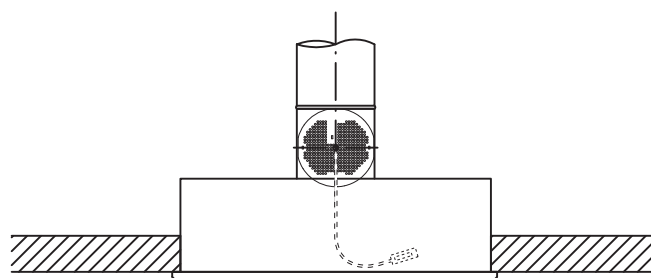
	350	500	650
A [mm]	350	500	650
B [mm]	150	150	150
Ød [mm]	98	123	123
i [mm]	100	115	115

INSTALLATION

Expansion boxes SR/NSC are designed for installation in the wall. Prepare an installation hole of a size of AxB for the chosen diffuser. Slide to box in and fix it to the wall by screws. Slide the front panel of the diffuser onto the box and fix it to the wall with screws through installation holes. Remember to seal connection between the diffuser and the box.

DESCRIPTION

SR/NSC are expansion boxes for diffusers NSC/RD and NSC/RDM. They stabilize the airflow and ensure uniform air supply to the diffuser. Expansion boxes connect diffusers with ventilation installation. They are made of zinc-coated sheet, joint by non-welded Click-Clock connection. Expansion boxes can be connected to the ventilation installation through the side or top. Boxes can be thermally and acoustically insulated from the inside by K-Flex rubber mat. Upon customer's request we can make other types of expansion boxes accordingly to provided drawings. In standard expansion boxes are equipped on the ferrule with machine crimped rubber gasket.





DESCRIPTION

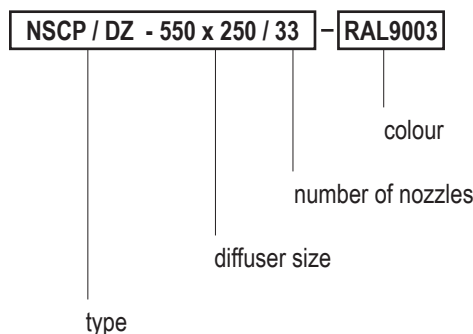
NSCP/DZ are two-part rectangular diffusers designed for low- and medium-pressure installations. One part comprises the perforated panel and the other - adjustable long-throw nozzles. Such set up allows for high induction of the airflow.

Possible simultaneous vertical and horizontal ventilation. NSCP/DZ can be used for ventilating cool or warm air, however the maximum difference of temperature for the cool air should be 12°C. diffusers can be used with constant and variable airflow. Recommended installation in the wall.

FEATURES

- standard make includes two, three or four rows of long-throw nozzles DZ a decorative frame
- nozzles can be set up to ventilate air in any direction
- easy dispersion of vertical stream
- possible simultaneous vertical and horizontal ventilation
- high induction factor
- can be installed with the expansion box SR/NSCP
- nozzles are made of high-quality material, and painted standard white
- available in standard RAL 9003 colour
- upon customer's request, can be made available in any size and colour from RAL palette

ORDER REFERENCE



INSTALLATION

To install the diffuser, prepare an installation hole of a size for the chosen diffuser in the wall, and slide the SR/NSCP expansion box. Put the front panel of the diffuser into the box and fix it to the sides with appropriate screws. Push the diffuser with the expansion box into the wall and fix it to the wall with screws through the installation holes.

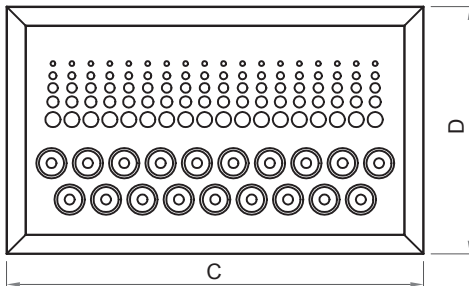
Instead of the expansion box, the diffuser can be installed directly into the end of rectangular ventilation duct. In this case, ensure that size of the ventilation duct matches the size of the expansion box.

6.3 NSCP/DZ

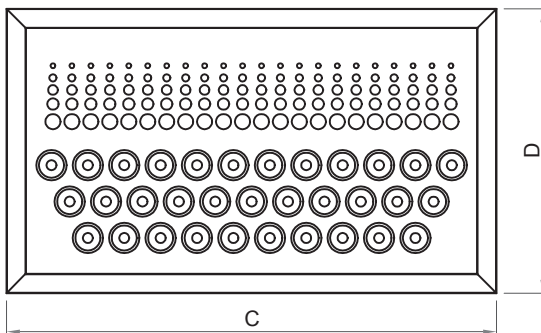
wall perforated diffusers with long-throw nozzles

DIFFUSERS NSCP/DZ

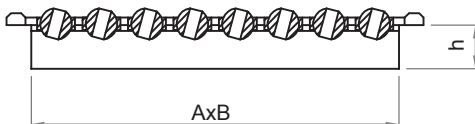
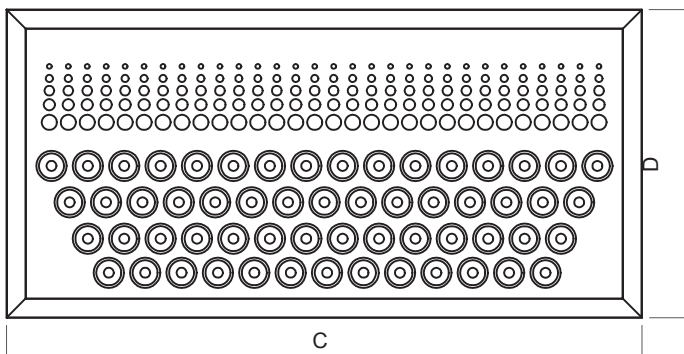
TWO ROWS



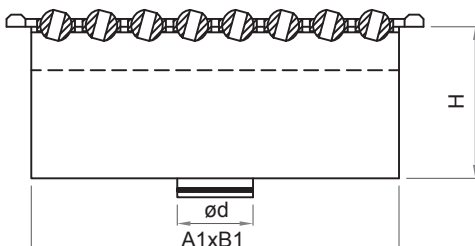
THREE ROWS



FOUR ROWS



DIFFUSER NSCP/DZ
WITH EXPANSION BOX SR/NSCP



STANDARDS SIZES

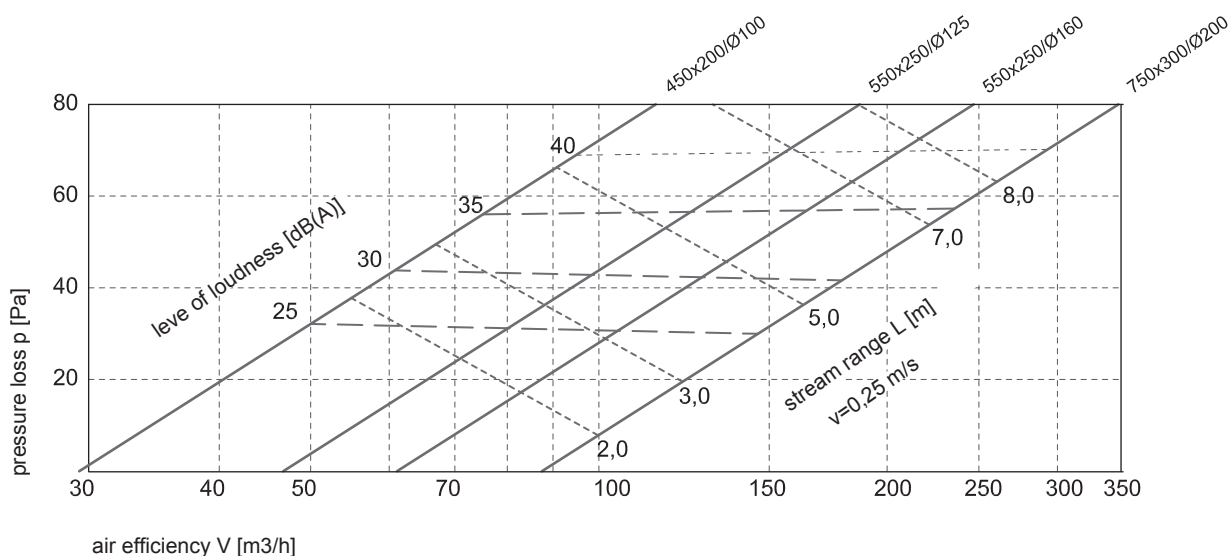
Diffuser NSCP/DZ	450x200/19	550x250/33	750x300/58
A [mm]	450	550	750
B [mm]	200	250	300
C [mm]	500	600	800
D [mm]	250	300	350
h [mm]	50	50	50
Number of nozzles	19	33	58
Number of nozzles rows	2	3	4
Installation hole	a [mm]	455	555
	b [mm]	205	255

FEATURES

The figure shows airflow capacity V (m³/h), pressure loss p (Pa), air-flow scope L (m) for end speed of 0.25 m/s, and volume level [db(A)].

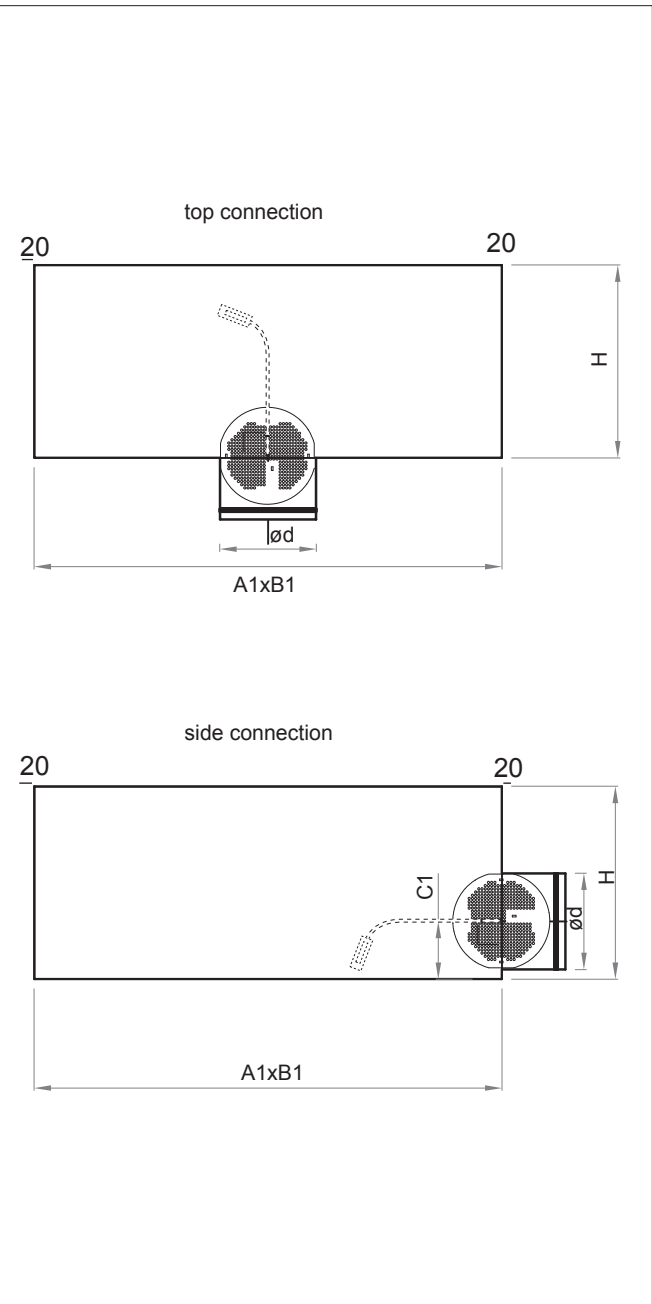
The airflow scope L relates to isothermal air supply.

DIFFUSERS NSCP/DZ WITH THE EXPANSION BOX SR/NSCP



6.3 SR/NSCP/DZ

expansion boxes for diffusers NSCP/DZ



Expansion boxes can be connected to the ventilation installation through the side or top.

Boxes can be thermally and acoustically insulated from the inside by K-Flex rubber mat.

Upon customer's request we can make other types of expansion boxes accordingly to provided drawings

ORDER REFERENCE

SR / NSCP- 200 - P - I - g				
diffuser type	size	no throttle P perforated damper with adjusting rod	_ non-insulated I insulated	b side connection g top connection

STANDARD SIZES

SR/NSCP	100	125	160	200
for NSCP/DZ	450x200	550x250	550x250	750x300
A1 [mm]	450	550	550	750
B1 [mm]	200	250	250	300
C1 [mm]	80	100	130	150
H [mm] top	225	250	285	325
H [mm] side	300	325	360	400
Ød [mm]	98	123	158	198

DESCRIPTION

SR/NSC are expansion boxes for NSCP/DZ diffusers. They stabilize the airflow and ensure uniform air supply to the diffuser. Expansion boxes connect diffusers with ventilation installation. They are made of zinc-coated sheet, joint by non-welded Click-Clock connection. In standard expansion boxes are equipped on the ferrule with machine crimped rubber gasket.



ORDER REFERENCE

NSCP / RDM - 550 x 250 / 33	RAL9003
type	colour
diffuser size	number of nozzles

DESCRIPTION

NSCP/RDM are two-part rectangular diffusers designed for low- and medium-pressure installations. One part comprises the perforated panel and the other - adjustable long-throw round nozzles with diameter of 35 mm. Such set up allows for high induction of the airflow. NSCP/RDM can be used for ventilating cool or warm air, however the maximum difference of temperature for the cool air should be 12°C. Sinusoidal RDM nozzles allow for 360° turn which gives unlimited airflow supply. diffusers can be used with constant and variable airflow. Recommended installation in the wall. NSCP/RDM can be also used to exhaust air.

INSTALLATION

To install the diffuser, prepare an installation hole of a size for the chosen diffuser in the wall, and slide the SR/NSCP expansion box so that the edges stick out by approx. 50 mm beyond the wall. Put the front panel of the diffuser into the box and fix it to the sides with appropriate screws. Push the diffuser with the expansion box into the wall and fix it to the wall with screws through the installation holes. Instead of the expansion box, the diffuser can be installed directly into the end of rectangular ventilation duct. In this case, ensure that size of the ventilation duct matches the size of the expansion box.

FEATURES

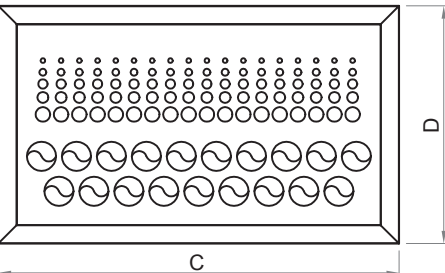
- standard make includes two, three or four rows of long-throw nozzles DZ a decorative frame
- adjustable airflow stream shape (360°)
- easy dispersion of vertical stream
- possible to swirl the stream
- possible simultaneous vertical and horizontal ventilation
- high induction factor
- can be installed with the expansion box SR/NSCP
- nozzles are made of high-quality material, and painted standard white
- all diffusers use nozzles of 35mm (RDM) and 57 mm (RD) diameter; single nozzle capacity of 6 m³/h with acoustic pressure of 30 dB (A)
- available in standard RAL 9003 colour
- upon customer's request, can be made available in any size and colour from RAL palette

6.4 NSCP/RDM

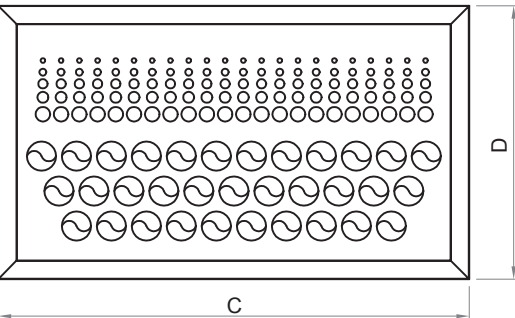
square perforated wall diffusers with adjustable nozzles

DIFFUSERS NSCP/RDM

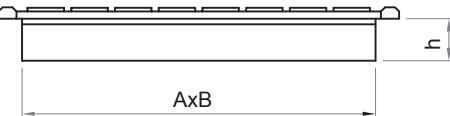
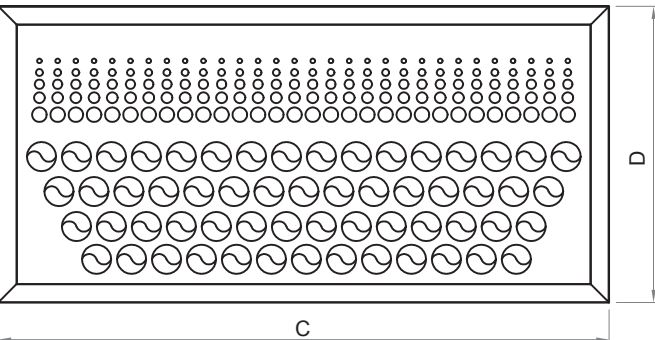
TWO ROWS



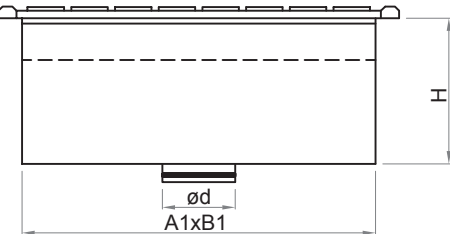
THREE ROWS



FOUR ROWS



DIFFUSER NSCP/RDM
WITH EXPANSION BOX SR/NSCP



STANDARD SIZES

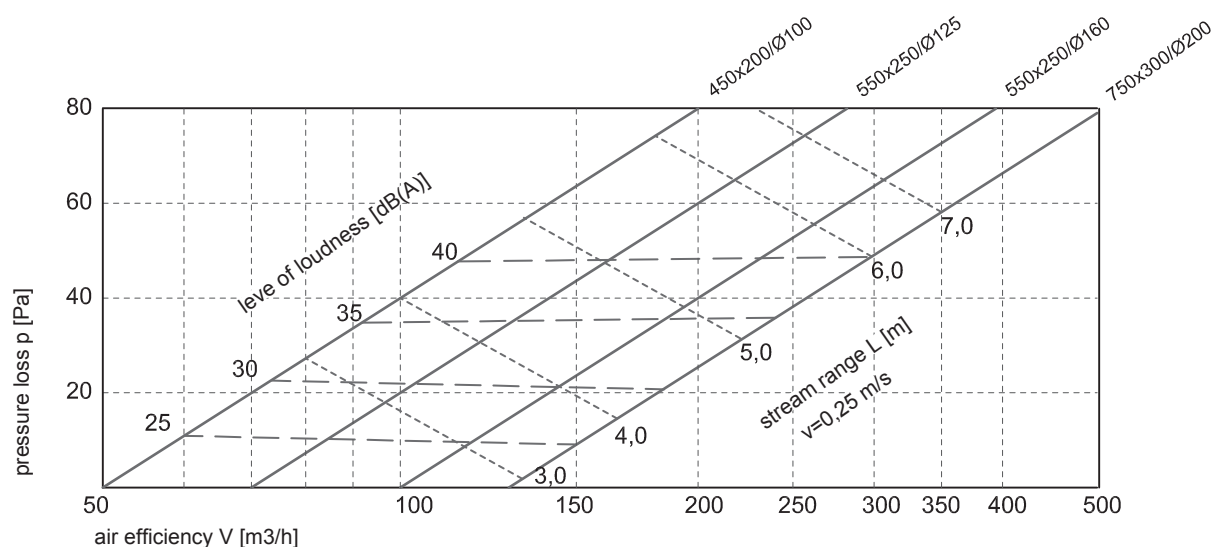
A [mm]		450	550	750
B [mm]		200	250	300
C [mm]		500	600	800
D [mm]		250	300	350
h [mm]		50	50	50
Number of nozzles		19	33	58
Number of nozzles rows		2	3	4
Installation hole	a [mm]	455	555	755
	b [mm]	205	255	305

FEATURES

The figure shows airflow capacity V (m³/h), pressure loss p (Pa), air-flow scope L (m) for end speed of 0.25 m/s, and volume level [db(A)].

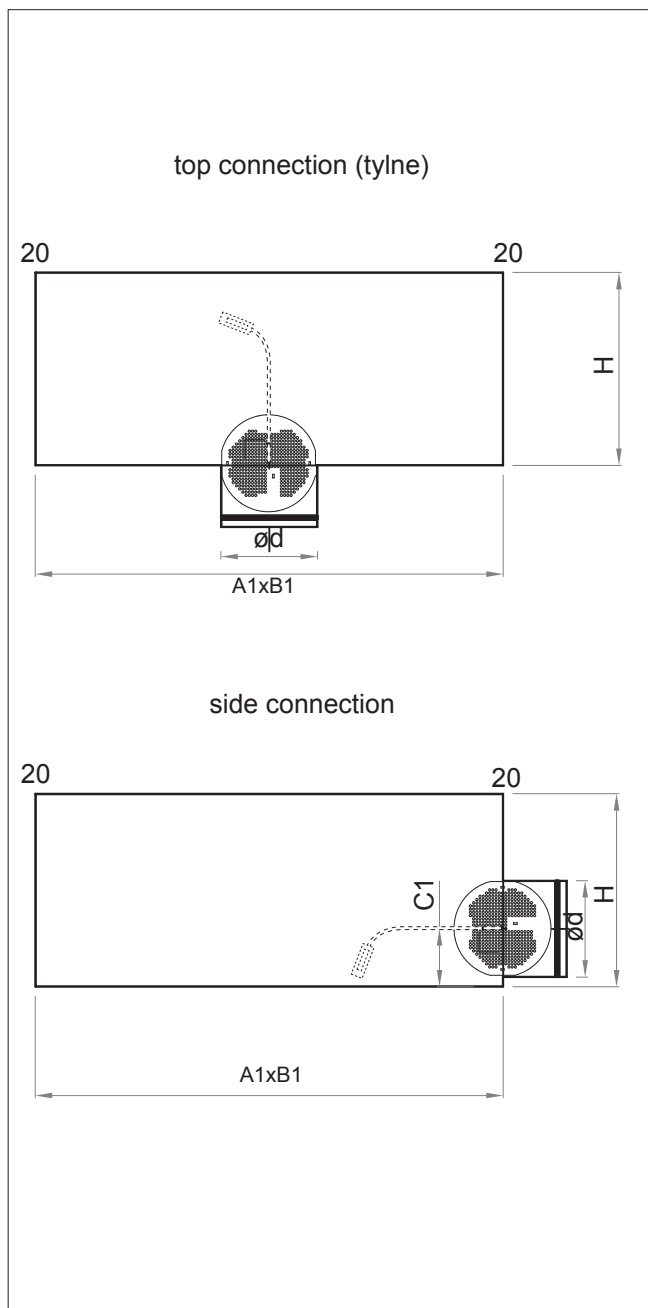
The airflow scope L relates to isothermal air supply.

DIFFUSERS NSCP/RDM WITH THE EXPANSION BOX SR/NSCP



6.4 SR/NSCP/RDM

expansion boxes for diffusers NSCP/RDM



Expansion boxes can be connected to the ventilation installation through the side or top.

Boxes can be thermally and acoustically insulated from the inside by K-Flex rubber mat.

Upon customer's request we can make other types of expansion boxes accordingly to provided drawings.

ORDER REFERENCE

SR / NSCP- 200 - P - I - g

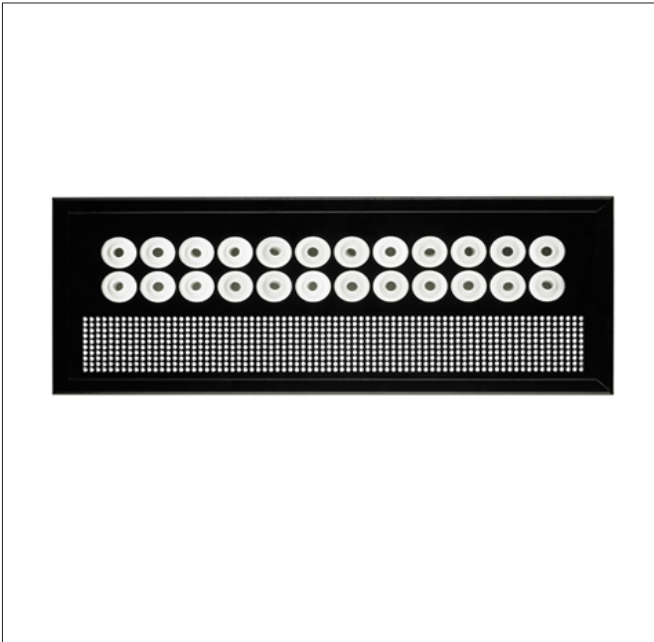
SR / NSCP- 200 - P - I - g
 size
 diffuser type
 P perforated damper with adjusting rod
 I insulated
 _ non-insulated
 g top connection
 b side connection

STANDARD DIMENSIONS

SR/NSCP	100	125	160	200
do NSCP/RDM	450x200	550x250	550x250	750x300
A1 [mm]	450	550	550	750
B1 [mm]	200	250	250	300
C1 [mm]	80	100	130	150
H [mm] p.top	225	250	285	325
H [mm] p. side	300	325	360	400
Ød [mm]	98	123	158	198

DESCRIPTION

SR/NSC are expansion boxes for NSCP/RDM diffusers. They stabilize the airflow and ensure uniform air supply to the diffuser. Expansion boxes connect diffusers with ventilation installation. They are made of zinc-coated sheet, joint by non-welded Click-Clock connection. In standard expansion boxes are equipped on the ferrule with machine crimped rubber gasket.



DESCRIPTION

It is difficult to use ceiling air vents in low rooms. However, it is still possible to utilise air-supply/air-exhaust grates mounted on walls which ensure proper ventilation of the room.

The air is tangentially supplied from the ceiling, from one side of the room. Thanks to this, an air cylinder is created which effectively ventilates the entire area guaranteeing even distribution of fresh air. All ZNW grate designs ensure a stable air stream for temperature difference $\Delta T_0 = -10K$ which does not fall in an uncontrollable manner to the zone where people are present.

The permissible volume of supplied air depends on the speed of the air stream which returns through the zone where people are present. The recommended air exchange volume is max. 5 w/k.

FEATURES

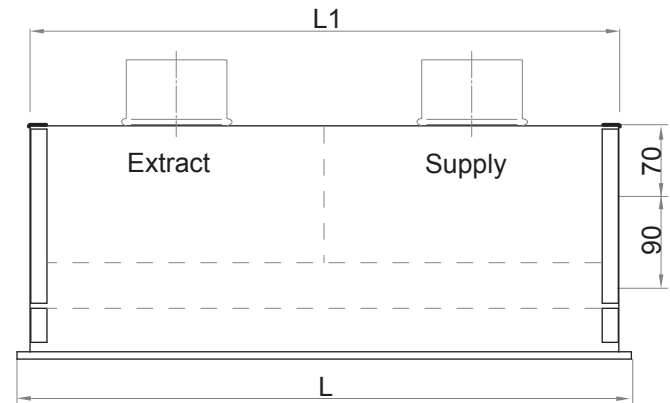
- connection box – steel galvanized sheet;
- nozzles – plastic, colour RAL 9003 (white);
- front plate - steel sheet veneered RAL 9003 (white);
- lamellas – plastic, RAL 9003 colour (white) or RAL 9005 (black)

CONSTRUCTION

ZNW-DZ 2/3 – front plate with integrated movable nozzles (2- or 3-row) for air-supply with perforated air-exhaust surface.

ZNW-L 3 – slot with lamellas (3-slot) for air-supply with perforated air-exhaust sheet metal.

DESIGN AND DIMENSIONS



INSTALLATION

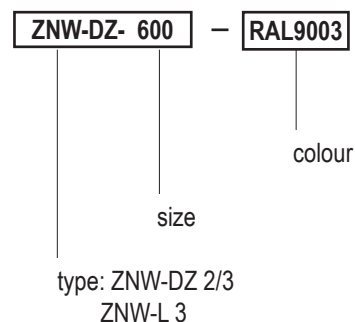
Drill an opening in the wall according to the dimensions given in the table. Then place there the expansion box making sure its edges protrude approx. 50 mm over the wall surface. Insert the front plate into the box and fix it with sheet metal screws to its sides. Push the air vent with the expansion box to the wall and fix it with screws through the mounting holes to the wall.

Instead of using the expansion box, an air vent may be similarly mounted directly to the ending of the rectangular ventilation duct. In this case, the duct dimensions must be equal to a proper plenum box dimensions.

Provided sizes

NW	nozzles per 1 row	lamellas	ZNW-DZ-2 ZNW-L-1		ZNW-DZ-3 ZNW-L-2		L	L1
			oD	KB	oD	KB		
600	23	38	98	132	158	207	615	575
800	31	50					815	775
1000	39	65					1015	975
1200	49	77					1215	1175

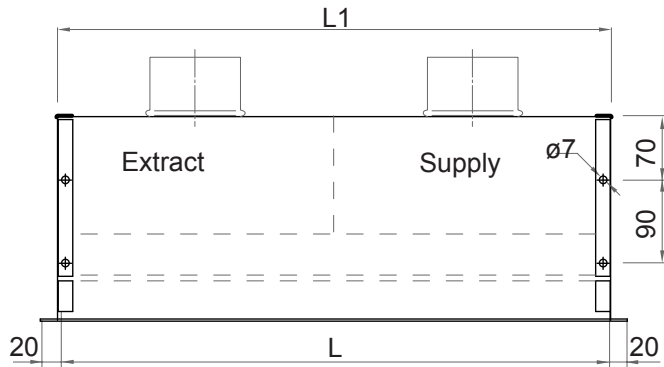
ORDER REFERENCE



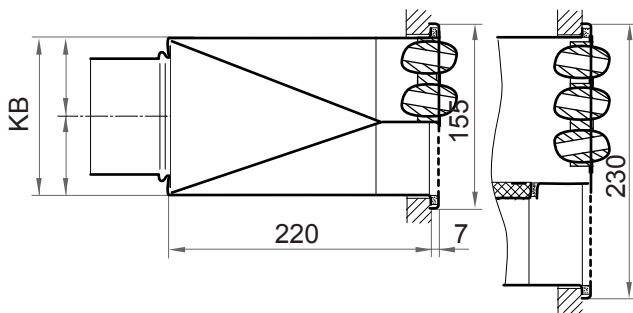
6.5 ZNW

Air-supply/air exhaust unit

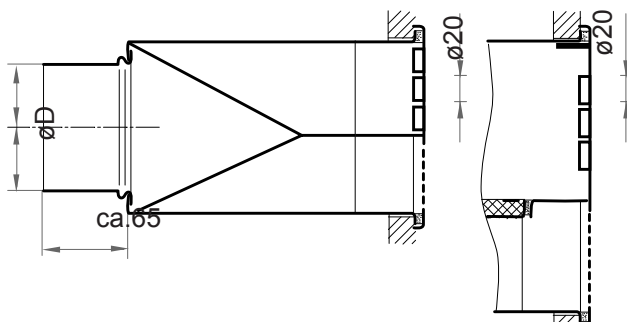
ZNW-L 3, ZNW-DZ 2/3 AIR-SUPPLY/AIR EXHAUST UNIT



ZNW-DZ-2,3



ZNW-L2,3

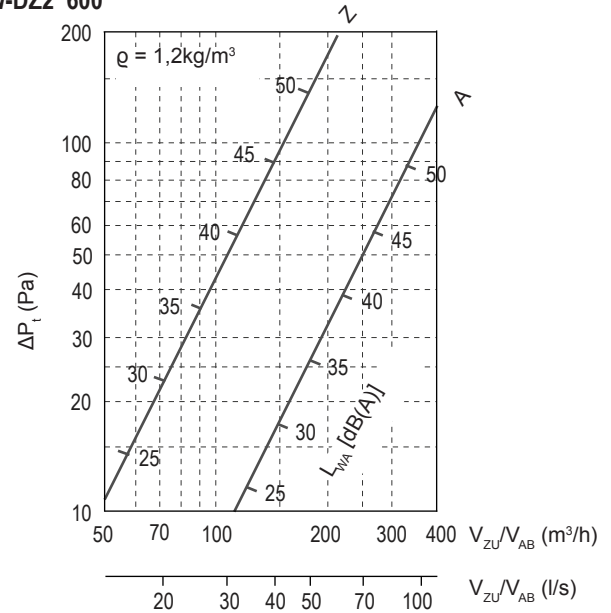


NW	ZNW-DZ-1		ZNW-DZ-2		L	L1
	oD	KB	oD	KB		
600	98	132	158	207	615	575
800					815	775
1000					1015	975
1200					1215	1175

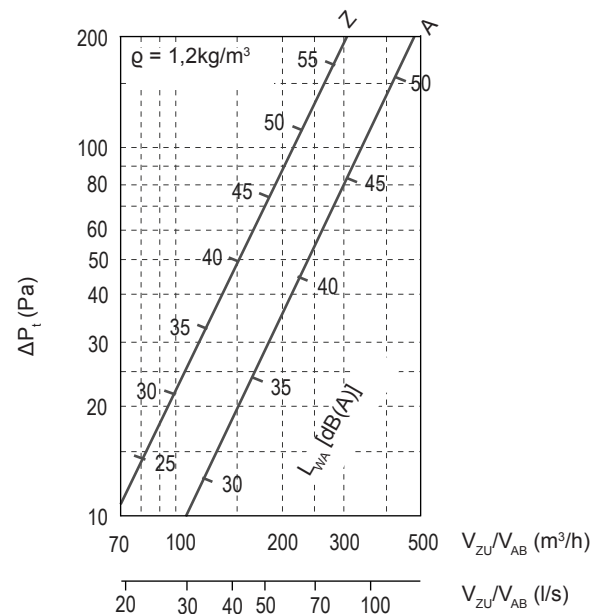
CHARACTERISTICS

PRESSURE LOSSES AND ACOUSTIC POWER LEVEL

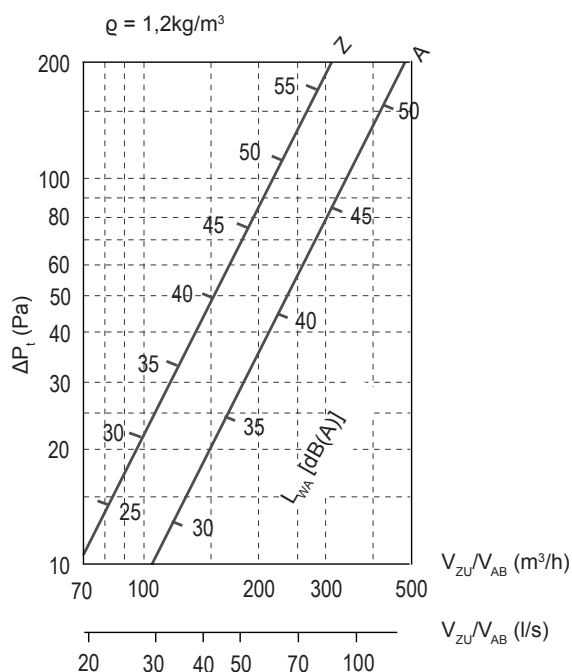
ZNW-DZ2 600



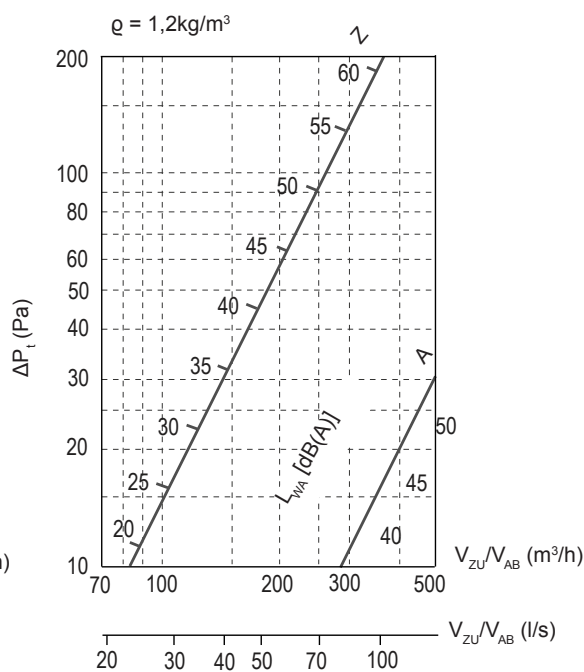
ZNW-DZ2 800



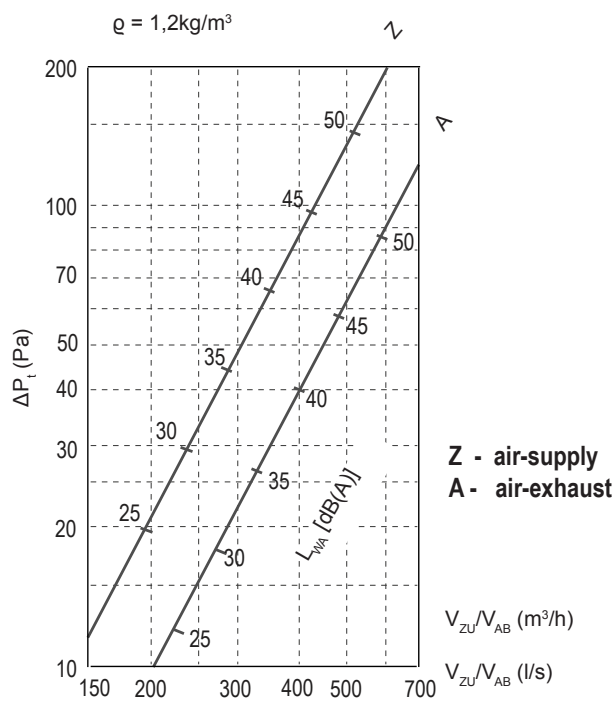
ZNW-DZ2 1000



ZNW-DZ2 1200



ZNW-DZ-3 NA METR

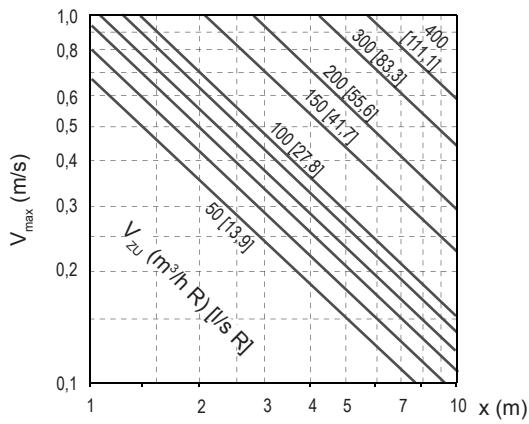


6.5 ZNW

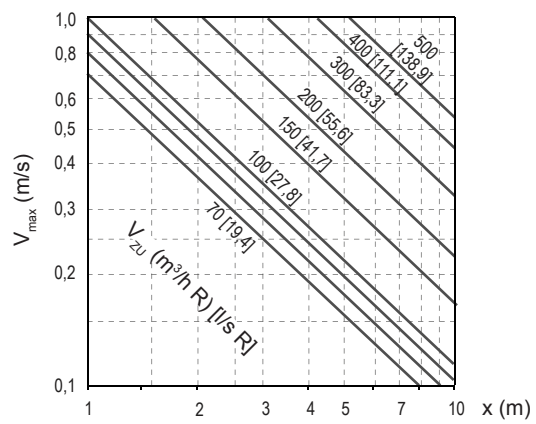
Air-supply/air exhaust unit

MAXIMUM AIR STREAM SPEED

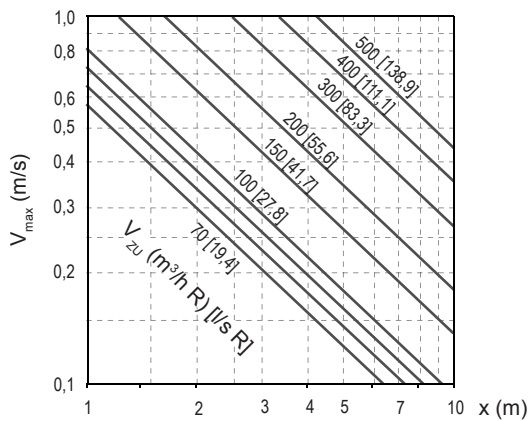
ZNW-DZ-3 600



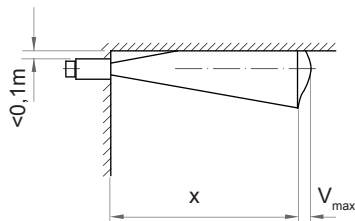
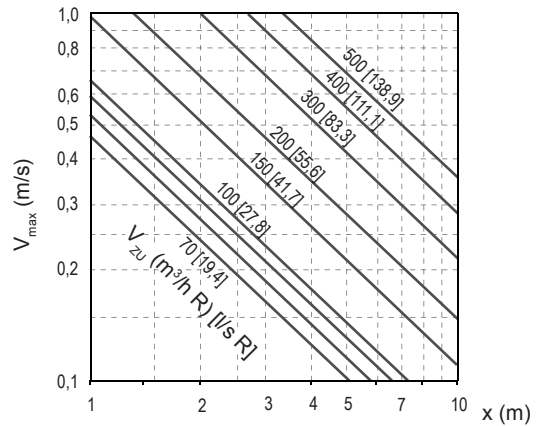
ZNW-DZ-2/3 800



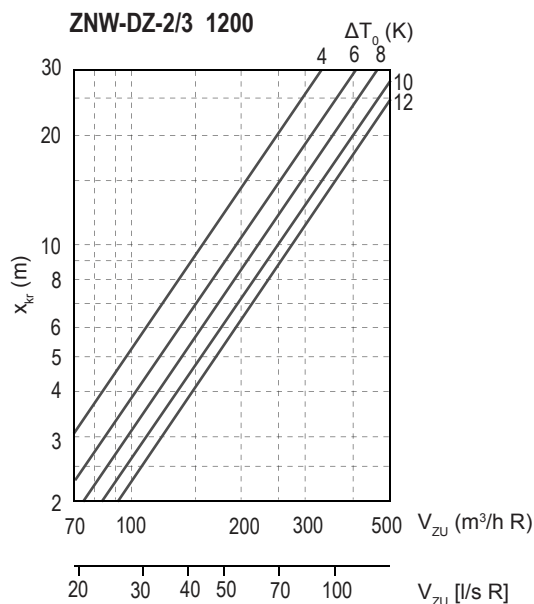
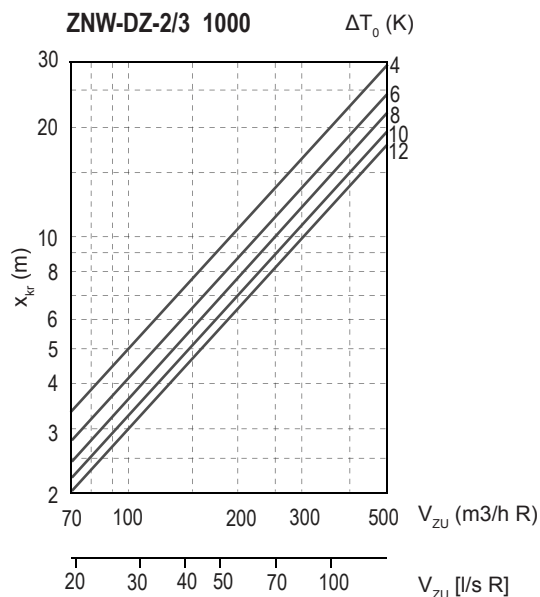
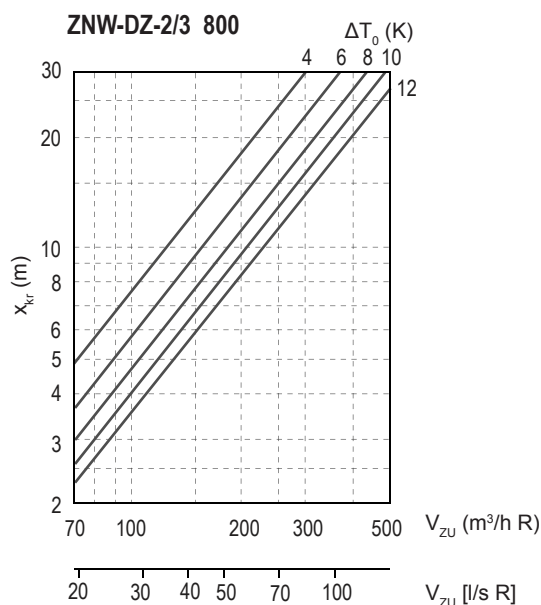
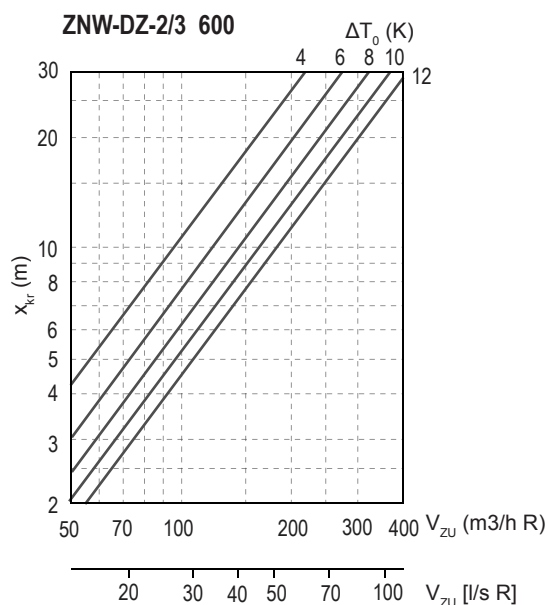
ZNW-DZ-2/3 1000



ZNW-DZ-2/3 1200



CRITICAL RANGE OF AIR STREAM

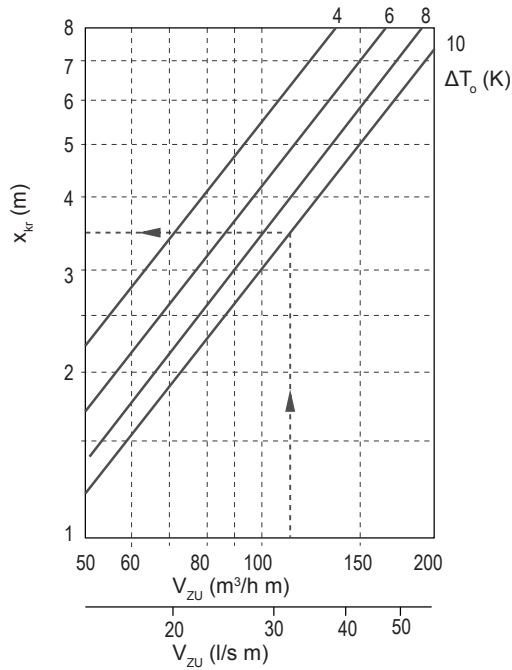


6.5 ZNW

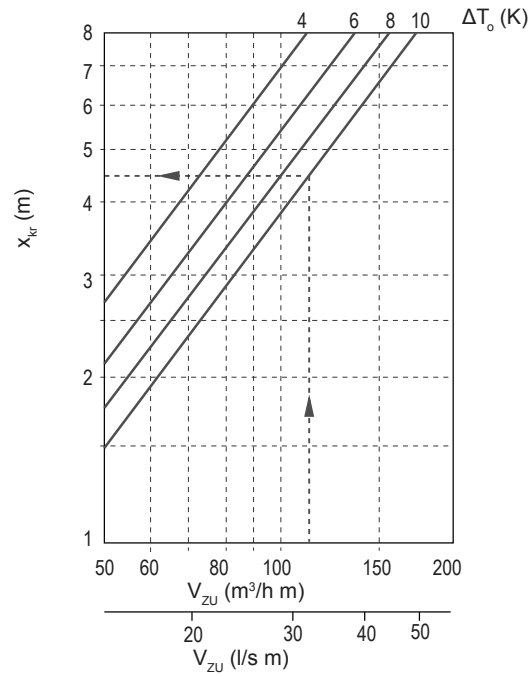
Air-supply/air exhaust unit

INTAKE- EXHAUST ZNW-L

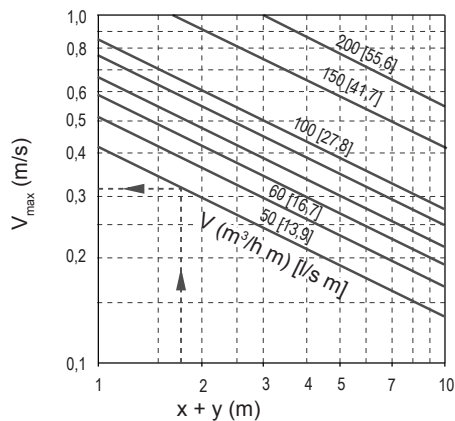
ZNW-L per meter diagonal ventilation



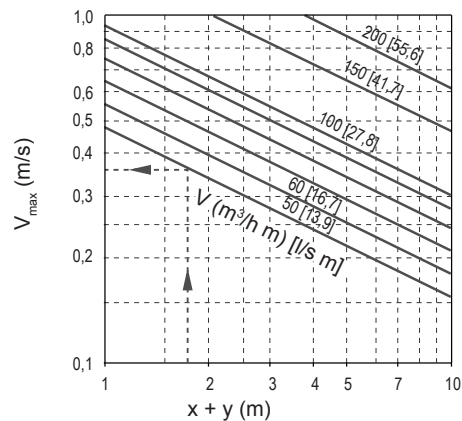
ZNW-L per meter vertical ventilation



ZNW-L per meter tangentially to the ceiling

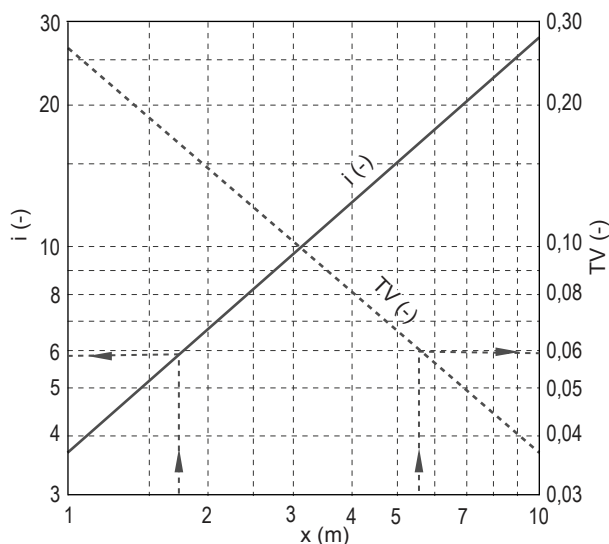


ZNW-L per meter below the ceiling



CRITICAL RANGE OF AIR STREAM

ZNW-DZ 2/3



V_{ZU}	(m ³ /h)	= volume of supplied air
V_{ZU}	(l/s)	= volume of supplied air
V_{ZU}	(m ³ /h R)	= volume of air supplied to nozzle row
V_{ZU}	(l/s R)	= volume of air supplied to nozzle row
V_{AB}	(m ³ /h)	= volume of exhausted air
V_{AB}	(l/s)	= volume of exhausted air
Z	(-)	= air-supply
A	(-)	= air-exhaust
H	(m)	= room height
L	(m)	= room length
V_{ZU}	(m ³ /h m)	= volume of supplied air per 1 metre
V_{ZU}	(l/s m)	= volume of supplied air per 1 metre
V_{AB}	(m ³ /h m)	= volume of exhausted air per 1 metre
V_{AB}	(l/s m)	= volume of exhausted air per 1 metre
ρ	(kg/m ³)	= density

D_{pt}	(Pa)	= pressure loss
L_{WA}	[dB(A)]	= acoustic power level in scale A
L_{WA1}	[dB(A)]	= acoustic power level for filter A as regards air-supply or air-exhaust
x+y	(m)	= horizontal + vertical air stream range
i	(-)	= induction factor
TV	(-)	= temperature difference reduction factor
x	(-)	= horizontal stream range
v_{max}	(m/s)	= maximum air stream speed
x_{kr}	(m)	= critical range of air stream
DT_{Δ}	(K)	= difference between supplied air temperature and room temperature ($DT_{\Delta} = t_{ZU} - t_R$)
t_{ZU}	(K)	= supplied air temperature
t_R	(K)	= room temperature
NW	(mm)	= size

notatki

6



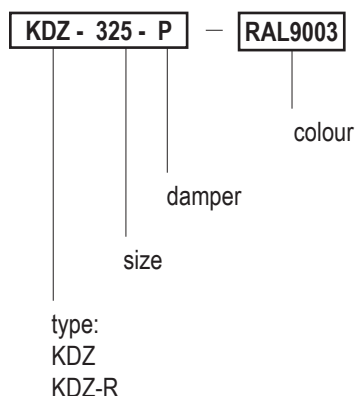
FEATURES

- made of steel sheet
- high quality of finish
- highly resistant to static stress
- by default, painted in RAL 9101.
- On special request, it can be manufactured in any size and RAL colour.
- KDZ – single-adjusted nozzles, designed to be mounted within the wall
- KDZ-R - single-adjusted nozzles, designed to be mounted in a round duct
- nozzles made of the ABS material

ASSEMBLY

Ventilation grilles are designed to be mounted on a wall, ceiling, in a duct or in an assembly box

ORDER REFERENCE



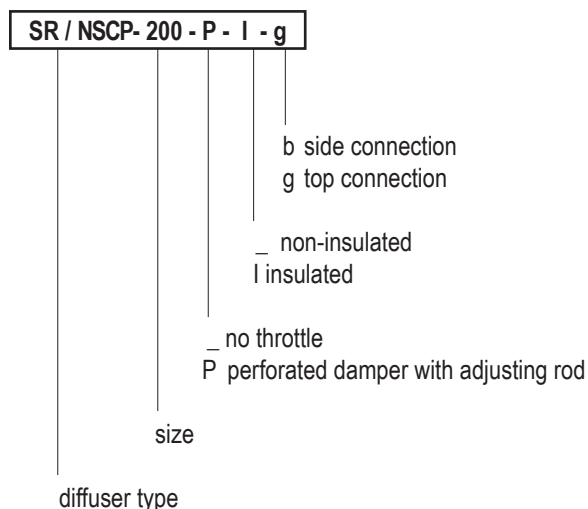
DESCRIPTION

In multi-purpose rooms/halls which are used in various ways, air-conditioning systems have to meet extended requirements. The rooms host both sport and culture events which require different amounts of supplied air and a variable difference in temperature of the air supplied and present in the room.

In order to meet such requirements, the KDZ long-throw ventilation grille was developed. Its well-thought structure allows for the inflow of air to be fast and silent. High speed of the air supply enables deep penetration of the airstream in the vented room, thanks to which an entire room will be filled with fresh air. Another advantage of the ventilation grille is the fact that the airstream is divided into several smaller streams, which significantly increases induction. Temperature and speed of individual streams can be quickly reduced. It means that when cooling, a stream does not reach human working zone too quickly. At the same time, when heating, the stream does not leave human working zone that fast.

A KDZ long-throw ventilation grille, equipped with manually adjusted single nozzles, allows to shape the airstream freely (movement range of 450). KDZ-R ventilation grilles were designed for round ducts. The amount of supplied air can be controlled thanks to a slotted damper. For an extra charge, an assembly box (if a slotted damper is not used) can be used. The damper, situated at the end of the box (for an extra charge) can be used for easy adjustment of the amount of supplied air. All options can be used in VAV systems (range from 1000 to 400).

ADDITIONAL ACCESSORIES

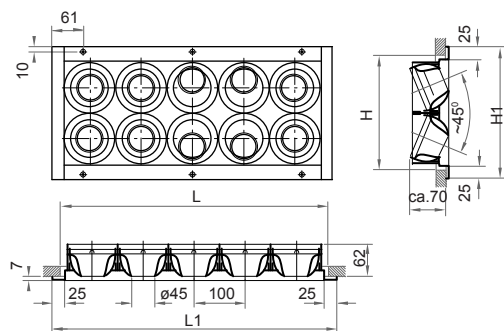


6.6 KDZ

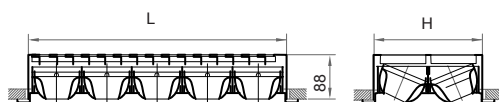
Long-throw ventilation grille

DIMENSIONS AND MAKE

DIMENSIONS: KDZ



KDZ-P

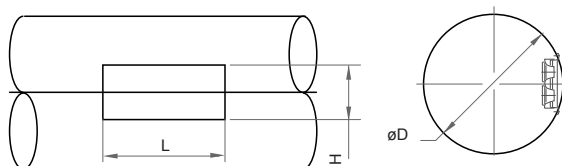


Standard KDZ dimensions

L	L1	H	H1
325	375	125	175
425	475		
525	575		
625	675		
825	875	225	275
1025	1075		
525	575		
625	675		
825	875	325	375
1025	1075		

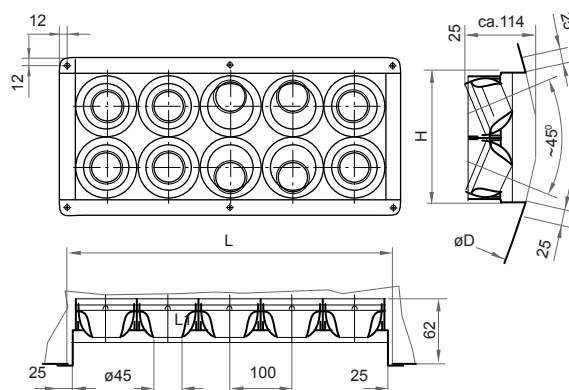
all combinations of length and width are possible

INSTALLATION METHOD

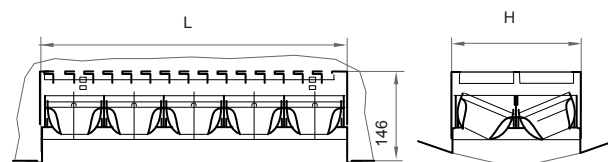


H (mm)	channel diameter (mm)		
125	250	315	400
225	630	800	1000

KDZ-R



KDZ-R-P



Standard KDZ dimensions

L	H
325	125
425	
525	225
625	
825	
1025	

all combinations of length and width are possible

The ventilation grille will fit the duct closely only with a perfect diameter

diameter of a round duct

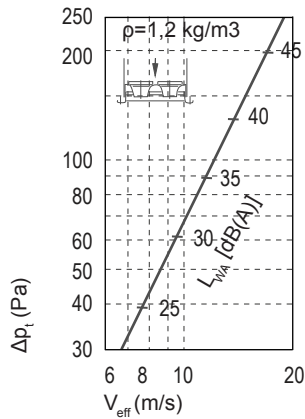
Two heights of the air vent and a skew flange allow for optimal fitting of a KDZ-r long-throw ventilation grille to the diameter of a round duct.

They also assure a reliable structure – resistance to twisting. When choosing the ventilation grille height, use the duct diameter data provided in the table below. The assembly of a KDOZ-R ventilation grille in a round duct is to be performed without application of stress. When using oval or twisted ducts, prevent the ventilation grille from bending.

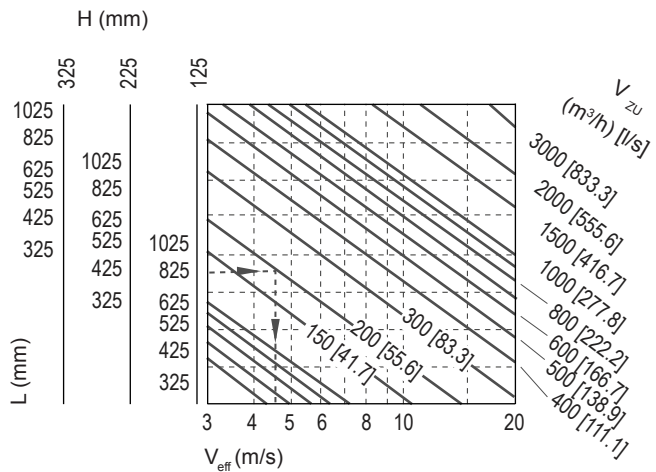
CHARACTERISTICS

PRESSURE LOSS AND THE SOUND POWER LEVEL

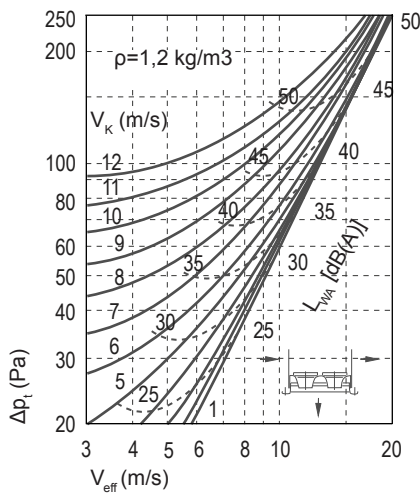
without a slotted damper



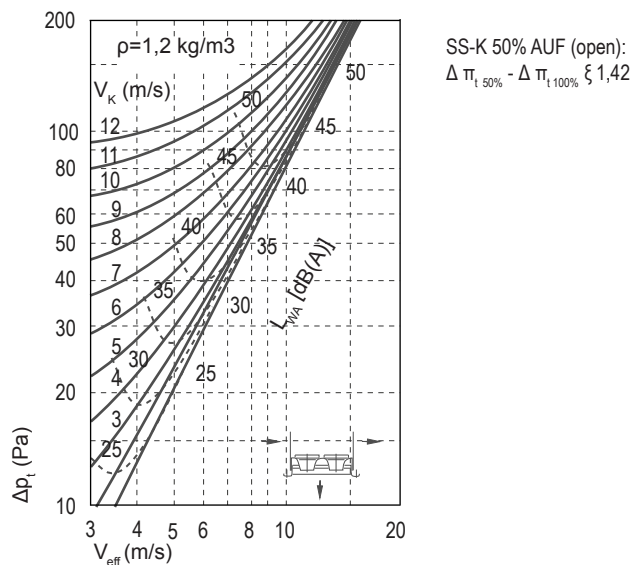
exhaust speed



without a slotted damper,
in-duct mount



with a SS-K slotted damper (100% open AUF),v
in-duct mount



SS-K 50% AUF (open):
 $\Delta \pi_{t 50\%} - \Delta \pi_{t 100\%} \xi 1,42$

FRONTAL SURFACE [A_{STIRN} (M2)]

H	L(mm)					
(mm)	325	425	525	625	825	1025
125	0,0310	0,0412	0,0514	0,0616	0,0820	0,1025
225	0,0614	0,0816	0,1018	0,1220	0,1624	0,2028
325	0,0918	0,1220	0,1522	0,1824	0,2428	0,3032

$$L_{WA} = L_{WA1} + KF$$

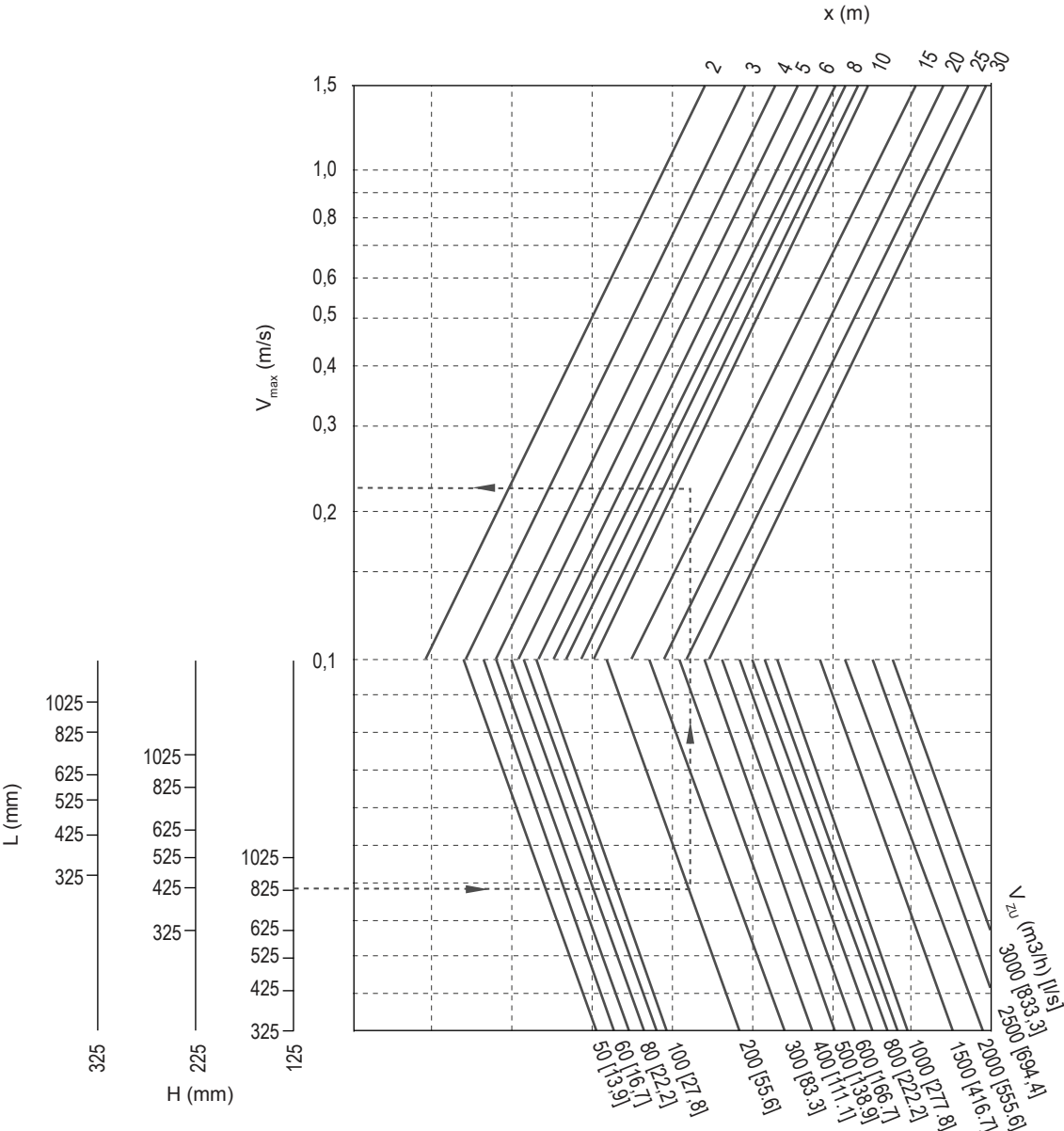
CORRECTION COEFFICIENTS

A_{STIRN} (M2) N	0,032	0,040	0,051	0,064	0,080	0,100	0,128	0,160	0,203	0,256	0,320
KF (-)	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5

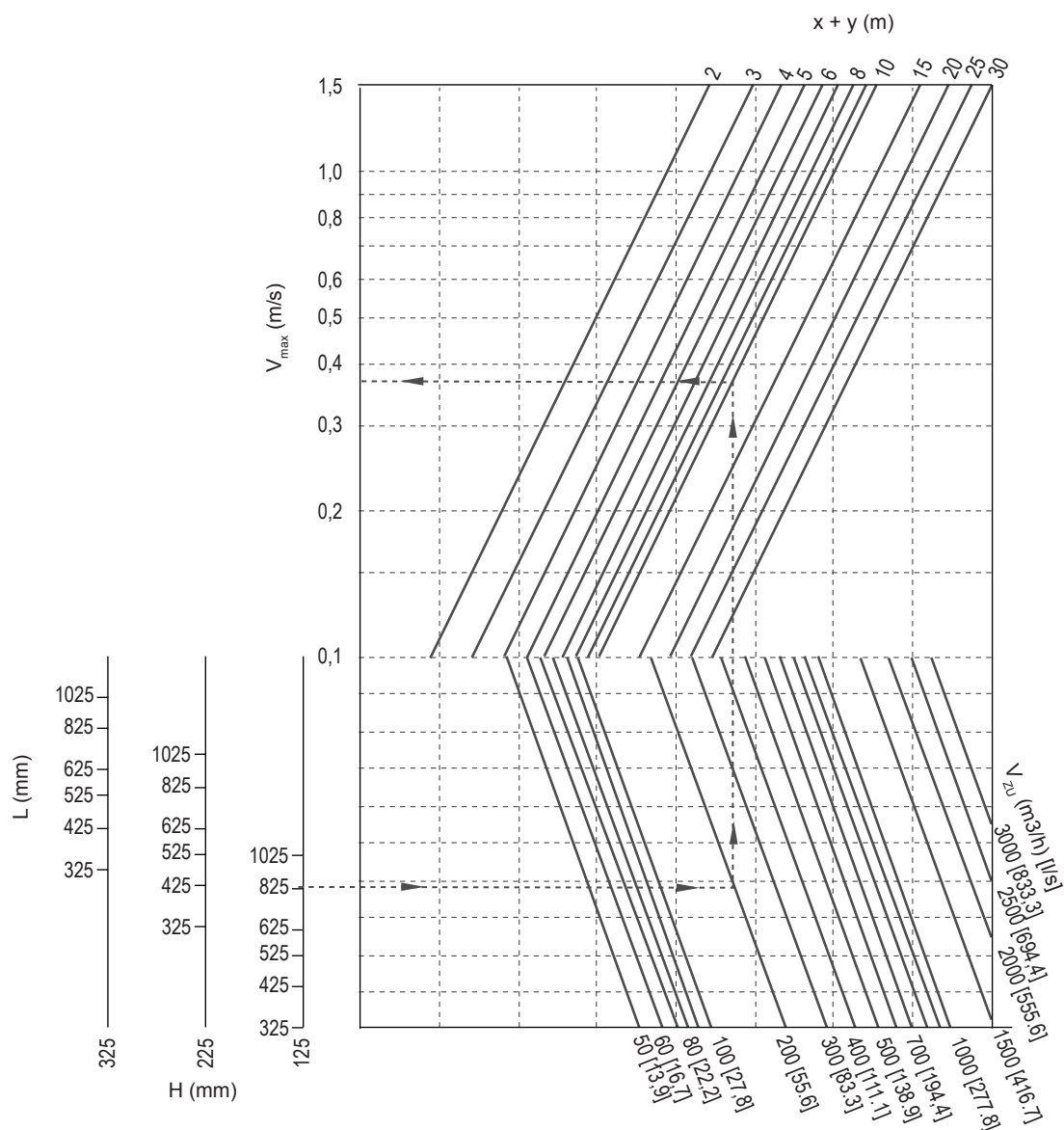
6.6 KDZ

Long-throw ventilation grille

MAXIMUM SPEED OF AIRSTREAM
EXCLUDING THE CEILING INFLUENCE

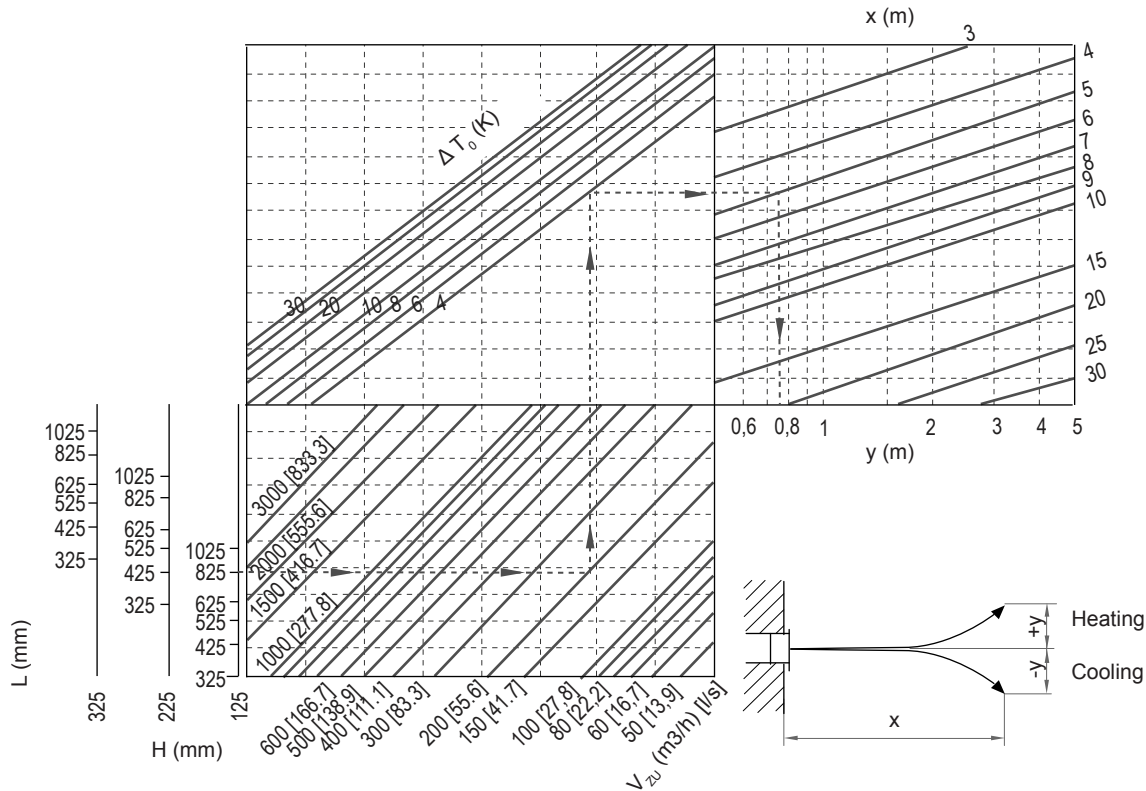


INCLUDING THE CEILING INFLUENCE

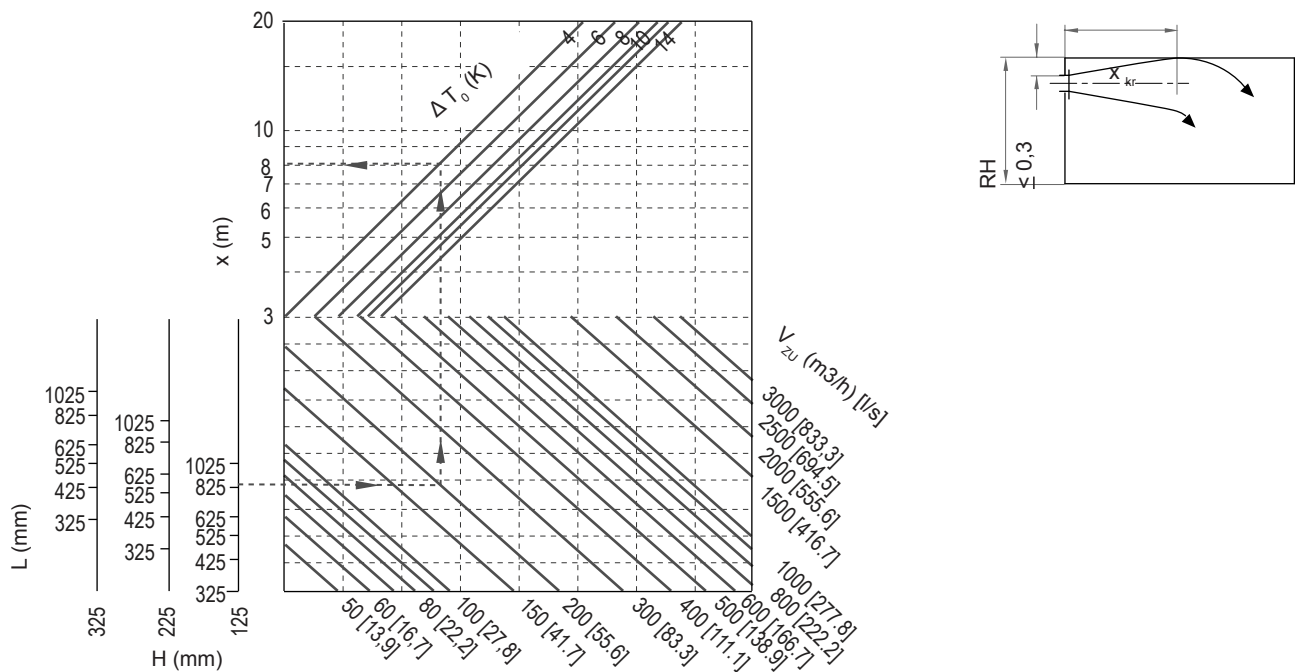


Long-throw ventilation grille

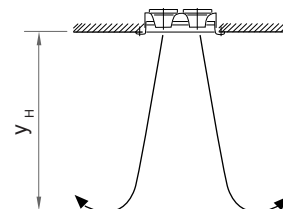
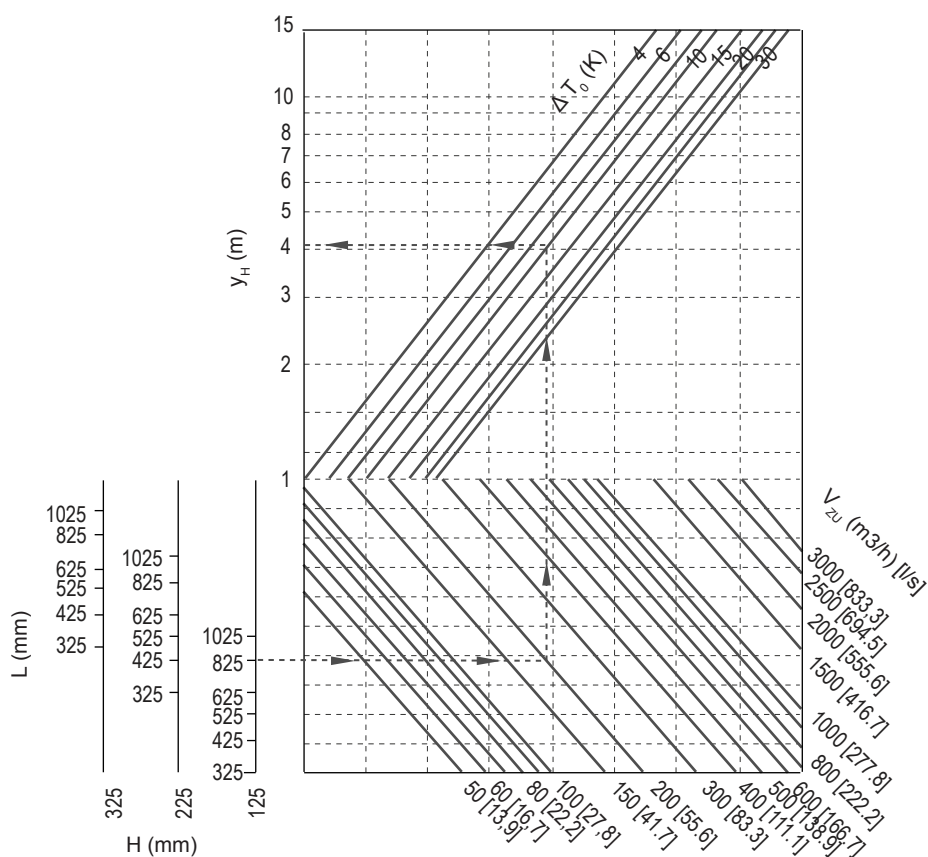
AIRSTREAM PATH FREE EXHAUST EXCLUDING THE CEILING INFLUENCE



CRITICAL REACH OF THE AIRSTREAM INCLUDING THE CEILING INFLUENCE (WHOLE COOLING)



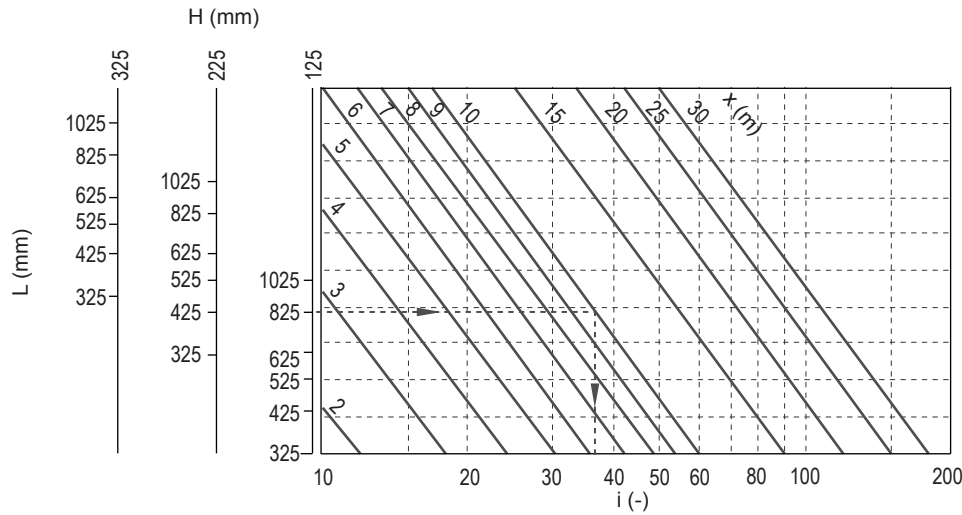
MAXIMUM REACH OF THE AIRSTREAM FOR HEATING



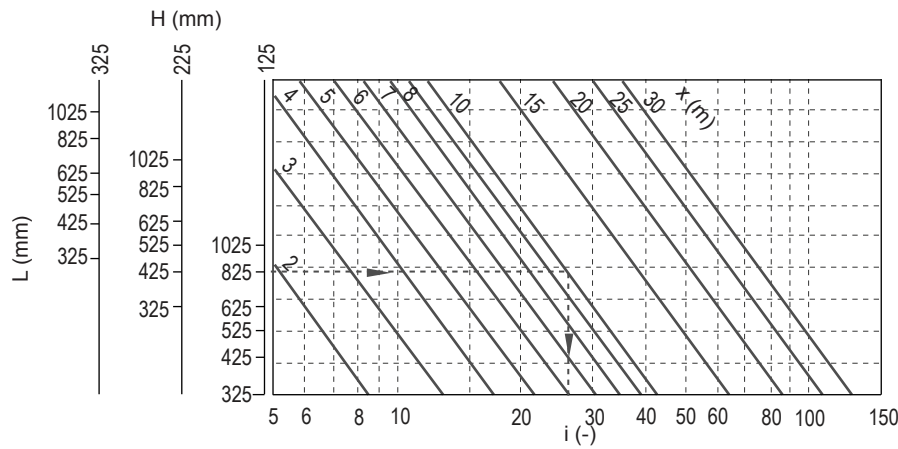
6.6 KDZ

Long-throw ventilation grille

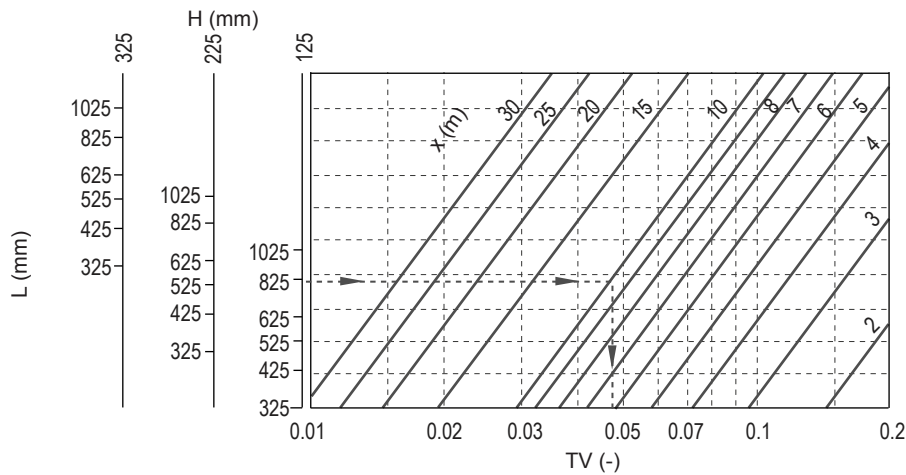
INDUCTION COEFFICIENT EXCLUDING THE CEILING INFLUENCE



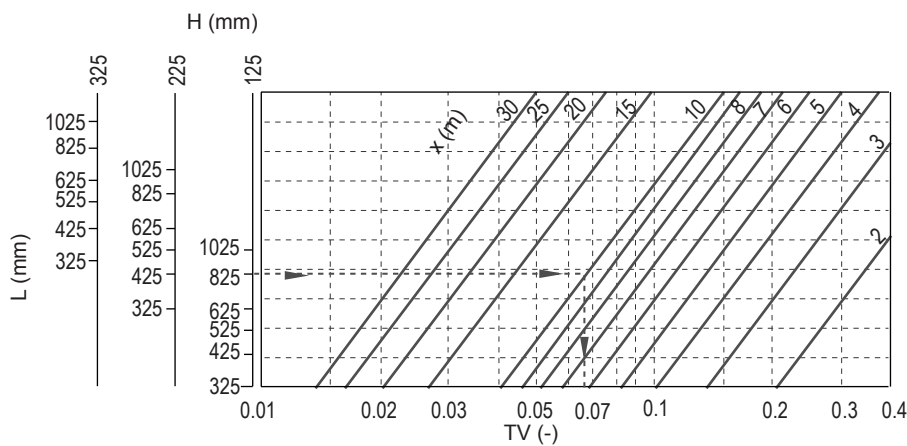
INCLUDING THE CEILING INFLUENCE



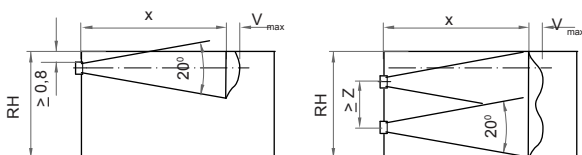
TEMPERATURE VARIANCE REDUCTION COEFFICIENT EXCLUDING THE CEILING INFLUENCE



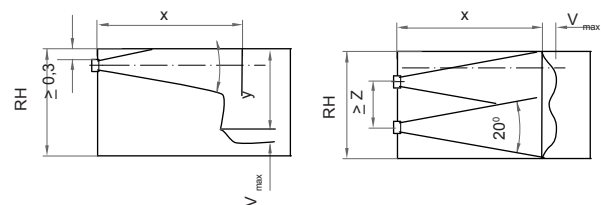
INCLUDING THE CEILING INFLUENCE



FURTHER DATA MINIMUM SPAN EXCLUDING THE CEILING INFLUENCE



INCLUDING THE CEILING INFLUENCE

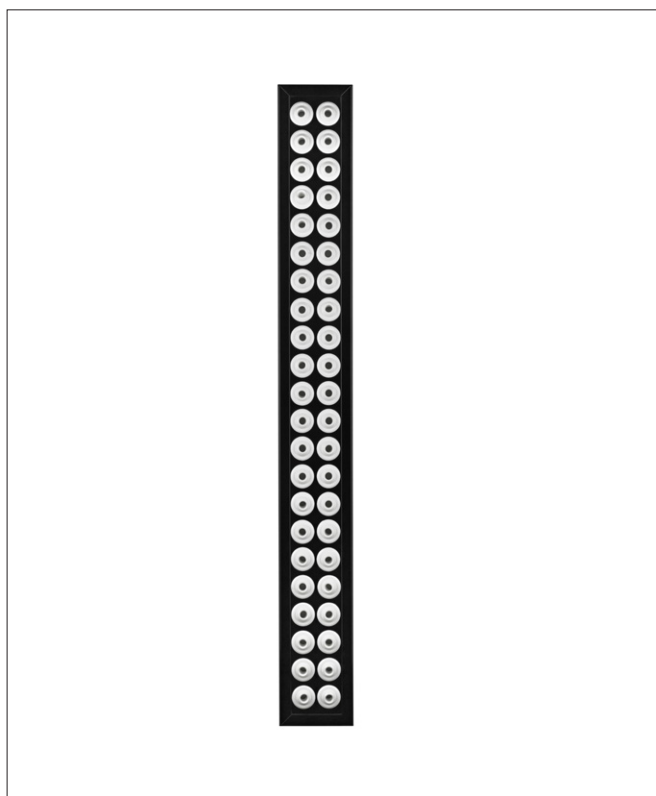


If the minimum distance "z" is smaller than (0.2 * x), the ventilation grilles operate like in the line assembly

Long-throw ventilation grille

KEY

VZU	(m ³ /h)	= amount of the supplied air
VZU	[l/s]	= amount of the supplied air
v _{max}	(m/s)	= maximum speed of the airstream
x	(m)	= vertical exhaust
y	(m)	= vertical horizontal
x+y	(m)	= vertical and horizontal exhaust
x _{kr}	(m)	= critical reach of the airstream
y _H	(m)	= maximum reach of the heating airstream
ΔTO	(K)	= temperature variance between the supplied air and the room temperature (ΔTO = t _{ZU} - t _R)
t _{ZU}	(°C)	= temperature of the supplied air
t _R	(°C)	= room temperature
Δp _t	(Pa)	= exhaust speed
v _{eff}	(m/s)	= exhaust speed
v _K	(m/s)	= duct air speed
A _{stim}	(m ²)	= frontal surface
K _F	(-)	= correction coefficients
L _{WA}	[dB(A)]	= sound power level (A scale)
ρ	(kg/m ³)	= density
i	(-)	= induction coefficient (i = V _X / V _{ZU})
TV	(-)	= temperature variance coefficient (TV = ΔTX / ΔTO)
R _H	(mm)	= room height
R _B	(mm)	= room width
L	(mm)	= length
H	(mm)	= height
z	(m)	= minimum distance between two ventilation grilles x (m) × 0,2



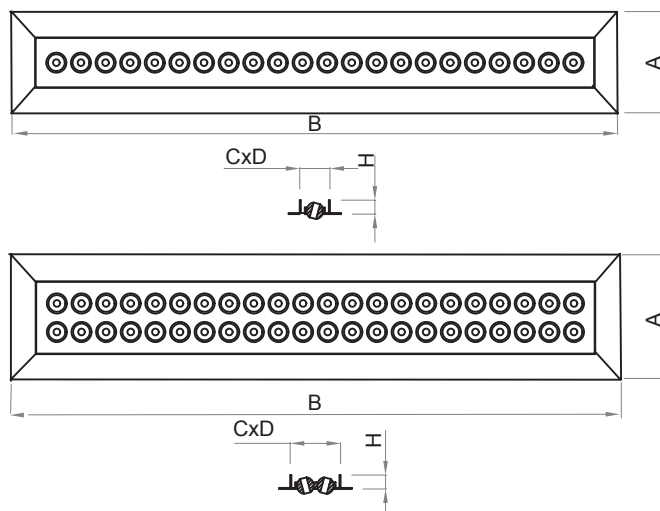
DESCRIPTION

NS/DZ are slot diffusers with adjustable long-throw nozzles designed low- and medium-pressure installations. As the shape of air outlet can be adjusted, the air can be supplied in any direction. Air can be simultaneously supplied vertically and horizontally, therefore the air can be supplied at the temperature lower or higher than the temperature in the ventilated room.

NS/DZ diffusers can be used in air-conditioning and ventilation systems for halls and offices where comfortable temperature is required.

FEATURES

- diffusers made of steel sheet with aluminium frame
- standard make includes one, two or three rows of long-throw nozzles
- nozzles position can be adjusted as required
- standard length of diffusers: 1000, 1500 or 2000 mm
- nozzles are made of high-quality material
- can be installed with the expansion box SR/NSDZ
- available in standard RAL 9003 colour
- upon customer's request, can be made available in any size and colour from RAL palette
- can be of any size up to 2mb



STANDARD SIZES

NS/DZ	A [mm]	B [mm]	C [mm]	D [mm]	H [mm]	Number of nozzles
1000/22	80	1030	50	1000	20	22
1000/44	120	1030	90	1000	20	44
1500/33	80	1530	50	1500	20	33
1500/66	120	1530	90	1500	20	66
2000/44	80	2030	50	2000	20	44
2000/88	120	2030	90	2000	20	88

ORDER REFERENCE

NS / DZ - 1000 / 22	- RAL9003
type	colour
Diffuser length	number of nozzles

INSTALLATION

NS/DZ diffusers are designed for installation with the expansion box SR/NSDZ Use rivets or screws.

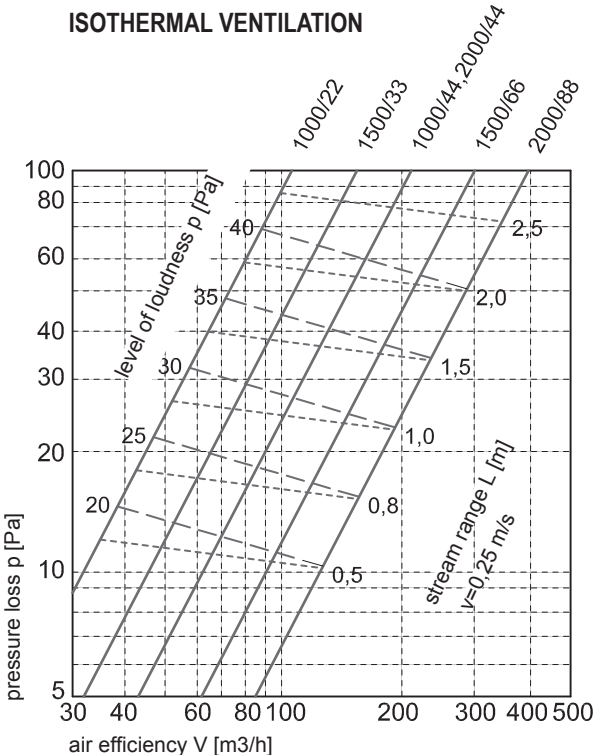
FEATURES

The figure shows airflow capacity V (m³/h), pressure loss p (Pa), airflow scope L (m) for end speed of 0.2 m/s, and volume level [db(A)].

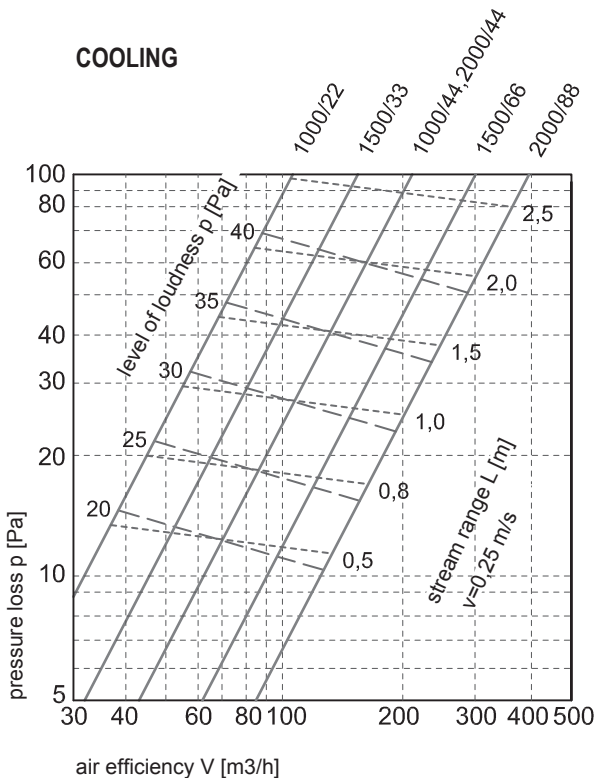
7.1 NS/DZ

slot diffusers with long-throw nozzles NS/DZ

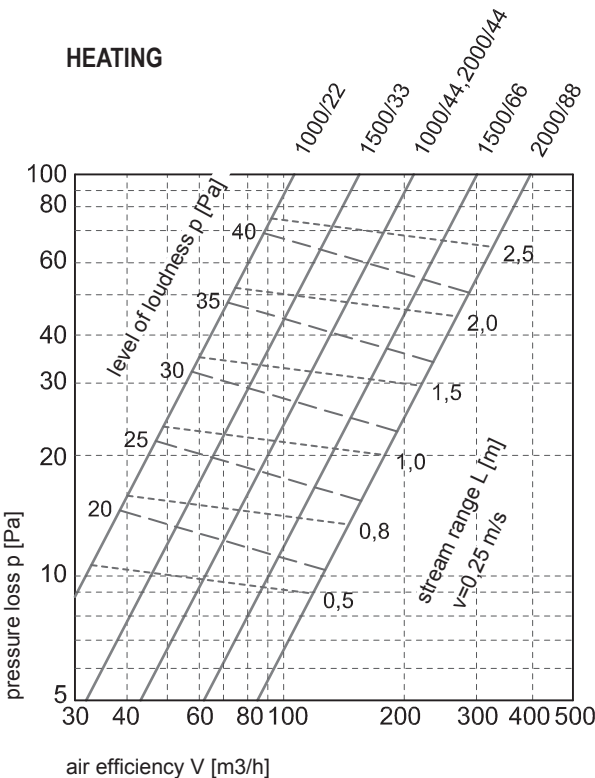
ISOTHERMAL VENTILATION

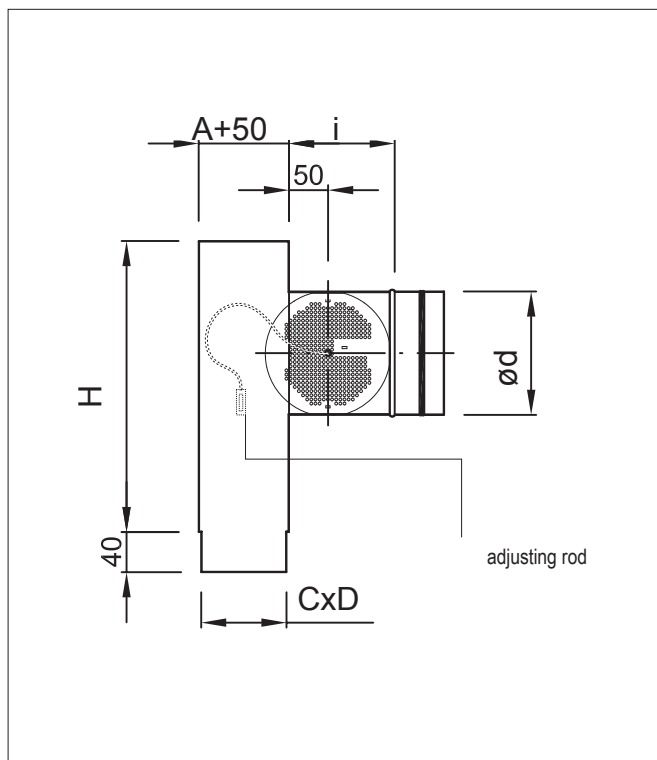


COOLING



HEATING





DESCRIPTION

SR/NSDZ are expansion boxes for slot diffusers NS/DZ. They stabilize the airflow and ensure uniform air supply to the diffuser. Expansion boxes connect diffusers with ventilation installation. They are made of zinc-coated sheet, joint by non-welded Click-Clock connection. Expansion boxes can be connected to the ventilation installation through the side or top. Boxes can be thermally and acoustically insulated from the inside by K-Flex rubber mat.

Upon customer's request we can make other types of expansion boxes accordingly to provided drawings. In standard expansion boxes are equipped on the ferrule with machine crimped rubber gasket.

ORDER REFERENCE

SR / NSDZ - 1000/22 - P - I					-	b
						b - side
						g - upper
						- non-insulated
						I insulated
					-	no throttle
					P	perforated damper with adjusting rod
						size
						diffuser type

STANDARD SIZES

	1000/22	1000/44	1500/33	1500/66	2000/44	2000/88
C [mm]	52	92	52	92	52	92
D [mm]	1000	1000	1500	1500	2000	2000
H [mm]	260	290	260	290	260	290
Ød [mm]	1x98	1x123	1x98	1x123	2x98	2x123
i [mm]	100	115	100	115	100	115

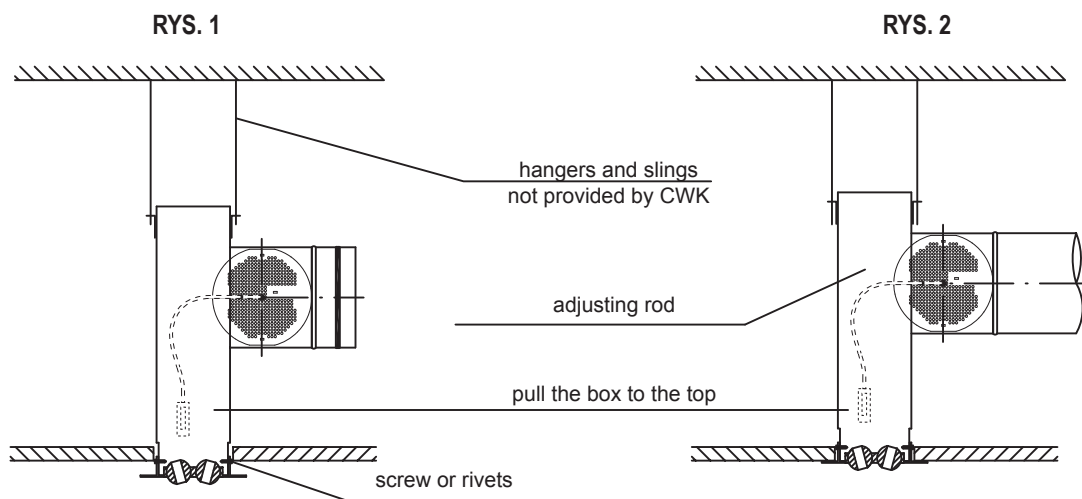
expansion boxes for diffusers NS/DZ

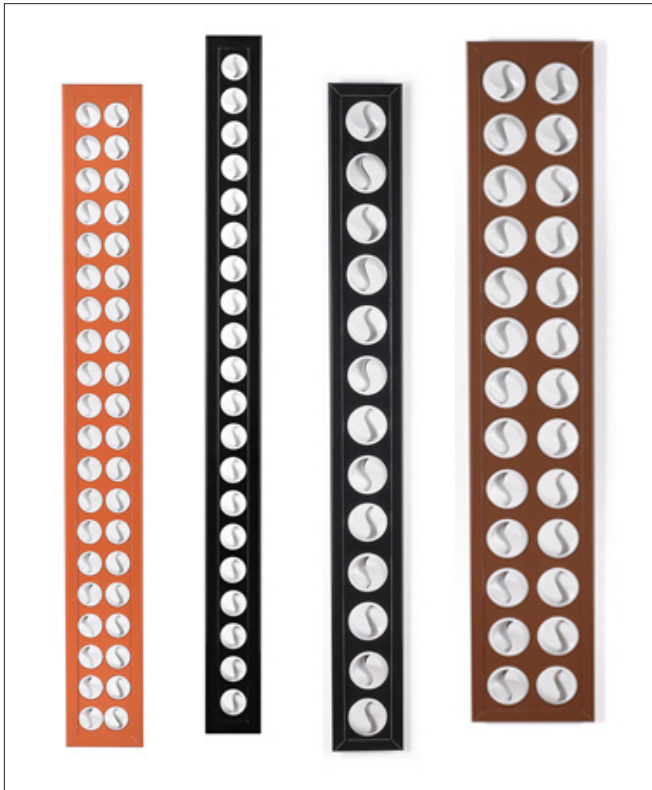
INSTALLATION

Expansion boxes SR/NSDZ are designed for installation in the underslung ceiling. Prepare an installation hole of a size of CxD for the chosen diffuser. Put the expansion in, accordingly to Fig. 1 slide the front panel of the diffuser onto the box. Pull the box up and hang on the roof using appropriate hangers (bars, pins...) or installation slings (Fig. 2).

Upon customer's request, boxes can be equipped with factory slings.

INSTALATION IN THE ROOF





- nozzles are made of high-quality ABS material, and painted standard white
- all diffusers use nozzles of 35 mm (RDM) and 57 mm (RD) diameter; single nozzle capacity of 6 and 9 m³/h with acoustic pressure of 30 dB (A)
- possible to adjust air supply to internal conditions
- low height settlement
- possible to be installed with an expansion box SR/NSRD and SR/NSRDM
- upon customer's request, can be made available in any size and colour from RAL palette

ORDER REFERENCE

NS / RD - 1000 / 26	—	RAL9003
		colour
		number of nozzles
		diffuser length
		RD nozzles of 57 mm diameter
		RDM nozzles of 35 mm diameter
		typ

DESCRIPTION

NS/RD and NS/RDM are long, rectangular slot diffusers with adjustable round nozzles designed for low- and medium-pressure installations. Nozzles of diameter sizes 57 (RD) and 35 (RDM) are ended with sinusoidal outlets that allows for high air diffusion. Due to stable air supply stream, NS/RD and NS/RDM can be used with constant and variable airflow. Air can be simultaneously supplied vertically and horizontally, therefore the air can be supplied at the temperature lower or higher than the temperature in the ventilated room.

FEATURES

- adjustable airflow stream shape (360°)
- standard make includes one, two or three rows of adjustable long-throw nozzles RD and RDM
- easy dispersion of vertical stream
- possible to swirl the stream
- possible simultaneous vertical and horizontal ventilation
- high induction factor
- available in standard RAL 9003 colour
- can be of any size up to 2mb

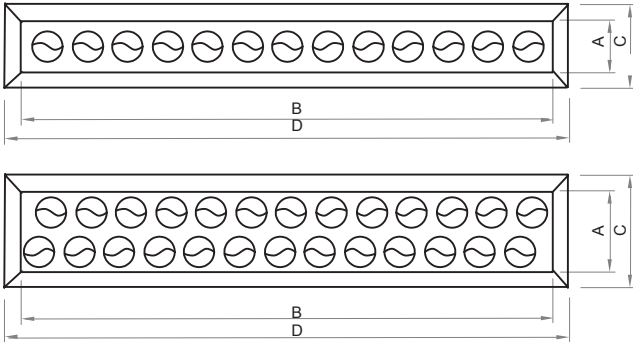
INSTALLATION

NS/RD and NS/RDM are designed for installation with the expansion box SR/NSRD. The diffuser should be fixed to the box by rivets or screws. Remember to seal joint, with for example silicon gasket. Diffusers can be installed without the expansion box, directly in the wall or ceiling. Prepare an installation hole of a size of AxB for the chosen diffuser. Slide to box in and fix it to the wall by screws. Slide the front panel of the diffuser onto the box and fix it to the wall with screws or bolts through installation holes in the frame. Low settlement height makes those diffusers ideal for low roof installation and installation between the roof and underslung ceiling.

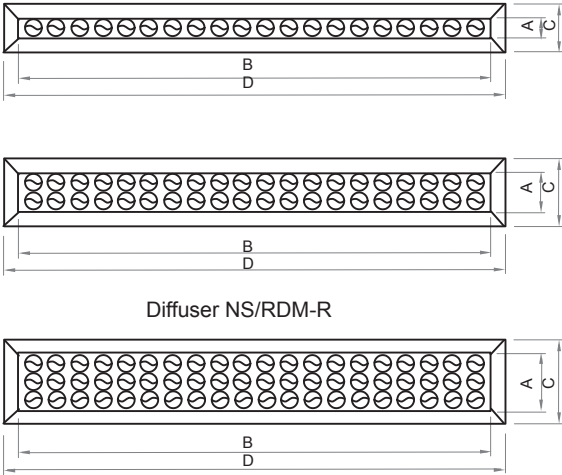
7.2 NS/RD(M)

slot diffusers with adjustable nozzles

DIFFUSER NS/RD



DIFFUSER NS/RDM

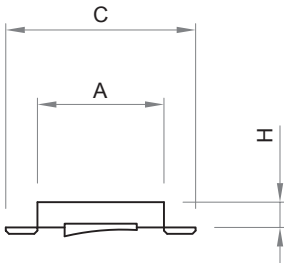


Diffuser NS/RDM-R

STANDARD SIZES

Diffuser NS/RD	A [mm]	B [mm]	C [mm]	D [mm]	H [mm]	Number of nozzles
1000/13	80	1000	110	1030	20	13
1000/26	150	1000	180	1030	20	26
1500/19	80	1500	110	1530	20	19
1500/39	150	1500	180	1530	20	39
2000/26	80	2000	110	2030	20	26
2000/52	150	2000	180	2030	20	52

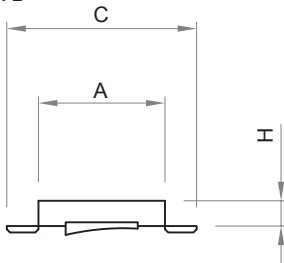
Standard diffuser sizes: A x B



STANDARD SIZES

Diffuser NS/RDM	A [mm]	B [mm]	C [mm]	D [mm]	H [mm]	Number of nozzles
1000/20	50	1000	85	1030	20	20
1000/40	90	1000	125	1030	20	40
1000/60	130	1000	170	1030	20	60
1500/30	50	1500	85	1530	20	30
1500/60	90	1500	125	1530	20	60
1500/90	130	1500	170	1530	20	90
2000/40	50	2000	85	2030	20	40
2000/80	90	2000	125	2030	20	80
2000/120	130	2000	170	2030	20	120

Standard diffuser sizes: A x B



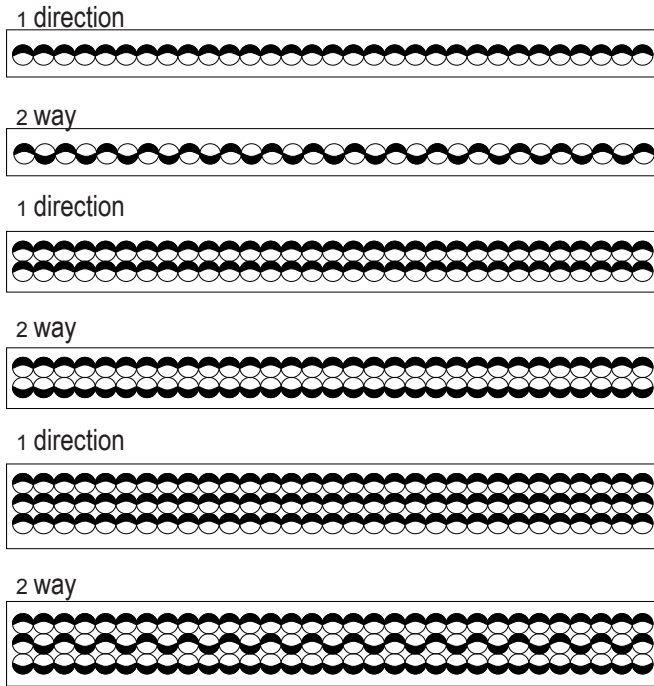
FEATURES

The figure shows airflow capacity V (m³/h), pressure loss p (Pa), airflow scope L (m) for end speed of 0.25 m/s, and volume level [db(A)].

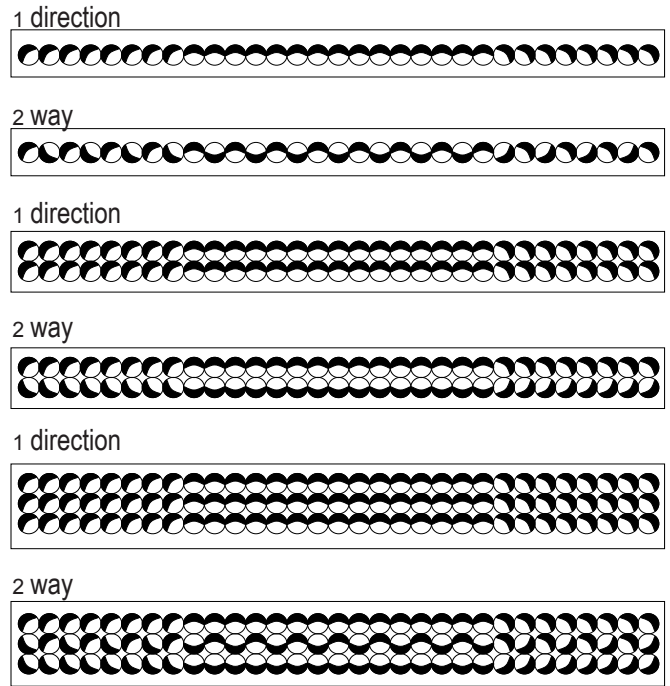
The airflow scope L relates to isothermal air supply.

ABILITY TO CONFIGURE THE DIFFUSER NOZZLES

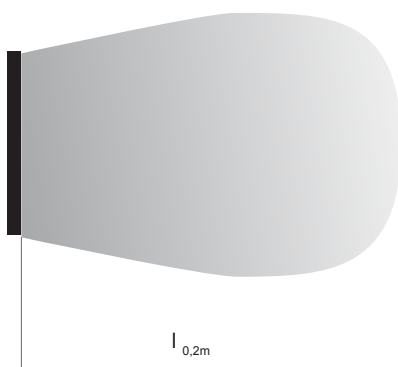
STANDARD NOZZLE SETUP



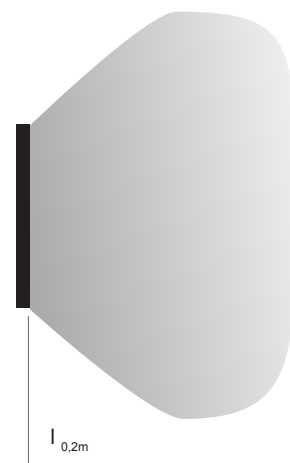
SET THE AIR INLET NOZZLE IN POSITION 45°



COVERAGE WITH A STANDARD SET OF NOZZLES



WITH A SETTING RANGE OF NOZZLES 45°



7.2 NS/RD(M)

slot diffusers with adjustable nozzles

TECHNICAL DATA

- Sound level dB (A) applies to rooms of 10 m² Sabine.
- Range L0.2 jet stream is measured in isothermal
- The recommended supply air temperature may be about 14°C lower than room temperature with a standard set of nozzles
- For the calculations the width of the stream, air speed and sound levels in rooms with other dimensions can be used computational programs ProAir and ProAc, which are available on the website.

ACOUSTICAL DATA - VENT

Sound power level L_w (dB)

Factor K_{ok}

Sound insulation ΔL (dB)

Factor ΔL

Size NS/RD(M)	Center frequency band, Hz							
	63	125	250	500	1000	2000	4000	8000
1000-1	2	3	4	3	0	-7	-15	-17
1000-2	3	7	5	1	0	-8	-16	16
1000-3	0	9	6	2	-1	-8	-15	-15
1500-1	5	7	5	2	-1	-9	-17	-16
1500-2	3	8	4	2	-1	-9	-15	-11
1500-3	3	9	4	2	0	-8	-17	-15
2000-1	0	7	4	3	-2	-9	-17	-15
2000-2	-2	8	4	3	-2	-10	-15	-12
2000-3	1	9	3	4	-3	-10	-17	-14
Tol. +/-	2	2	2	2	2	2	2	2

Size NS/RD(M)	Center frequency band, Hz							
	63	125	250	500	1000	2000	4000	8000
1000-1	22	16	15	20	18	14	21	18
1000-2	21	13	13	18	15	13	19	17
1000-3	20	10	12	16	12	12	17	16
1500-1	22	16	15	20	18	14	21	18
1500-2	21	13	13	18	15	13	19	17
1500-3	20	10	12	16	12	12	17	16
2000-1	22	16	15	20	18	14	21	18
2000-2	21	13	13	18	15	13	19	17
2000-3	20	10	12	16	12	12	17	16
Tol. +/-	2	2	2	2	2	2	2	2

FLOW - PRESSURE DROP - SOUND LEVEL - RANGE

Data for the diffuser mounted in the ceiling suspended.

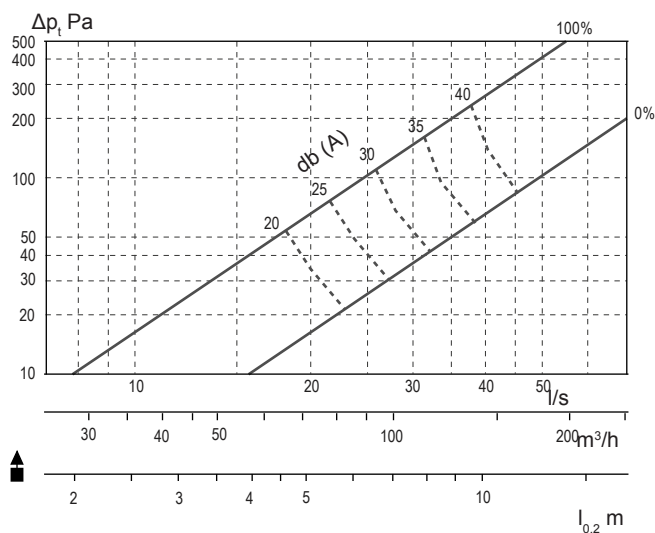
- Characteristics can not be used to regulate diffuser.

- ∇ = adjustable minimum flow

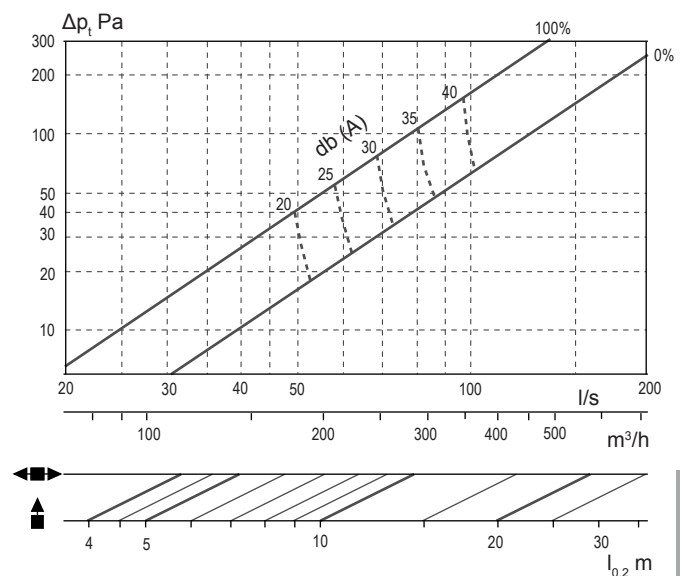
- The value of dB (A) relates to the premises of the absorption 4 dB and the acoustic volume 30 m³

- Value of dB (C) is usually about 6-9 dB niż wartość dB(A).
- Set the nozzle 45o zrange decreases by about 30%. Set the nozzle to the diffuser onl 45o individual is not connected in series.
- 100% means the throttle zamkniętą regulatory 0% mark the throttle open regulatory

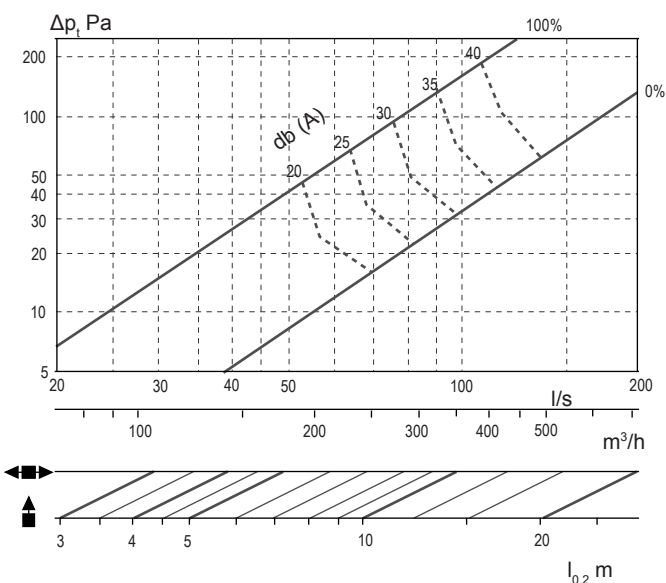
NS/RD(M) 1000-1 + SR/RD(M)



NS/RD(M) 1000-2 + SR/RD(M)



NS/RD(M) 1000-3 + SR/RD(M)



7.2 NS/RD(M)

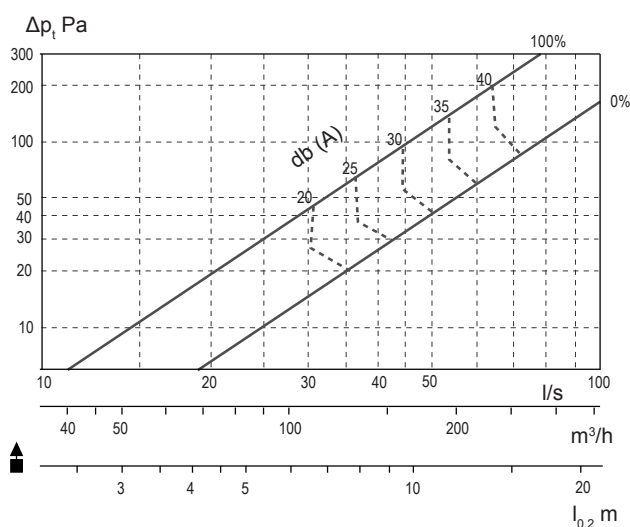
slot diffusers with adjustable nozzles

FLOW - PRESSURE DROP - SOUND LEVEL - RANGE

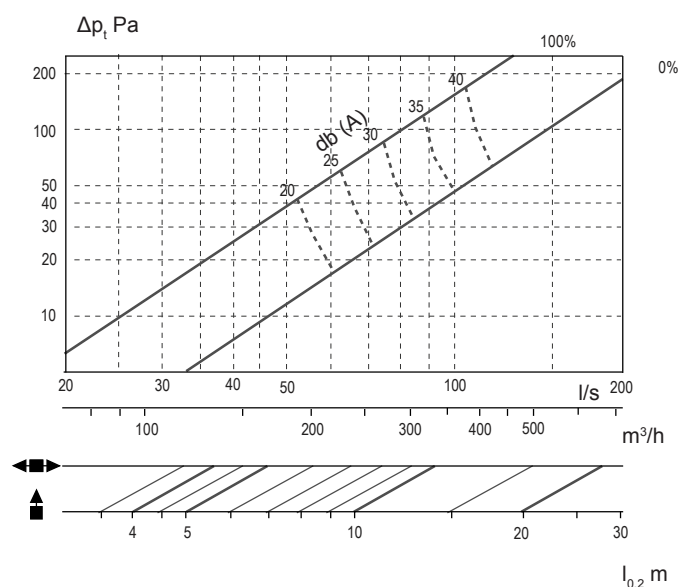
- Data for the diffuser mounted in the ceiling suspended.
- Characteristics not be used to control diffuser.
- ∇ = adjustable minimum flow
- The value of dB (A) relates to the premises of the absorption 4 dB and the acoustic volume 30 m³

- Values of dB (C) is usually about 6-9 dB higher than the value dB (A).
- Set the nozzle 45° range decreases by about 30%. Set the nozzle to the diffuser only 45° individual is not connected in series.
- 100% means the throttle zamknięta regulatory
0% mark the throttle open regulatory

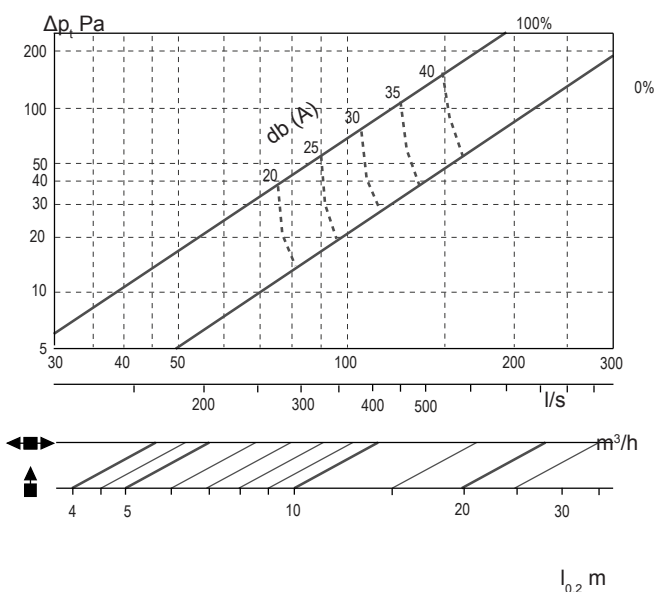
NS/RD(M) 1500-1 + SR/RD(M)



NS/RD(M) 1500-2 + SR/RD(M)



NS/RD(M) 1500-3 + SR/RD(M)

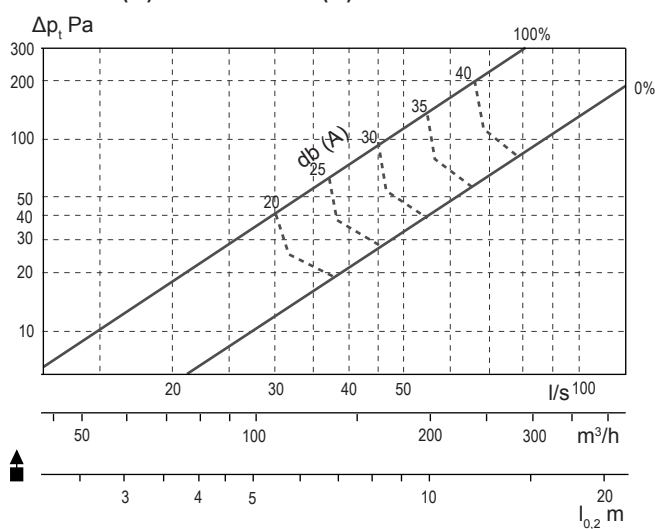


FLOW - PRESSURE DROP - SOUND LEVEL - RANGE

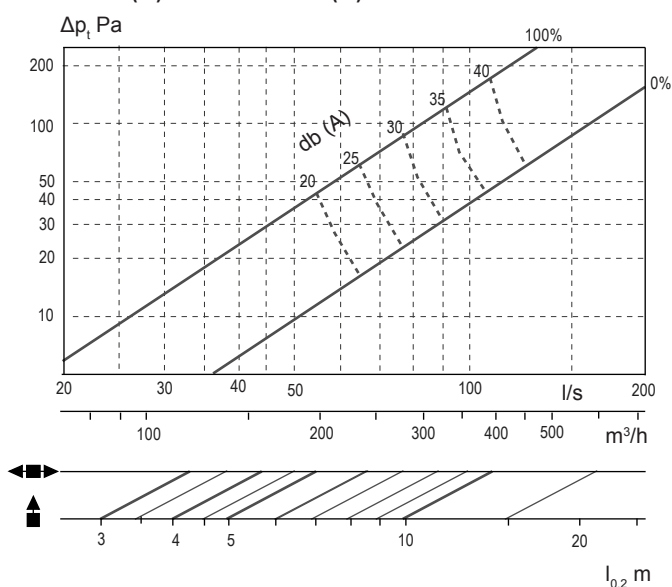
- Data for the diffuser mounted in the ceiling suspended.
- Characteristics not be used to control diffuser.
- ∇ = adjustable minimum flow
- The value of dB (A) relates to the premises of the absorption 4 dB and the acoustic volume 30 m³

- Values of dB (C) is usually about 6-9 dB higher than the value dB (A).
- Set the nozzle 45° range decreases by about 30%.
- Set the nozzle to the diffuser only 45° individual is not connected in series.
- 100% means the throttle zamknięta regulatory
0% mark the throttle open regulatory

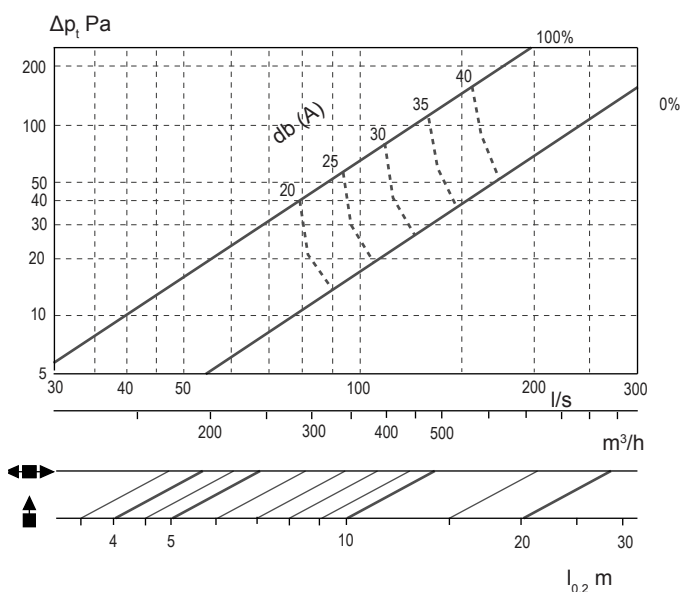
NS/RD(M) 2000-1 + SR/RD(M)



NS/RD(M) 2000-2 + SR/RD(M)

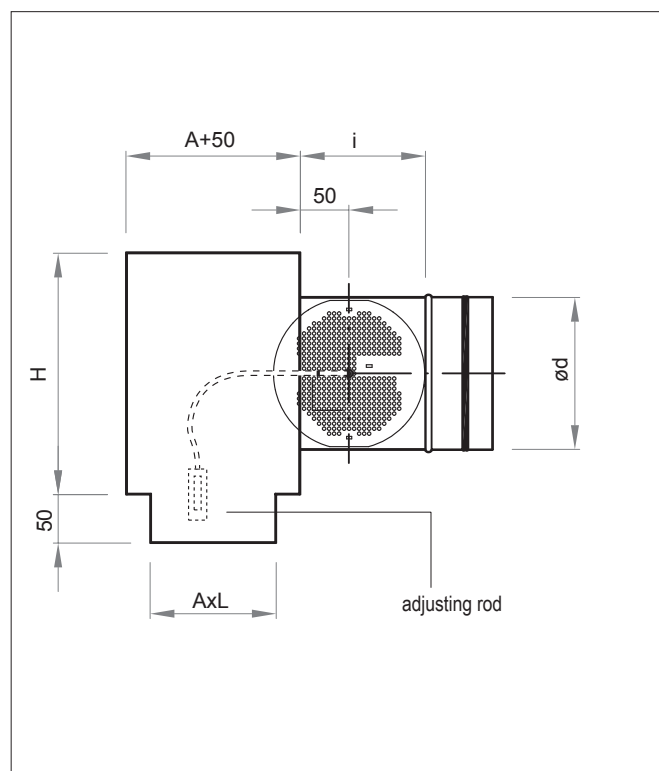


NS/RD(M) 2000-3 + SR/RD(M)



7.2 SR/NS/RD(M)

expansion boxes for diffusers NS/RD i NS/RDM



DESCRIPTION

SR/NSRD, SR/NSRDM are expansion boxes for slot diffusers NS/RD and SN/RDM. They stabilize the airflow and ensure uniform air supply to the diffuser. Expansion boxes connect diffusers with ventilation installation. They are made of zinc-coated sheet, joint by non-welded Click-Clock connection.

Expansion boxes can be connected to the ventilation installation through the side or top.

Boxes can be thermally and acoustically insulated from the inside by K-Flex rubber mat.

Upon customer's request we can make other types of expansion boxes accordingly to provided drawings.

In standard expansion boxes are equipped on the ferrule with machine crimped rubber gasket.

ORDER REFERENCE

SR / NSRD - 1000/26 - PW - I - b				b - side
				g - upper
				- non-insulated
				I insulated
				- no throttle
				P perforated damper with adjusting rod
				size
				diffuser type

STANDARD SIZES

SR/NSRD	1000/13	1000/26
A [mm]	80	150
L [mm]	1000 / 1500 / 2000	
H[mm]	225	260
Ød [mm]	123	158
i [mm]	115	130

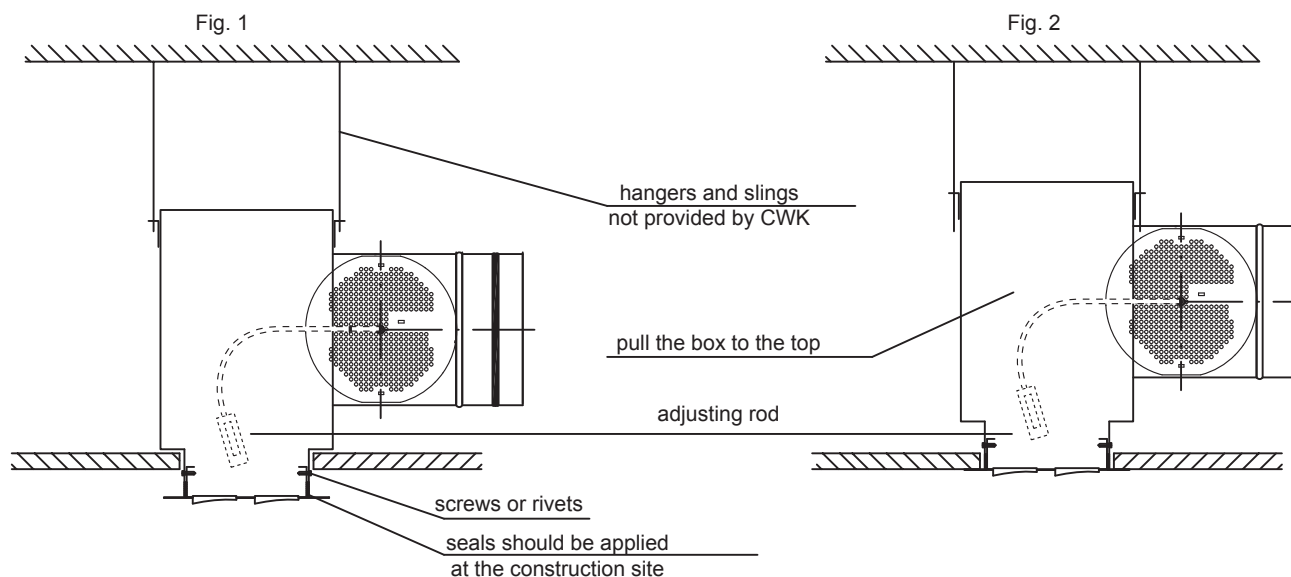
SR/NSRDM	1000/20	1000/40	1000/60
A [mm]	50	90	135
L [mm]	1000 / 1500 / 2000		
H[mm]	225	260	260
Ød [mm]	123	158	158
i [mm]	115	130	130

INSTALLATION

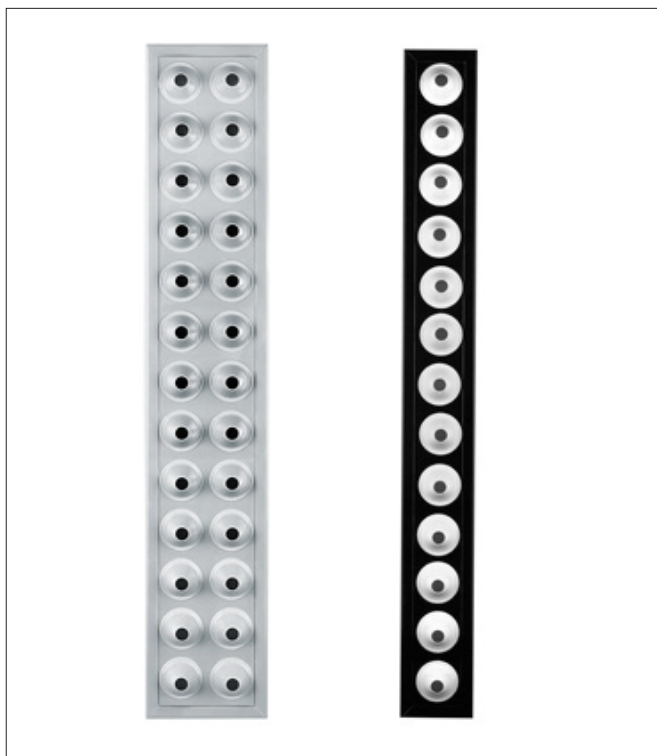
Expansion boxes SR/NSRD and SR/NSRDM are designed for installation in the underslung ceiling. Prepare an installation hole of a size of CxD for the chosen diffuser. Put the expansion in, accordingly to Fig. 1 slide the front panel of the diffuser onto the box. Pull the box up and hang on the roof using appropriate hangers (bars, pins...) or installation slings (Fig. 2).

Upon customer's request, boxes can be equipped with factory slings.

INSTALTION IN THE ROOF



notes



DESCRIPTION

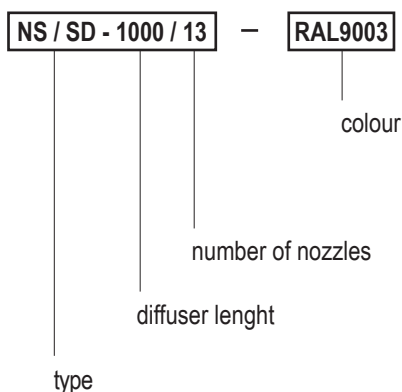
NS/SD are slot diffusers with cone-shaped nozzles designed for low- and medium-pressure installations. These diffusers were designed to keep construction places free from steaming: windows, walls etc. Due to stable air flow shape, these diffusers can work with constant or variable airflow.

Standard make includes one (1) or two (2) rows of nozzles. Diffusers are equipped with a decorative frame.

FEATURES

- standard make includes one or two rows of cone-shaped nozzles made of zinc-coated sheet with ABS materials
- possible to install individual diffusers in a row
- can be installed with the expansion box SR/NSSD
- Diffusers equipped with decorative aluminium frame
- available in standard RAL 9003 colour
- upon customer's request, can be made available in any size and colour from RAL palette

ORDER REFERENCE



INSTALLATION

Diffusers NS/SD are designed for installation with the expansion box SR/NSSD. The diffuser should be fixed to the box by rivets or screws. Remember to seal joint, with for example silicon gasket.

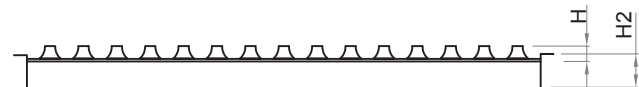
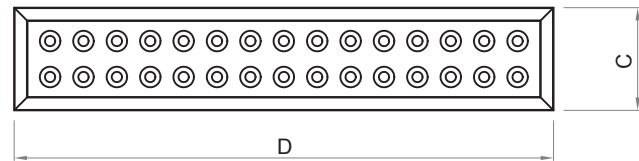
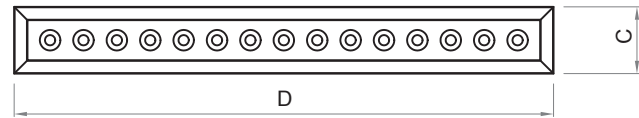
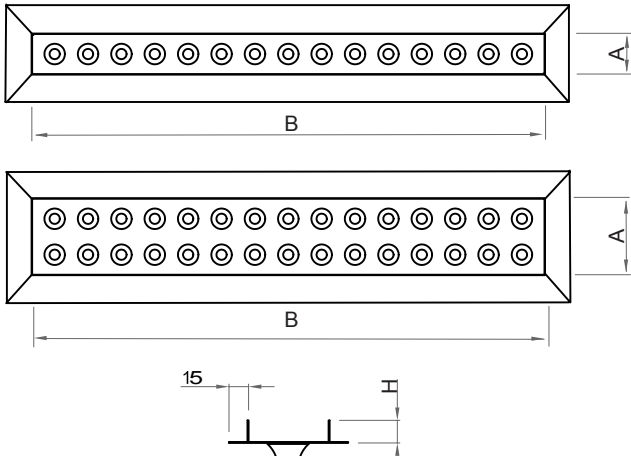
Diffusers can be installed without the expansion box, directly in the wall or ceiling. Prepare an installation hole of a size of AxB for the chosen diffuser. Slide to box in and fix it to the wall by screws. Slide the front panel of the diffuser onto the box and fix it to the wall with screws or bolts through installation holes in the frame.

Low settlement height makes those diffusers ideal for low roof installation and installation between the roof and underslung ceiling.

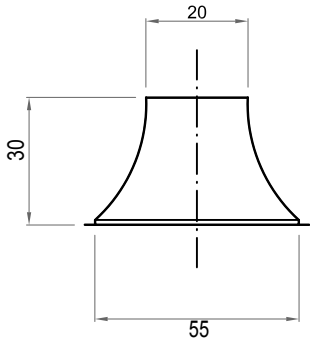
7.3 NS/SD

slot diffusers with cone-shaped nozzles

Diffuseri NS/SD



conical nozzle SD



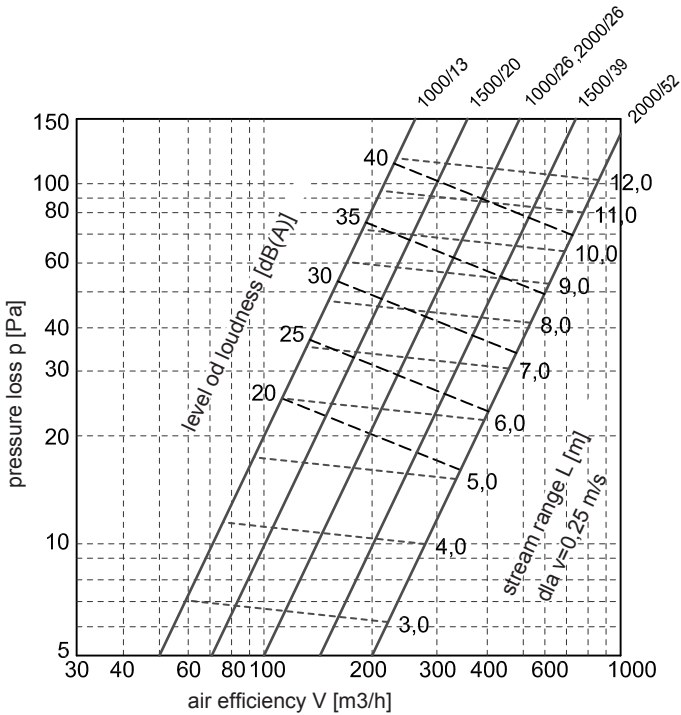
STANDARD SIZES

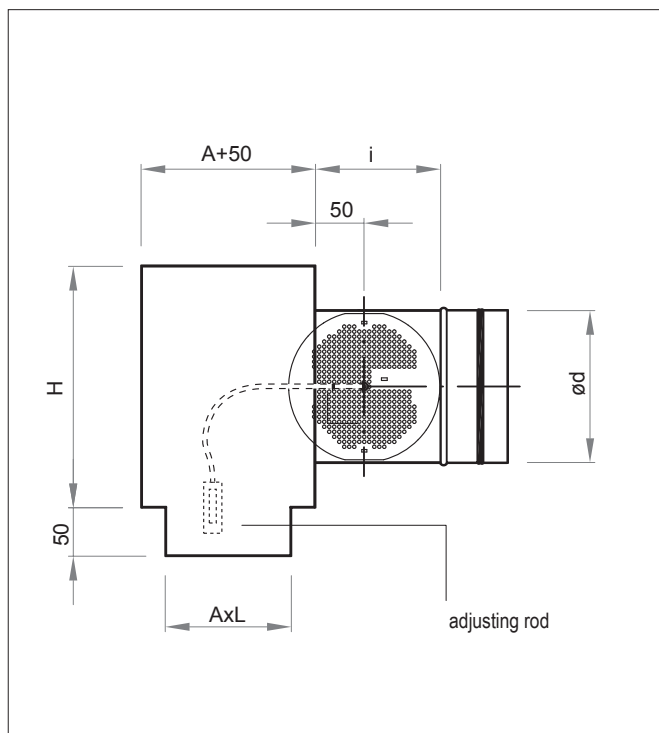
Diffuser NS/SD	A [mm]	B [mm]	C [mm]	D [mm]	H [mm]	H2 [mm]	Number of nozzles
1000/13	80	1000	110	1030	20	50	13
1000/26	150	1000	180	1030	20	50	26
1500/20	80	1500	110	1530	20	50	20
1500/39	150	1500	180	1530	20	50	39
2000/26	80	2000	110	2030	20	50	26
2000/52	150	2000	180	2030	20	50	52

FEATURES

The figure shows airflow capacity V (m³/h), pressure loss p (Pa), airflow scope L (m) for end speed of 0.25 m/s, and volume level [db(A)].

The airflow scope L relates to isothermal air supply.





DESCRIPTION

SR/NSSD are expansion boxes for slot diffusers NS/SD. They stabilize the airflow and ensure uniform air supply to the diffuser. Expansion boxes connect diffusers with ventilation installation. They are made of zinc-coated sheet, joint by non-welded Click-Clock connection. Expansion boxes can be connected to the ventilation installation through the side or top. Boxes can be thermally and acoustically insulated from the inside by K-Flex rubber mat.

Upon customer's request we can make other types of expansion boxes accordingly to provided drawings. In standard expansion boxes are equipped on the ferrule with machine crimped rubber gasket.

ORDER REFERENCE

SR / NSSD - 1000/13 - P - I

diffuser type

size

no throttle
P perforated damper
with adjusting rod

non-insulated
I insulated

STANDARD SIZES

	1000/13	1000/26	1500/20	1500/39	2000/26	2000/52
A [mm]	80	150	80	150	80	150
L [mm]	1000	1000	1500	1500	2000	2000
H[mm]	225	260	225	260	225	260
Ød [mm]	1 x 123	1 x 158	1 x 123	1 x 158	2 x 123	2 x 158
i [mm]	115	130	115	130	115	130

7.3 SR/NS/SD

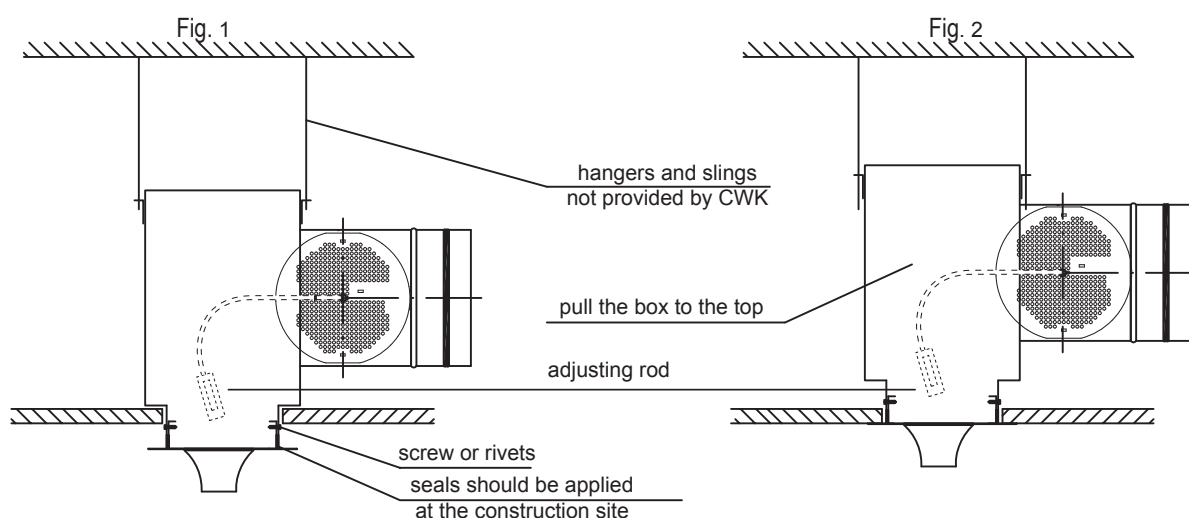
expansion boxes for diffusers NS/SD

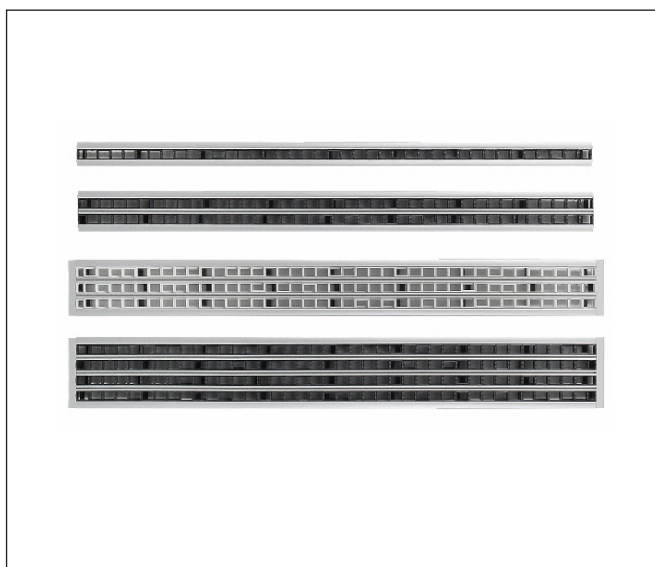
INSTALLATION

Expansion boxes SR/NSSD are designed for installation in the underslung ceiling. Prepare an installation hole of a size of CxD for the chosen diffuser. Put the expansion in, accordingly to Fig. 1 slide the front panel of the diffuser onto the box. Pull the box up and hang on the roof using appropriate hangers (bars, pins...) or installation slings (Fig. 2).

Upon customer's request, boxes can be equipped with factory slings.

INSTALLATION IN THE ROOF





registered design

DESCRIPTION

NSZ are slot air vents with mobile directing elements, available for installation in false ceilings. They consist of a front element and 1 to 4 slots. Finishing is available in the form of plates or angle brackets, fitted with elements directing the air stream, factory-adjustable with a possibility of later adaptation to local conditions.

The choke length of a slot air vent is variable. The front element is installed on an expansion box only at the construction site. Upon request, the expansion box may be fitted with internal insulation, with a round connector pipe on the side, which is connected to the choke valve, adjustable from the front.

Thanks to their small dimensions, these air vents can be used in low mid-ceiling areas, especially in false ceilings. Their high stream induction results in a rapid decrease in the difference of temperature and flow velocity.

The recommended difference of air-supply temperature is 10 K. A stable air-supply stream makes slot air vents perfect for small and variable flow of air. The air-supply direction may be adjusted to desired internal conditions. If the change of direction of exhaust is needed, it can be performed by turning directing elements.

MATERIAL:

The front element, extra profile and finishing elements are made of moulded aluminium profile, natural colour anodised or powder veneered with a RAL palette colour. Elements controlling the stream of air are made of black plastic (polystyrene, standard finish) – colour similar to RAL 9005, or of white plastic – colour similar to RAL 9003

FEATURES

- simultaneous vertical and horizontal air-supply
- high rate of induction
- possibility to adjust air-supply to desired internal conditions
- controlling elements are made of high quality white or black PVC
- air vents are made of decorative aluminium profiles
- possibility to install single vents in a row
- possibility to install with an SR/NSZ plenum box
- low height
- standard air vents are natural colour anodised
- possibility to prepare a vent of any length (upon special request)
- assembly with springs

ORDER REFERENCE

NSZ - 1 - SR - P **Z1** **1000** **C** - **RAL9003**

typ

number of slots:
1 - 2 - 3 - 4

expansion box

P - performance control

length: 600, 1000, 1200, 1500, 1800, 2000

deflector:
B - white, C - black

RAL 9003,
Anoda Kol. NAT

INSTALLATION

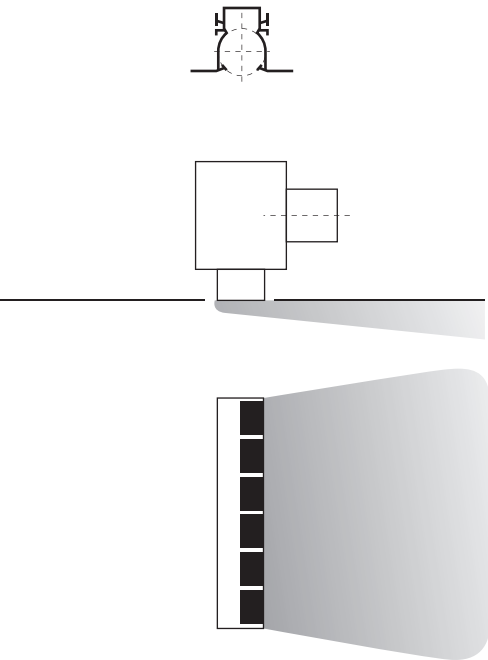
NSZ slot air vents can be installed together with an SR/NSZ plenum box. The air vent should be fitted into a box with the use of rivets or screws. It is important to remember about sealing the connection, for example with a silicone gasket.

Thanks to their small dimensions, these air vents can be used in low mid-ceiling areas, especially in false ceilings.

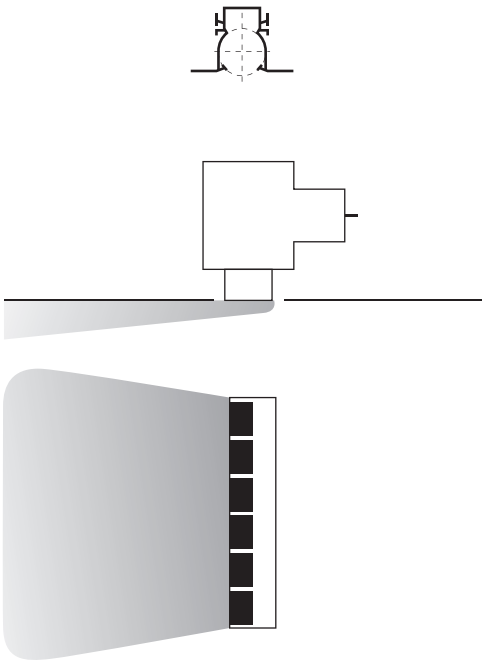
7.4 NSZ

slot air vents

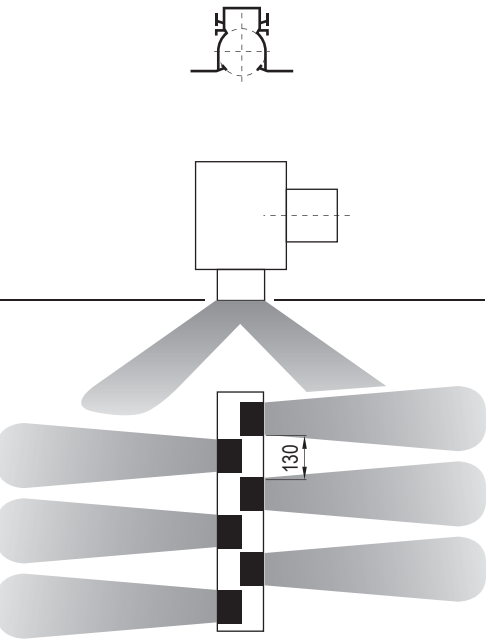
HORIZONTAL AIR EXHAUST - RIGHT



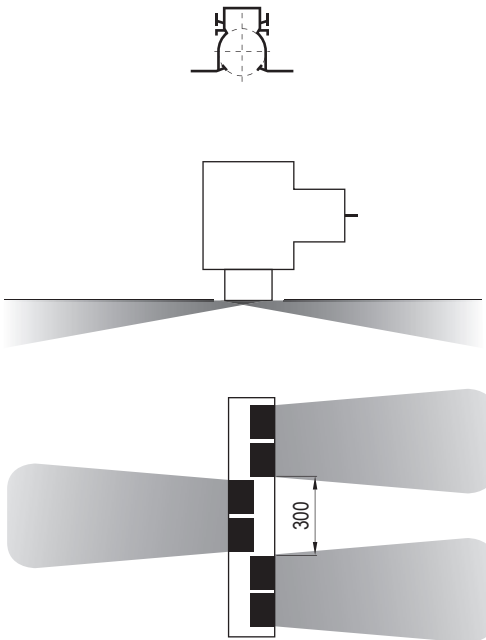
HORIZONTAL AIR EXHAUST - LEFT



VARIABLE AIR EXHAUST - SLANT

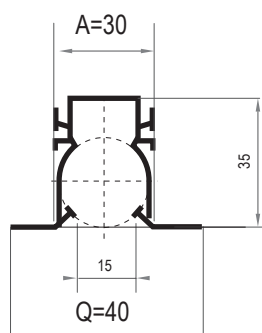


VARIABLE AIR EXHAUST - HORIZONTAL

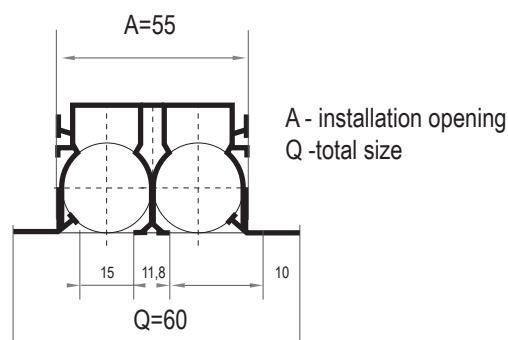


7

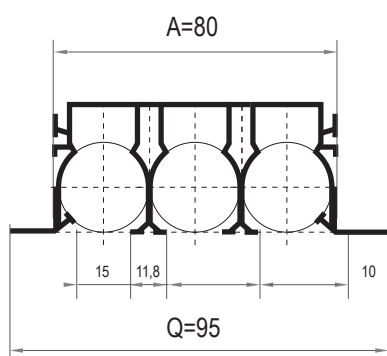
NSZ - 1



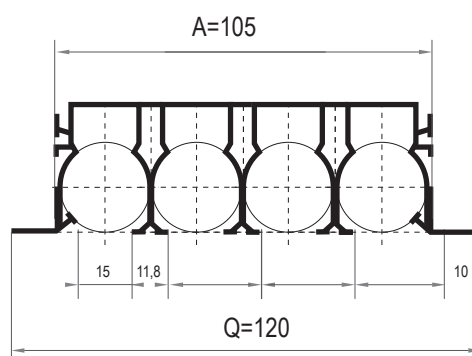
NSZ - 2



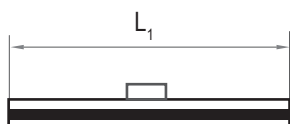
NSZ - 3



NSZ - 4



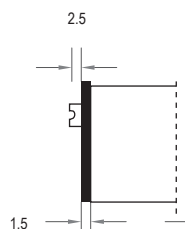
FINISHING ELEMENTS



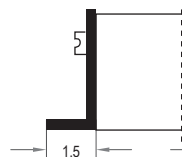
without the finishing element



finishing element on both sides



finishing angle bracket

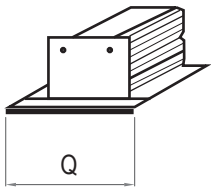


finishing plate

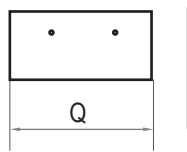
7.4 NSZ

slot air vents

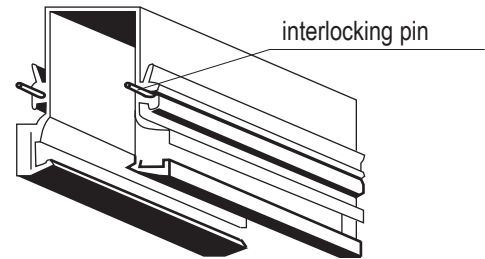
FINISHING ANGLE BRACKET



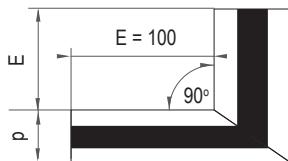
FINISHING PLATE



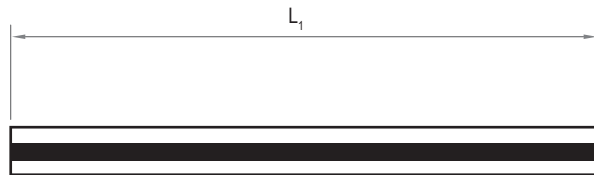
JOINT CONNECTION



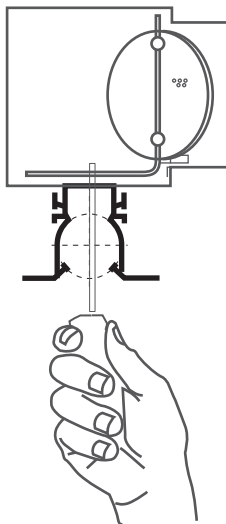
90° ANGLE ELEMENT



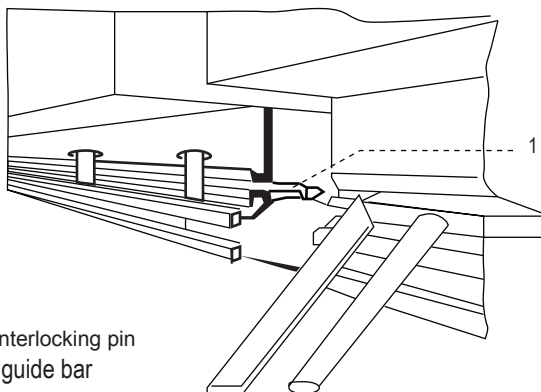
FRONT BAR 'F'



FRONTAL AIR STREAM CONTROL



INSTALLATION WITH A LINEAR ARRANGEMENT OF DIFFUSERS



1 interlocking pin
2 - guide bar

DESIGNATIONS

V	$l/s \cdot m$:	efficiency for 1 rms
V	$m^3/s \cdot m$:	efficiency for 1 rms
V_t	l/s :	total efficiency
V_t	m^3/s :	total efficiency
A	m :	distance between two air vents
H_1	m :	distance between the ceiling and human activity zone
H_{1MAX}	m :	max. range of a warm air stream
L	m :	distance from an air vent $L = A/2 + H_1$ lub $L = X + H_1$
V_{H1}	m/s :	average velocity of the air stream between two air vents in H_1 time
V_L	m/s :	average velocity of the air stream along the wall, in distance L
V_{elf}	m/s :	effective exhaust velocity
Δt_z	K :	difference in temperature between air in the room and supplied air
Δt_L	K :	difference between the temperature of the room and stream temperature, in distance L
Δt_{H1}	K :	difference between the temperature of the room and stream temperature, in distance H_1
ΔP_t	Pa :	loss of total pressure
L_{WA}	$dB(A)$:	sound intensity level in A scale
L_{WNC}	:	limit curve spectrum sound
L_{WNR}	:	$L_{WNR} = L_{WNC} + 2$
L_{PA}, L_{PNR}	:	limit curve of the sound intensity spectrum A lub NC scale in a room $L_{PA} \approx L_{WA} - 8 \text{ dB}$ $L_{PNC} \approx L_{WNC} - 8 \text{ dB}$
ΔL	dB/oct :	relative level of sound intensity, in reference to L_{WA}
L_{WA}	dB/oct :	octave level of sound intensity for illegible/ $L_W = L_{WA} + \Delta L$

EFFECTIVE INFLOW VELOCITY

$$V_t \text{ l/s} \quad V_t \text{ m}^3/\text{h}$$

$$V_{\text{elf}} = \frac{V_t}{S_{\text{elf}} \cdot L_1 \cdot 1000} [\text{m/s}] \quad V_{\text{elf}} = \frac{V_t}{S_{\text{elf}} \cdot L_1 \cdot 3600} [\text{m/s}]$$

L_1 = length of the slot diffuser [m]

slot length $L_1 = 1000 \text{ mm}$
total efficiency $V_t = 25 \text{ l/s}$
connector pipe diameter $D = 98 \text{ mm}$
search for: octave level of sound intensity

Diagram 1: Sound intensity and pressure loss
 $\Delta p_t = 17 \text{ Pa} \cdot 1,4 \approx 24 \text{ PS}$ $LWA = 29 \text{ dB(A)}$
Effective exhaust velocity V_{eff}

$$V_{\text{elf}} = \frac{V_t}{S_{\text{elf}} \cdot L_1 \cdot 1000} = \frac{25}{0,0049 \cdot 1,05 \cdot 1000} = 49 \text{ m/s}$$

EFFECTIVE WIDTH OF A SLOT

Air exhaust	horizontal	slant
$S_{\text{eff}} [\text{m}]$	0,00062	0,0049

SPECTRUM DATA

Example

Data:

NSZ -1; variable slant exhaust

Average octave frequency [Hz]	63	125	225	500	1000	2000	4000	8000
$L_{WA} \text{ dB (A)}$	29	29	29	29	29	29	29	29
$\Delta L \text{ dB}$	3	2	7	-3	-15	-23	-32	-38
$\Delta_w \text{ dB}$	32	30	36	26	14	6	-2	-9

THE RELATIVE SPECTRUM ΔL FOR THE ANGLE OF THE DAMPER POSITION 0°

type	length mm	effective outflow velocity $V_{\text{eff}} V_{\text{elf}} \text{ m/s}$	average frequencies of octave band							
			63	125	250	500	1000	2000	4000	8000
NSZ -1	600 1000 1500	2	13 17 16	6 2 8	6 7 6	-6 -10 -8	-28 -30 -26	-42 -43 -36	-45 -46 -47	-50 -52 -53
	600 1000 1500	3	9 11 11	5 2 6	6 7 7	-4 -6 -5	-21 -22 -20	-32 -34 -29	-35 -42 -38	-40 -48 -46
	600 1000 1500	5	3 3 3	2 1 2	6 7 6	-1 -3 -2	-14 -15 -13	-21 -23 -20	-28 -31 -30	-34 -38 -40
	600 1000 1500	7	-2 -3 -3	0 0 -1	4 6 5	0 -2 -1	-10 -10 -9	-14 -16 -16	-27 -29 -33	-31 -34 -36
NSZ -2	600 1000 1500	2	14 20 5	9 7 8	5 6 7	-5 -9 -5	-24 -20 -18	-33 -27 -26	-37 -35 -37	-42 -45 -47
	600 1000 1500	3	9 14 1	7 6 5	6 7 7	-3 -5 -3	-18 -15 -14	-26 -23 -22	-30 -34 -36	-36 -43 -43
	600 1000 1500	5	0 6 -5	3 3 1	6 6 6	-1 -3 -2	-11 -12 -10	-19 -19 -17	-27 -30 -32	-33 -38 -40
	600 1000 1500	7	-6 -1 -10	-1 0 -2	5 6 5	-1 -2 -1	-8 -10 -8	-15 -17 -15	-29 -35 -36	-30 -38 -38
NSZ -3	600 1000 1500	2	10 9 11	5 6 2	6 7 7	-3 -7 -5	-24 -16 -17	-39 -28 -26	-44 -38 -36	-51 -48 -48
	600 1000 1500	3	5 3 5	4 4 1	6 7 7	-2 -5 -4	-18 -13 -13	-28 -23 -21	-35 -36 -35	-42 -45 -45
	600 1000 1500	5	-2 -6 -3	1 0 0	6 7 6	-2 -3 -3	-10 -11 -9	-17 -17 -15	-28 -29 -33	-36 -39 -42
	600 1000 1500	7	-8 -12 -8	-2 -3 -2	4 6 5	-2 -2 -3	-6 -9 -7	-10 -14 -12	-30 -32 -36	-34 -36 -40
NSZ -4	600 1000 1500	2	9 13 4	6 5 3	7 7 7	-5 -7 -5	-18 -18 -13	-29 -28 -21	-34 -38 -36	-45 -50 -45
	600 1000 1500	3	5 5 1	5 3 2	7 7 7	-4 -5 -4	-13 -13 -10	-22 -21 -18	-29 -32 -26	-40 -44 -38
	600 1000 1500	5	-2 -6 -4	2 -1 1	6 6 6	-4 -4 -3	-7 -7 -7	-15 -15 -14	-28 -28 -26	-36 -38 -35
	600 1000 1500	7	-7 -14 -8	-1 -4 -1	4 3 5	-4 -4 -3	-5 -4 -6	-11 -11 -12	-31 -30 -27	-35 -33 -32

7.4 NSZ

slot air vents

ACOUSTIC DATA

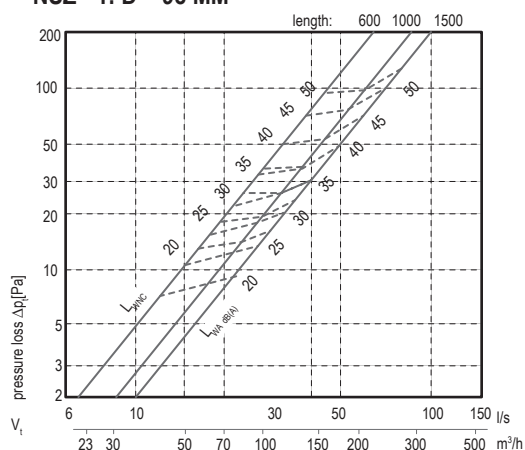
D=98 mm		horizontal exhaust			slant exhaust		
angel		0°	45°	90°	0°	45°	90°
L1 = 600	Δp_t	x1	x 1,3	x 2,0	x 1,7	x 1,9	x 2,6
L2 = 1000	Δp_t	x1	x 1,3	x 2,6	x 1,4	x 1,7	x 3,0
L3 = 1500	Δp_t	x1	x 1,5	x 3,5	x 1,2	x 1,6	x 3,8
	L_{WA}	-	+3	+5	-	+3	+5
	L_{WNC}	-	+3	+5	-	+4	+6

D=123 mm		horizontal exhaust			slant exhaust		
angel		0°	45°	90°	0°	45°	90°
L1 = 600	Δp_t	x1	x 1,1	x 1,6	x 1,8	x 1,9	x 2,3
L2 = 1000	Δp_t	x1	x 1,2	x 2,2	x 1,6	x 1,8	x 2,8
L3 = 1500	Δp_t	x1	x 1,3	x 2,3	x 1,4	x 1,7	x 3,2
	L_{WA}	-	+3	+5	-	+4	+5
	L_{WNC}	-	+4	+6	-	+5	+6

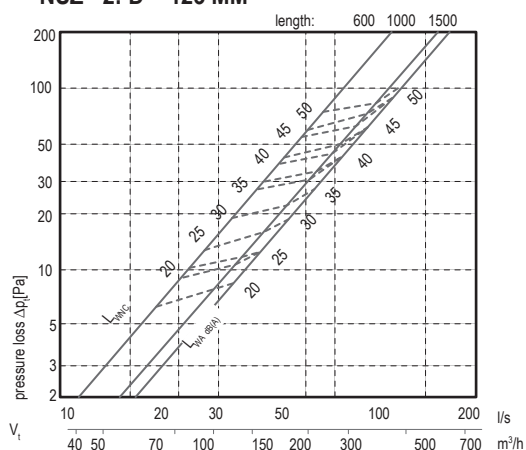
D=123 mm		horizontal exhaust			slant exhaust		
angel		0°	45°	90°	0°	45°	90°
L1 = 600	Δp_t	x1	x 1,3	x 2,4	x 1,7	x 2,0	x 3,4
L2 = 1000	Δp_t	x1	x 1,6	x 3,8	x 1,3	x 1,9	x 4,7
L3 = 1500	Δp_t	x1	x 1,5	x 4,3	x 1,2	x 1,8	x 4,4
	L_{WA}	-	+3	+5	-	+4	+7
	L_{WNC}	-	+4	+6	+1	+5	+8

D=148 mm		horizontal exhaust			slant exhaust		
angel		0°	45°	90°	0°	45°	90°
L1 = 600	Δp_t	x1	x 1,3	x 2,4	x 1,5	x 1,8	x 3,4
L2 = 1000	Δp_t	x1	x 1,5	x 4,0	x 1,5	x 1,9	x 5,1
L3 = 1500	Δp_t	x1	x 1,7	x 4,9	x 1,3	x 2,0	x 6,6
	L_{WA}	-	+4	+7	-	+5	+8
	L_{WNC}	-	+4	+6	-	+5	+8

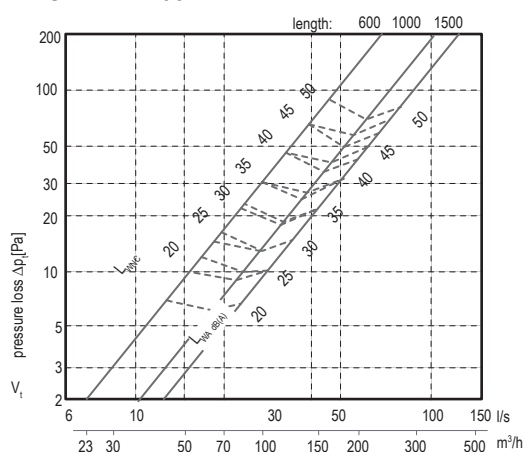
1. SOUND INTENSITY AND PRESSURE LOSS NSZ - 1: D = 98 MM



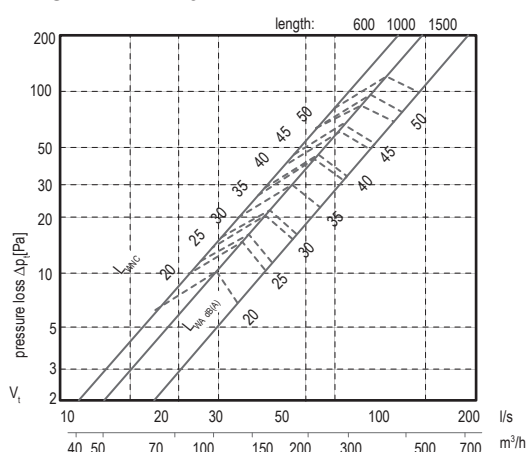
2. SOUND INTENSITY AND PRESSURE LOSS NSZ - 2: D = 123 MM



3. SOUND INTENSITY AND PRESSURE LOSS NSZ - 1: D = 98 MM



4. SOUND INTENSITY AND PRESSURE LOSS NSZ - 2: D = 148 MM

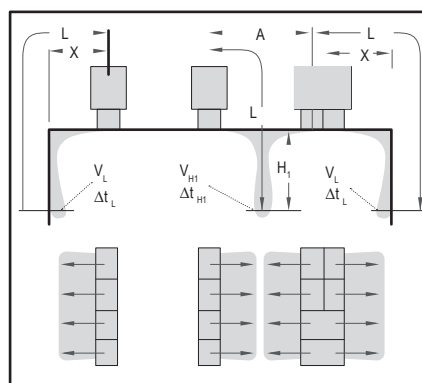
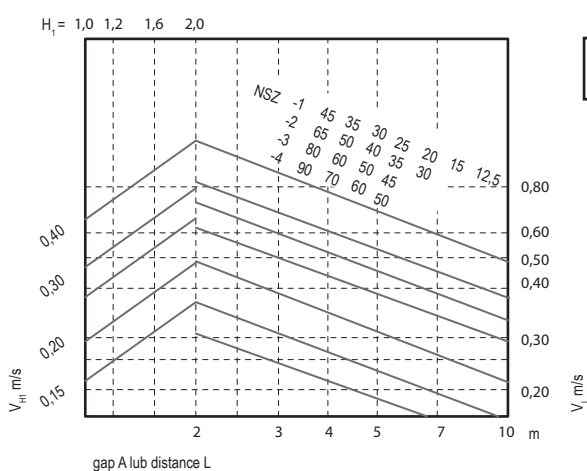


FEATURES

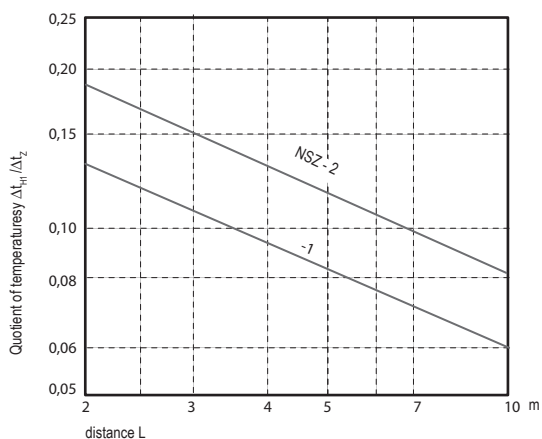
EXHAUST: ONE- AND TWO-SIDE, HORIZONTAL

9. STREAM VELOCITY BETWEEN TWO AIR VENTS AND ALONG THE WALL

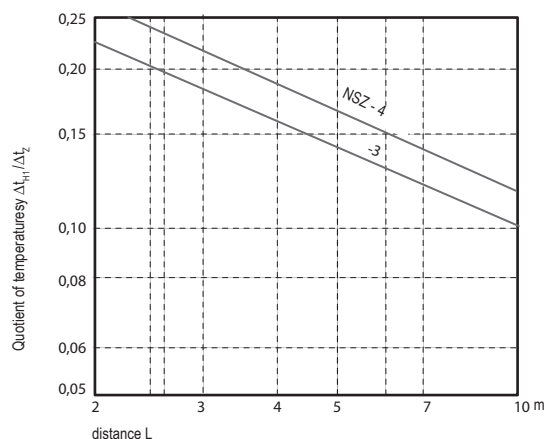
RULE OF SELECTION



10. QUOTIENT OF TEMPERATURES



11. QUOTIENT OF TEMPERATURES



7.4 NSZ

slot air vents

FEATURES

EXHAUST: VARIABLE, HORIZONTAL

Example

Data:

NSZ - variable horizontal exhaust

efficiency for 1 rms

$$V = 30 \text{ l/s} \cdot \text{m}$$

temperature difference between the room

and air-supply in the cooling mode $\Delta t_z = -10 \text{ K}$

distance between diffusers

$$A = 1,8 \text{ m}$$

distance between the ceiling and human activity

and human activity $H_1 = 1,2 \text{ m}$

distance from the air vent axis to the wall $x = 2,4 \text{ m}$

Diagram 12:

Stream velocity between two air vents

$$V_{H1} = 0,13 \text{ m/s}$$

Diagram 13:

Flow velocity alongside the wall

$$L = X + H_1 = 2,4 + 1,2 = 3,6 \text{ m}$$

$$V_L = 0,27 \text{ m/s}$$

Diagram 14:

Quotient of temperatures

$$L = A/2 + H_1 = 0,9 + 1,2 = 2,1 \text{ m}$$

$$\Delta t_L / \Delta t_z = 0,064$$

$$\Delta t_L = 0,064$$

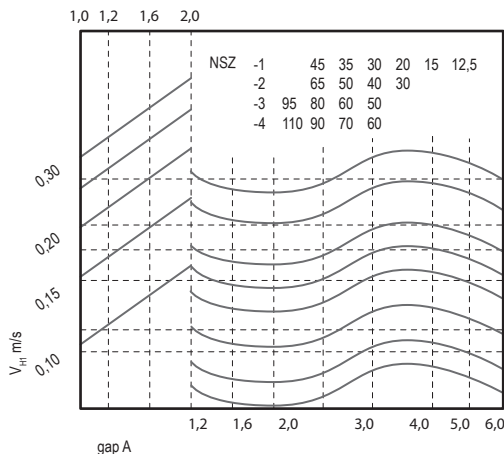
$$\Delta t_L = 0,064 \times (-10) \text{ K}$$

$$\Delta t_L = -0,64 \text{ K}$$

$$\text{For } L = X + H_1 = 3,6 \text{ m; } \Delta t_L / \Delta t_z = 0,049;$$

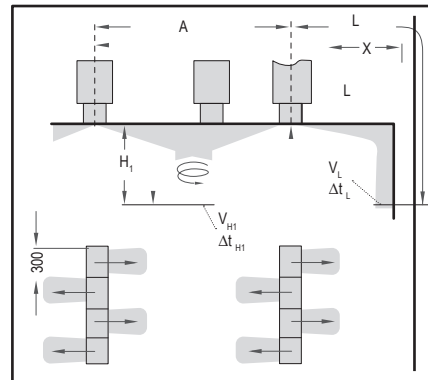
$$\Delta t_L \approx -0,5 \text{ K}$$

12. STREAM VELOCITY BETWEEN TWO AIR VENTS

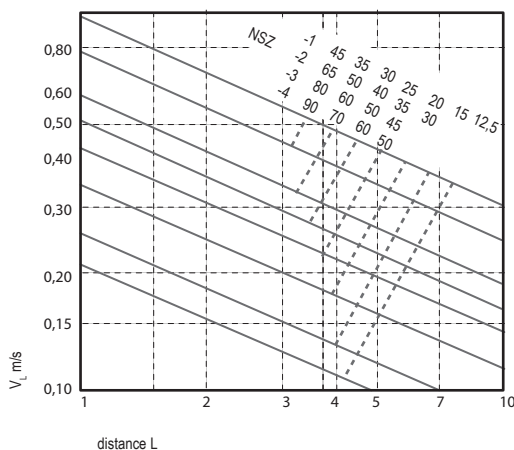


RULE OF SELECTION

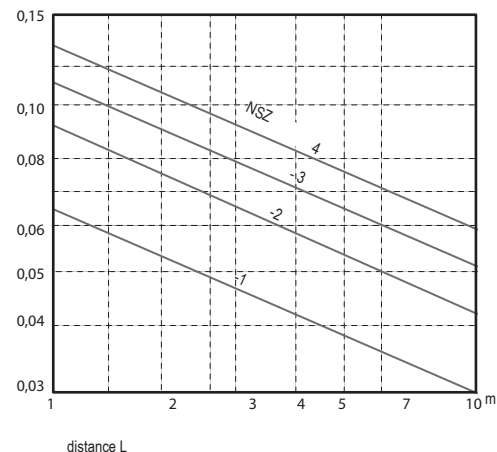
$$V[\text{m}^3/\text{h}] = V[\text{l/s}] \times 3,8$$



13. THE VELOCITY ALONG THE WALL



14. QUOTIENT OF TEMPERATURES



FEATURES

EXHAUST: VARIABLE, OBLIQUE

Example

Data:

NSZ - 1 variable horizontal exhaust
efficiency for 1 rms

temperature difference between the
room and air-supply

distance between diffusers
distance between the ceiling
and human activity

$$V = 25 \text{ l/s} \cdot \text{m}$$

$$\Delta t_z = -8 \text{ K}$$

$$\text{or } +8 \text{ K}$$

$$A = 2,4 \text{ m}$$

$$H_1 = 1,0 \text{ m}$$

Diagram 15:

Stream velocity between two air vents

$$V_{H1} = 0,20 \text{ m/s}$$

Diagram 17:

temperature quotient in the cooling mode

$$\Delta t_{H1} / \Delta t_z = 0,051$$

$$\Delta t_{H1} = -0,051 \times (-8 \text{ K}) \approx -0,4 \text{ K}$$

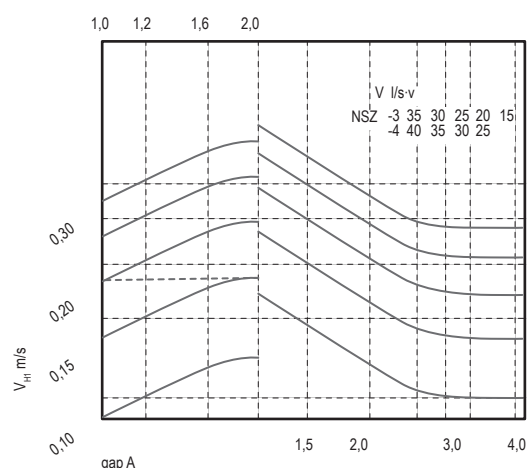
the heating mode $\Delta t_z = +8 \text{ K}$

Diagram 19:

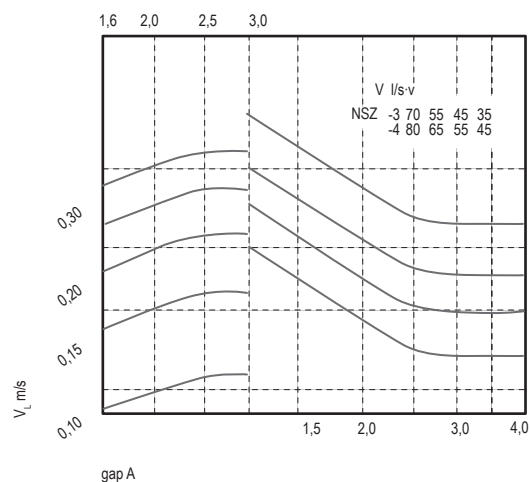
max. range of a warm air stream

$$H_{1\text{MAX}} \approx 1,5 \text{ m}$$

15. STREAM VELOCITY BETWEEN TWO AIR VENTS

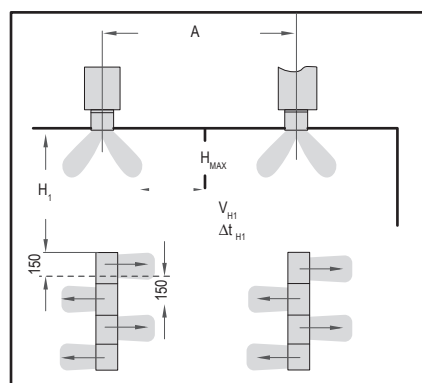


16. STREAM VELOCITY BETWEEN TWO AIR VENTS

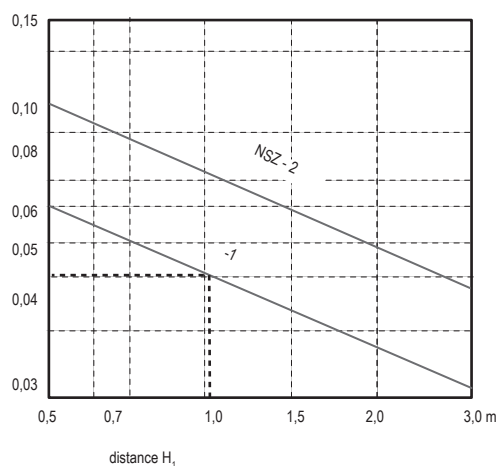


RULE OF SELECTION

$$V[\text{m}^3/\text{h}] = V[\text{l/s}] \times 3,8$$

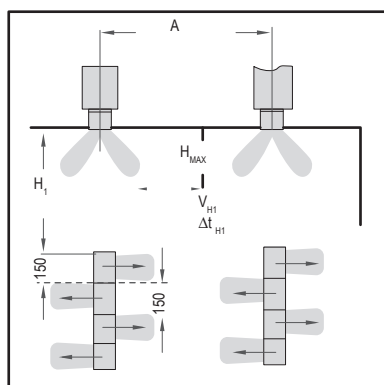


17. QUOTIENT OF TEMPERATURES

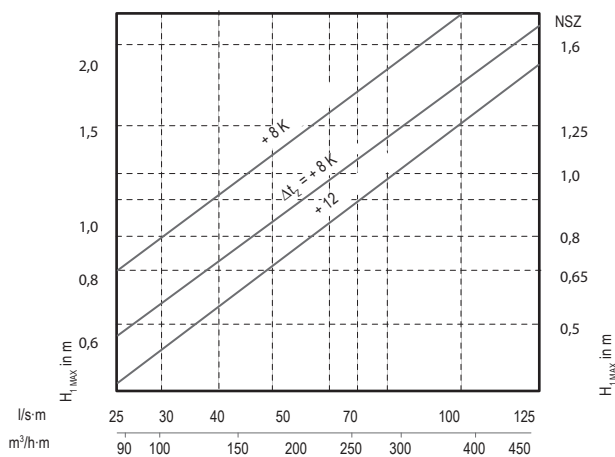


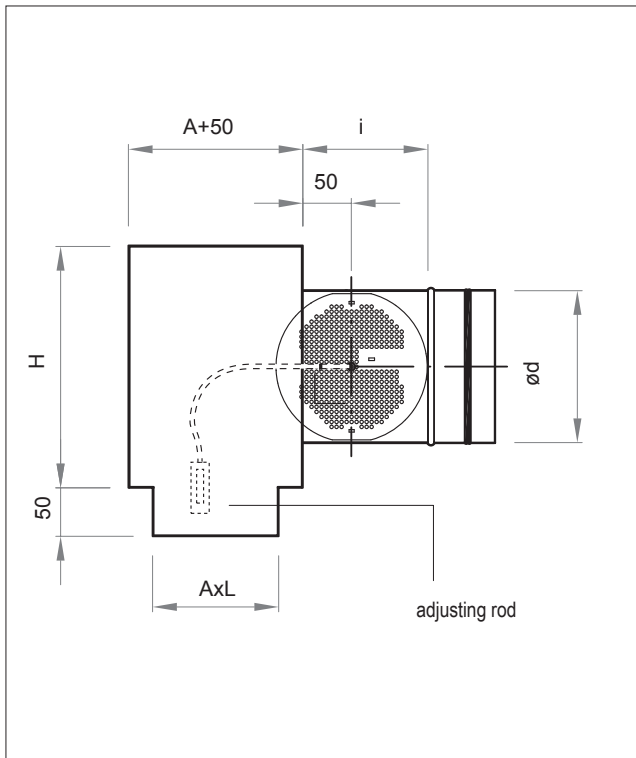
EXHAUST: VARIABLE, OBLIQUE

RULE OF SELECTION



20. MAXIMUM RANGE OF A WARM AIR STREAM





DESCRIPTION

SR/NSZ are plenum boxes for NSZ/N and NSZ/W slot air vents. They serve as elements stabilising the flow of air and cause even inflow of air to the vent.

They are also a linking element between vents and ventilation system. They are made of galvanized sheet metal, joined by unwelded Cloc-Clok connections. Connections of boxes to the ventilation system may be done only in the horizontal level of the box. It is possible to create boxes which are internally thermoinsulated and soundproofed using K-Flex rubber mat. On a special request, we can prepare other types of boxes, according to schematics provided by the ordering party.

In standard expansion boxes are equipped on the ferrule with machine crimped rubber gasket.

ORDER REFERENCE

SR / NSZ - 2 - P - I - 1000					-	b
						b - side
						g - upper
						length
						non-insulated
					I	insulated
						no throttle
					P	perforated damper
						with adjusting rod
						size:
						diffuser type

STANDARD SIZES

	1	2	3	4
A [mm]	30	55	80	105
L [mm]	600, 1000, 1200, 1500, 1800, 2000			
H [mm]	200	225	250	300
i [mm]	100	115	130	150

L ₁	NSZ			
	NSZ - 1	NSZ - 2	NSZ - 3	NSZ - 4
600				
1000	1 x 98	1 x 123	1 x 123	1 x 158
1200	1 x 123	1 x 138	1 x 158	1 x 198
1500				
1800	2 x 98	2 x 123	2 x 123	2 x 158
2000	2 x 123	2 x 138	2 x 138	2 x 198

7.4 SR/NSZ

expansion boxes for diffusers NSZ

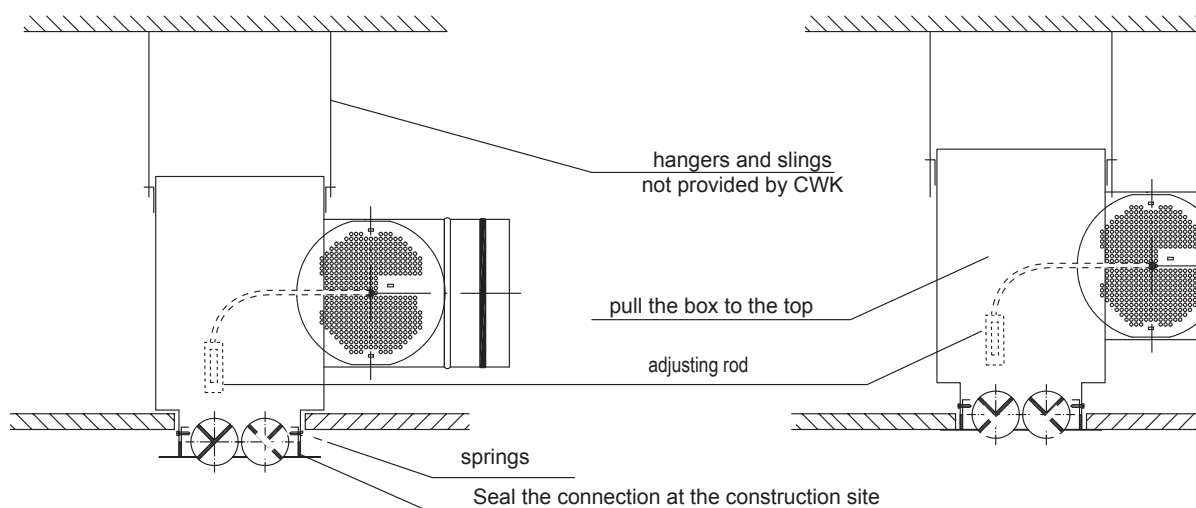
INSTALLATION

SR/NSZ plenum boxes are designed for installation in the false ceiling space. In order to install it, an installation opening should be made in the false ceiling (size: A x L for a box of a given size). Put the expansion in, accordingly to Fig. 1 slide the front panel of the diffuser onto the box. Pull the box up and hang on the roof using appropriate hangers (bars, pins...) or installation slings (Fig. 2). Upon customer's request, boxes can be equipped with factory slings.

INSTALATION IN THE ROOF

Fig. 1

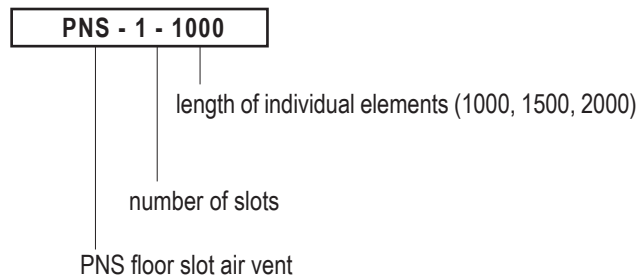
Fig. 2



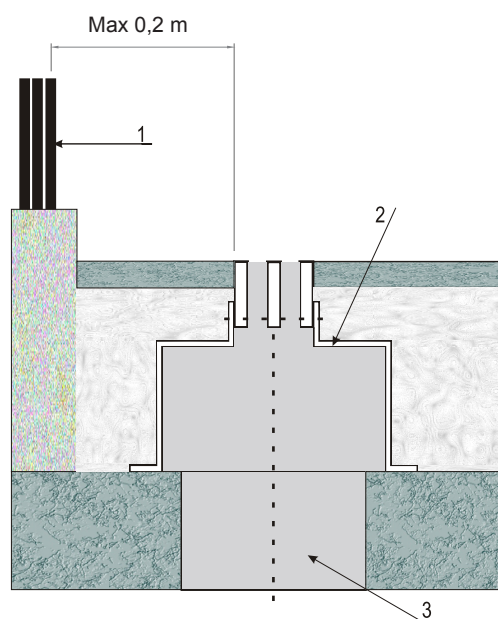


- simple installation
- customised air vent length (clients' requirements)

ORDER REFERENCE



INSTALLATION METHOD



1. glazed surface
2. PNS floor slot air vent
3. air duct

DESCRIPTION

PNS floor slot air vents are available as 1-, 2-, 3-, 4-, 5- and 6-row models. They are made of aluminium profiles and include a support frame (also made of aluminium).

One section may be 200 – 2000 mm long. The colour and coating technique is adjusted to individual clients' needs. The device is covered with RAL 9003 coat as a standard.

APPLICATION

PNS floor slot air vents are designed for providing ventilation in indoor swimming pools and similar interiors with large windows and glass surfaces. They are mounted in the floor. The air is supplied from the bottom up to the glazed surfaces. A selection of a proper air vent size guarantees the supply of a proper amount of air without swirls and with correct sound intensity values (LWA 35 dB(A)).

BENEFITS OF THE SOLUTION

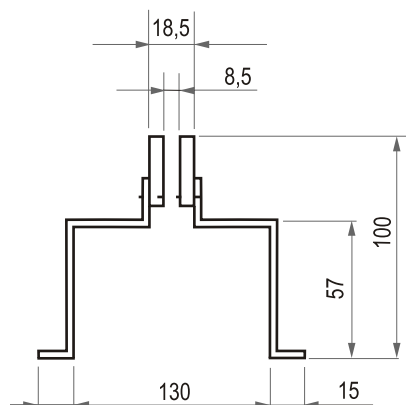
- prevent dew formation
- guarantee optimum ventilation
- no heat losses
- little pressure losses
- prevent cool air penetration through window surfaces
- do not cause the air to warm up in the vicinity of windows on sunny days

7.5 PNS

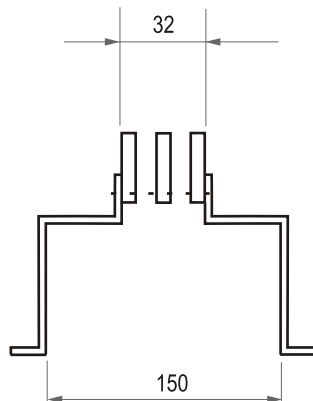
floor slot air vents

Modele

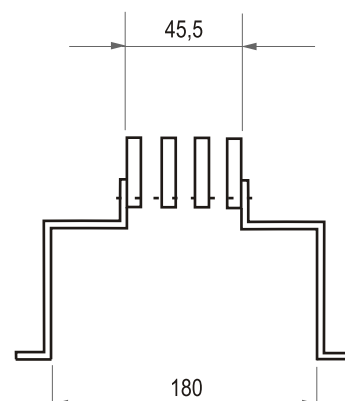
1-row model PNS-1



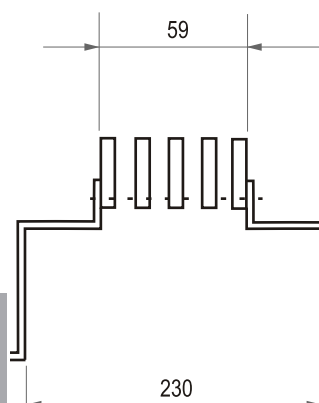
2-row model PNS-2



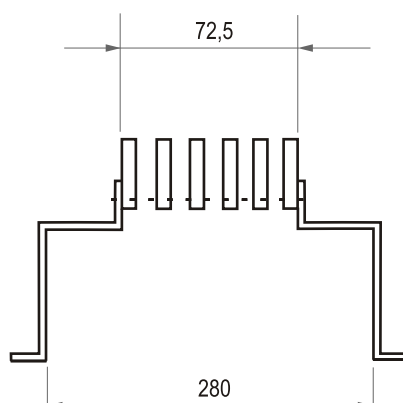
3-row model PNS-3



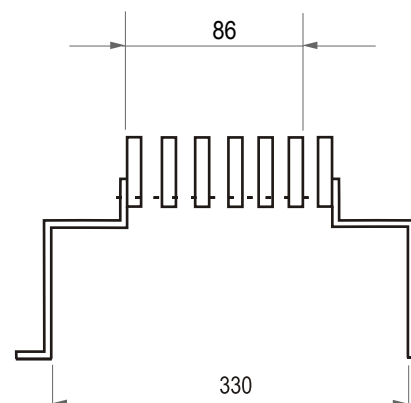
4-row model PNS-4



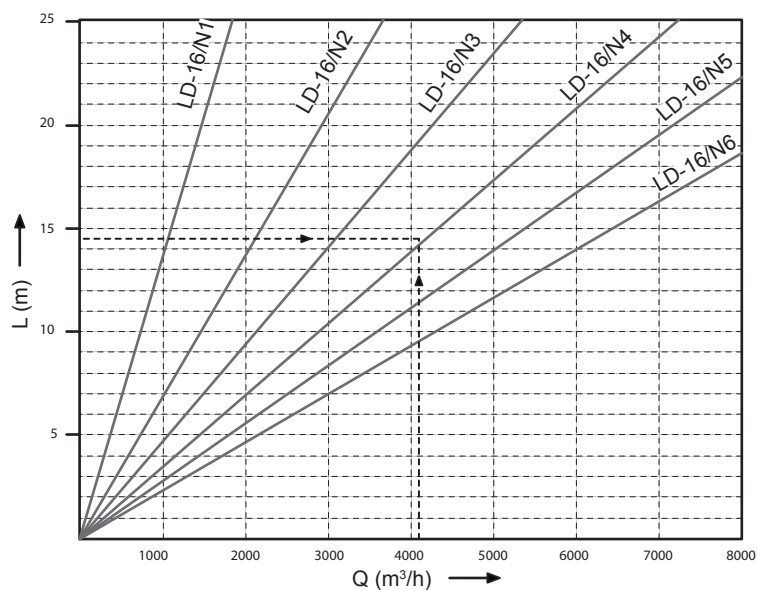
5-row model PNS-5



6-row model PNS-6

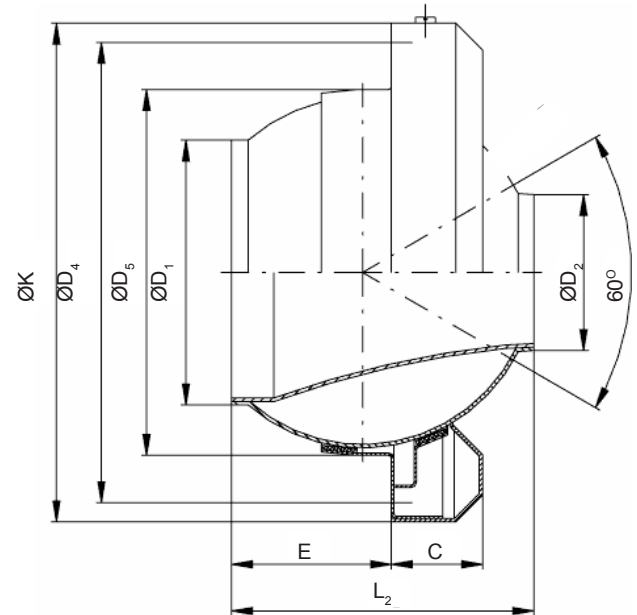


7



$L_{WA} < 35 \text{ dB(A)}$; $V_{ef} = 2,5 \text{ m/s}$; $\Delta p_t = 80 \text{ Pa/m}$

$Q \text{ (m}^3\text{/h)}$	volume of supplied air
$L_{WA} \text{ (dB(A))}$	sound intensity level
$\Delta p_t \text{ (Pa)}$	pressure loss
$L \text{ (m)}$	slot air vent length
$V_{ef} \text{ (m/s)}$	effective air speed



DESCRIPTION

DDZ/K are short long-throw nozzles designed for rooms of large cubic capacity. Long scope of the airflow ensures best spread of the air. Silent nozzles are capable of high efficiency. DDZ/K can be installed individually or in rows what increases their combined efficiency.

The air can be supplied at the temperature lower or higher by 8°C than the temperature in the ventilated room. The angle of the air-flow stream can be adjusted up to 0-30° in any direction. Nozzles are ideal for sport facilities, industrial halls, event facilities, theatres, cinemas, etc. They provide maximum air supply with the minimum noise level. Recommended installation in the wall, ceiling or ventilation ducts.

DDZ/K come with a decorative frame, which covers installation screws.

FEATURES

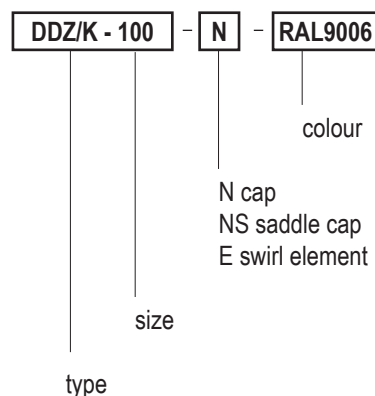
- maximum air supply with the minimum noise level
- airflow stream can be adjusted up to 0-30° in any direction
- can be installed individually or in rows what increases their combined efficiency
- nozzles made of aluminium, with a decorative frame, covering installation screws
- available in standard RAL 9006 colour
- upon customer's request, can be painted in any colour from RAL palette

STANDARD SIZES

Size	50	100	150	200
Ø D1 [mm]	70	150	210	260
Ø D2 [mm]	50	100	150	200
Ø D5 [mm]	120	220	325	360
Ø D4 [mm]	145	255	370	415
C [mm]	35	55	55	75
E [mm]	42	70	110	115
L2 [mm]	88	160	230	270
Ø K [mm]	160	285	390	460

Ø D5 - installation hole size

ORDER REFERENCE



8.1 DDZ/K

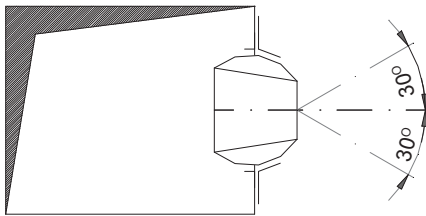
short long-throw nozzles

INSTALLATION

Before installation remove the decorative frame from the nozzle. Long-throw nozzles should be installed to the flat surface of walls, ceilings or rectangular ventilation ducts. Cut the installation hole sized ØD5 for the appropriate size and slide the nozzles up to the depth of the fixing collar.

Remember to seal joint, with for example silicon gasket. The collar should be fixed to the surface through installation holes using screws or bolts. Put the frame on and screw it with a bolt to the collar of the nozzle.

EXAMPLE ASSEMBLY



NOZZLES ARRANGEMENT

The table below shows basic sizes useful when choosing nozzles lay out.

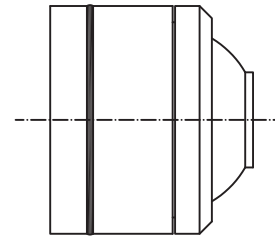
Size		50	100	150	200
height of the installation	min. [m]	2.5	3.0	3.3	3.6
	max. [m]	3.3	5.4	8.6	10.7
min. distance between nozzles [m]		0.16	0.3	0.46	0.46

ACCESSORIES

N-Cap for spiro pipe

The cap allows for installation of the DDZ/K directly at the end of round ventilation duct. Equipped with a rubber gasket.

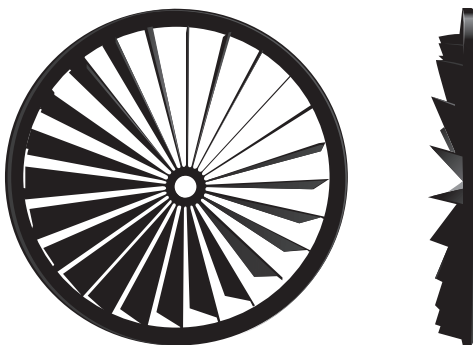
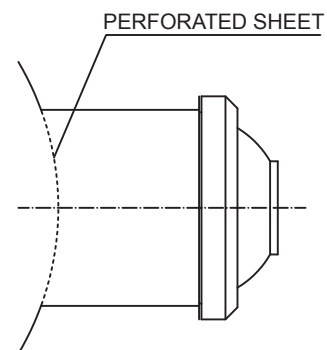
Nozzle size	Duct diameter [mm]
50	160
100	250
150	400
200	450



NS-Saddle cap for spiro pipe

The cap allows for installation of the DDZ/K directly to the side of a round ventilation duct. Equipped with perforated sheet.

Nozzle size	Duct diameter [mm]
50	arranged individually
100	arranged individually
150	arranged individually
200	arranged individually



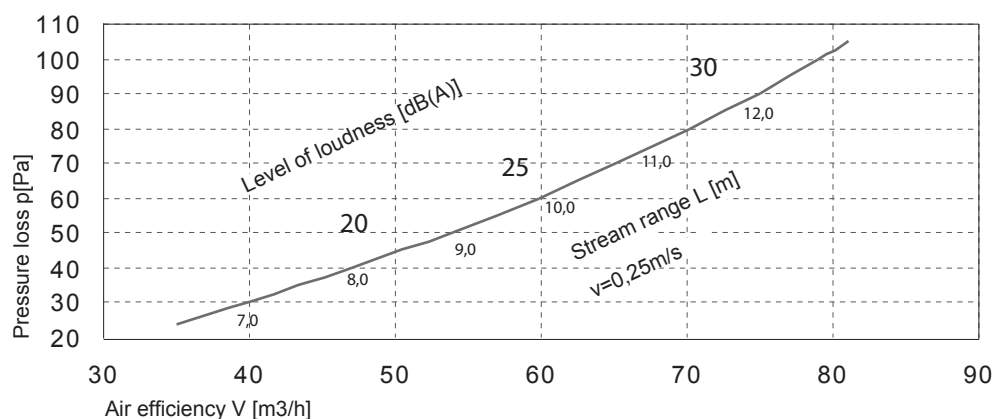
swirl element

FEATURES

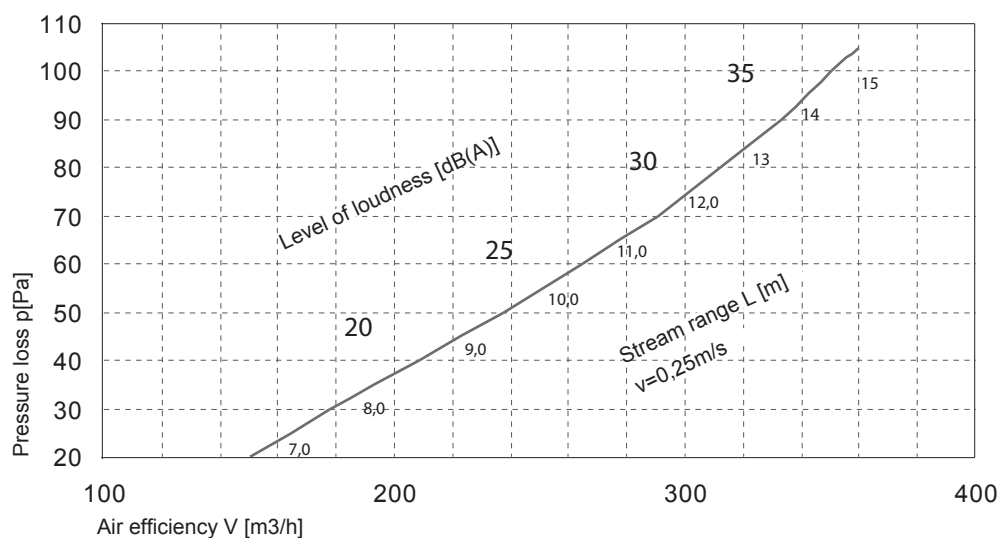
The figure shows airflow capacity V (m³/h), pressure loss p (Pa), air-flow scope L (m) for end speed of 0.25 m/s, and volume level [db(A)].

The airflow scope L relates to isothermal air supply.

Nozzle size 50



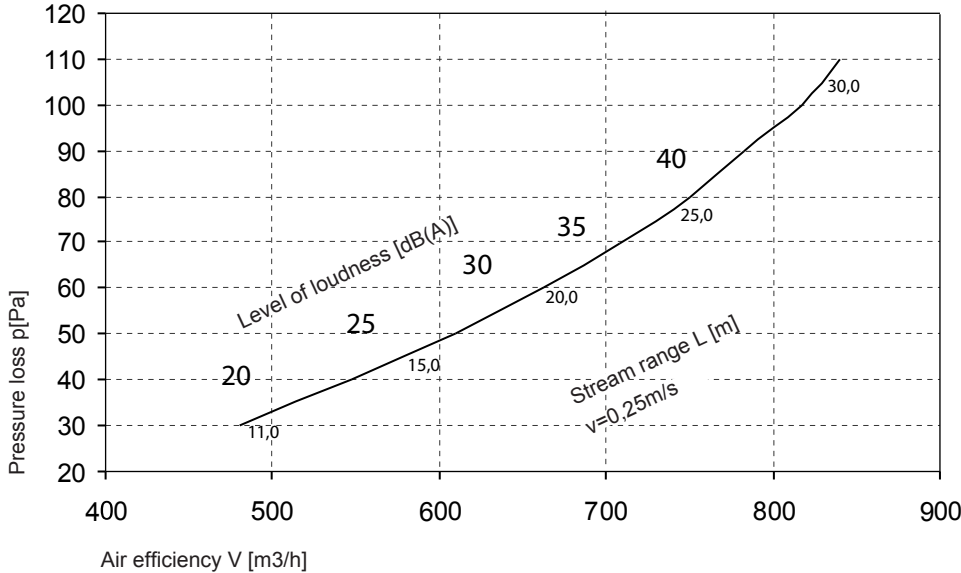
Nozzle size 100



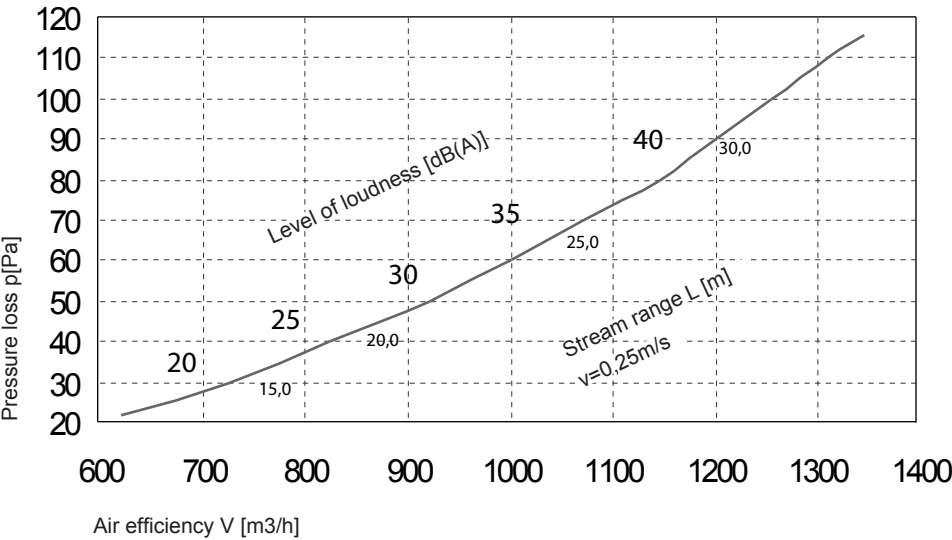
8.1 DDZ/K

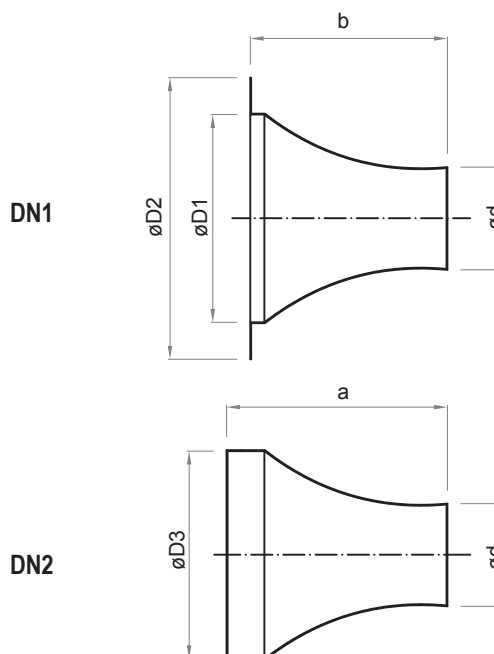
short long-throw nozzles

Nozzle size 150



Nozzle size 200





DESCRIPTION

DN are ventilating nozzles designed for rooms of large cubic capacity. Long scope of the airflow ensures best spread of the air. Silent nozzles are capable of high efficiency.

Nozzles are ideal for sport facilities, event facilities and shopping centres. The air can be supplied at the temperature lower or higher by 8°C than the temperature in the ventilated room. Recommended installation in the wall, ceiling or ventilation duct.

FEATURES

- nozzles made of aluminium
- made in two variants:
1 – for flat installation
2 – for installation on spiro pipe
- can be used individually or in surfaces to increase their efficiency
- available in standard RAL 9006 colour
- upon customer's request, can be painted in any colour from RAL palette

AKCESORIA

N-Cap for spiro pipe

The cap allows for installation of the DDZ/K directly at the end of round ventilation duct. Equipped with a rubber gasket.

STANDARD SIZES

DN	Ød [mm]	ØD1 [mm]	ØD2 [mm]	ØD3 [mm]	a [mm]	b [mm]	m	Pipe diameter [mm]
20	20	40	52	-	-	60	0,180	-
50	50	100	116	120	125	100	0,155	125
100	100	200	220	245	185	160	0,150	250
160	160	250	290	310	275	250	0,145	315
200	200	320	360	395	300	270	0,145	400
250	250	400	440	445	380	350	0,150	450

m - turbulence factor

ORDER REFERENCE

DN - 2 - 160	-	N	-	RAL9006
type	size	colour	N cap (only for DN-2) E swirl element	
	1 for flat surfaces 2 for spiro pipe			

ventilating nozzles

FEATURES

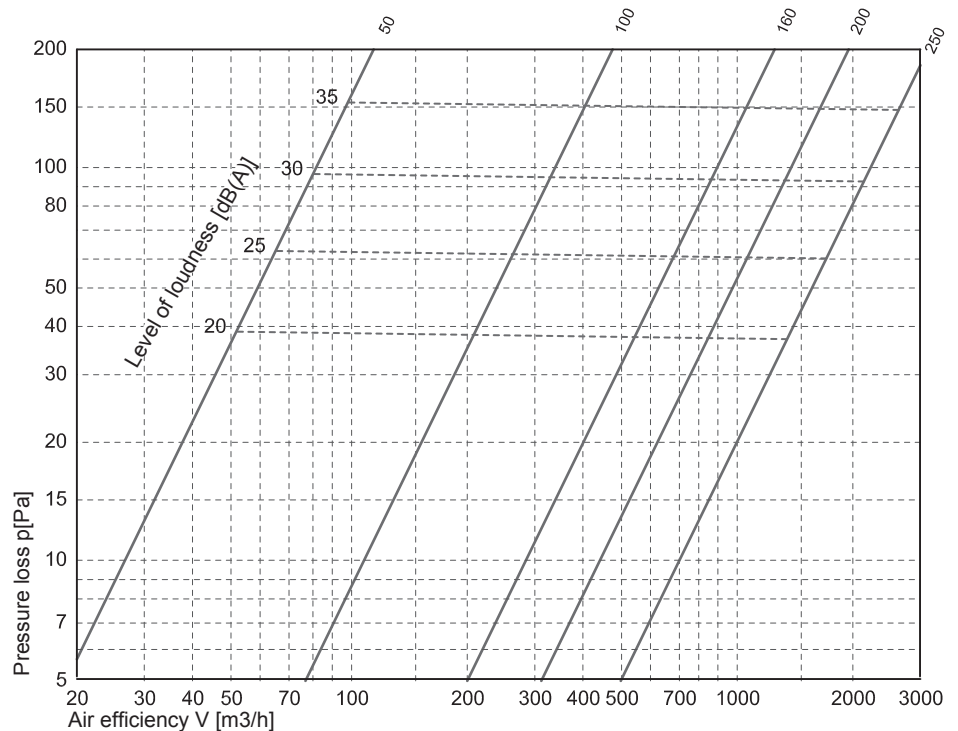
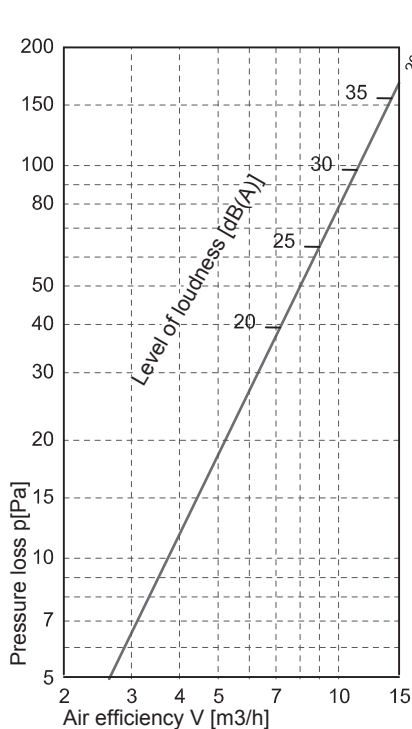
The figure shows airflow capacity V (m³/h), pressure loss p (Pa), airflow scope L (m) for end speed of 0.25 m/s, and volume level [db(A)].

The airflow scope L relates to isothermal air supply.

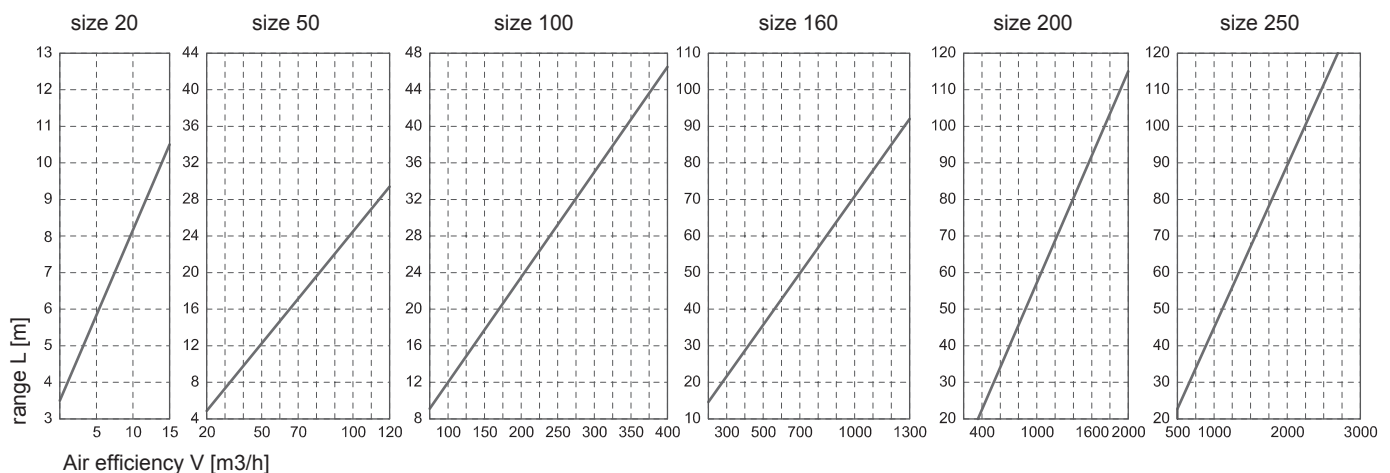
INSTALLATION

Nozzles DN-1 should be installed on the flat surface of walls, ceilings or rectangular ventilation ducts. Cut the installation hole sized $\varnothing D1$ for the appropriate size and fix the nozzle using screws or bolts. Remember to seal joint, with for example silicon gasket.

Nozzles DN-2 should be installed using steel bolts directly at the end of round ventilation duct. To connect the nozzle with the duct, use cap N.



AIR FLOW SCOPE L (M) FOR END SPEED OF 0.25 M/S



CALCUATING NOZZLE AIRFLOW SCOPE

$$L = d/m + d/0,128 \cdot (Ve/VI - 0,63)$$

where:

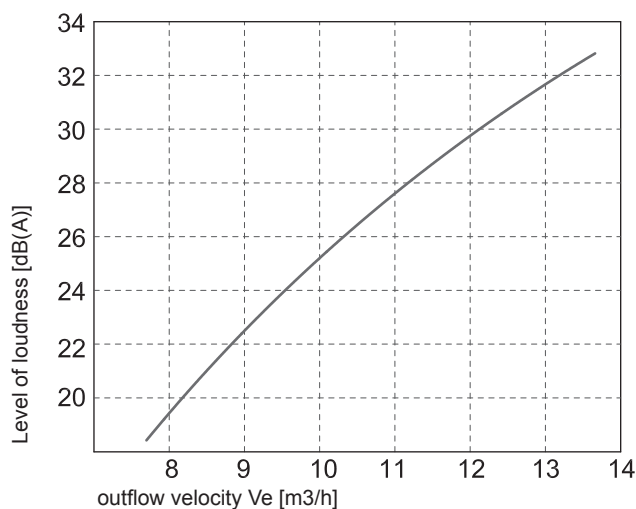
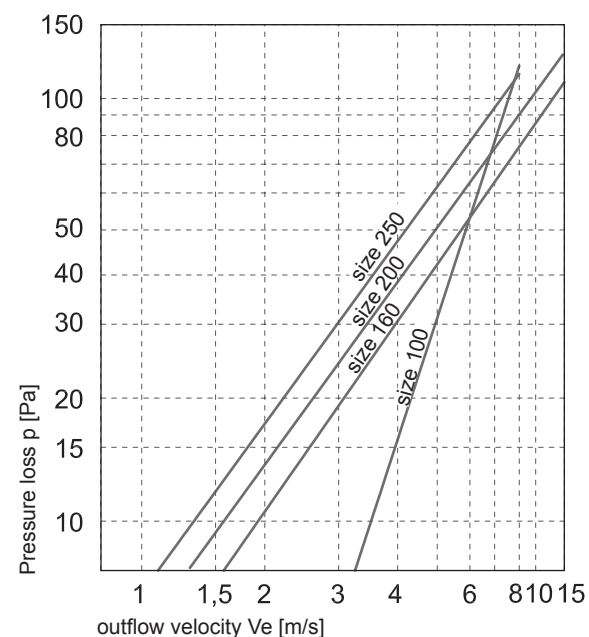
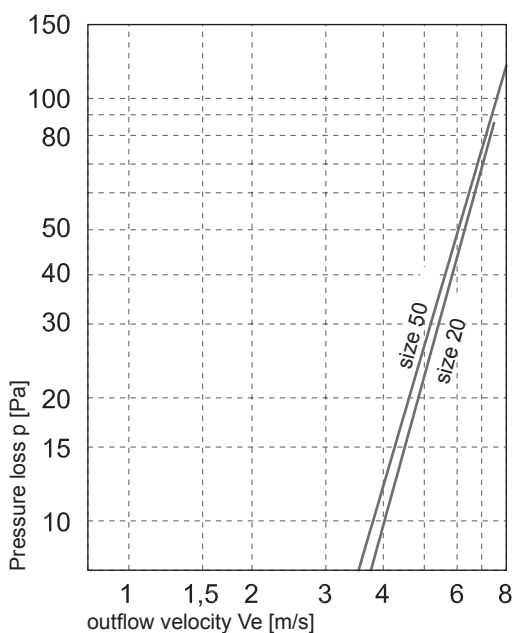
L – scope [m]

d – nozzle outlet diameter [m]

m – turbulence factor [-]

Ve – outgoing speed [m/s]

VI – speed in distance [m/s]



Example:

$$V = 500 \text{ m}^3/\text{h}$$

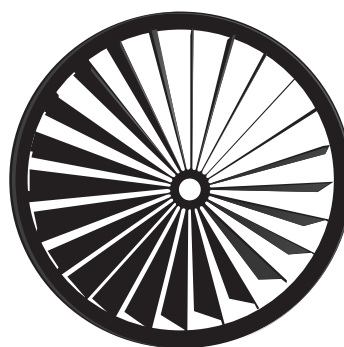
$$d = \text{Ø}200 \text{ mm}$$

$$m = 0,145$$

$$Ve = 4,5 \text{ m/s}$$

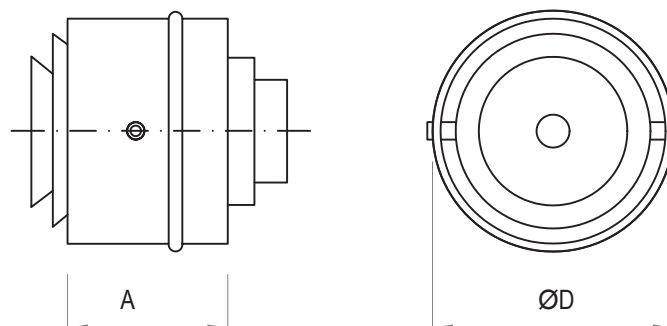
$$VI = 0,2 \text{ m/s}$$

$$L = 0,2 / 0,145 + 0,2 / 0,128 \cdot (4,5 / 0,2 - 0,63) = 35,6 \text{ m}$$



E swirl element

notes



STANDARD SIZES

Size	A [mm]	Ø D [mm]	Number of rings [pieces]
200	115	198	2
250	115	248	2
315	115	313	3
400	115	398	3
500	115	498	4

DESCRIPTION

NDZ are round, cone-shaped, long-throw diffusers designed to supply large quantities of air to high buildings like shopping centres, sport facilities, events facilities and warehouses. They can also be used in industrial buildings. The air can be supplied at the temperature lower or higher by 12°C than the temperature in the ventilated room. The angle of air supply is adjustable up to 15 – 30° - depending on air distribution. Diffusing or focusing the stream can be achieved by turning the diffuser by 180°. NDZ can be installed in the wall or ceilings.

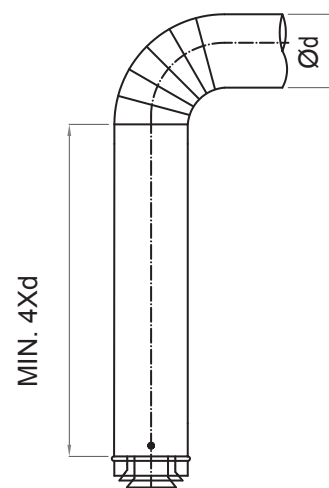
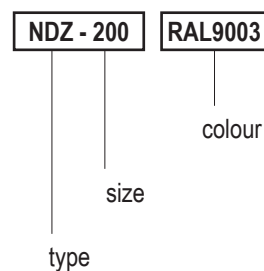
FEATURES

- supplying large quantities of air
- airflow stream can be adjusted 15-30° in any direction
- adjustable type and scope of air distribution
- diffusers made of zinc-coated sheet
- available in standard RAL 9003 colour
- upon customer's request, can be painted in any colour from RAL palette

INSTALLATION

NDZ are installed directly on the round ventilation duct and fixed with rivets. Remember to apply straight distance of the duct of length of 4 of its diameter in front of the diffuser installation spot.

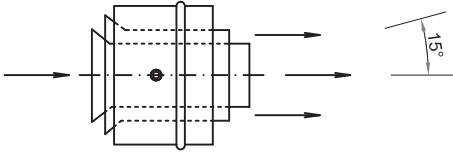
ORDER REFERENCE



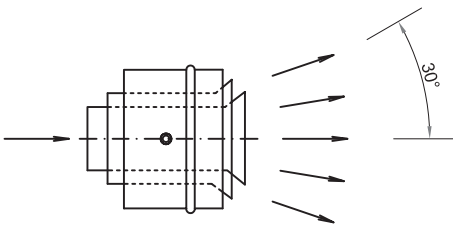
8.3 NDZ

long-throw diffusers

AIR SUPPLY DIRECTIONS



large range
focused air supply



short range
dispersed air supply

FEATURES

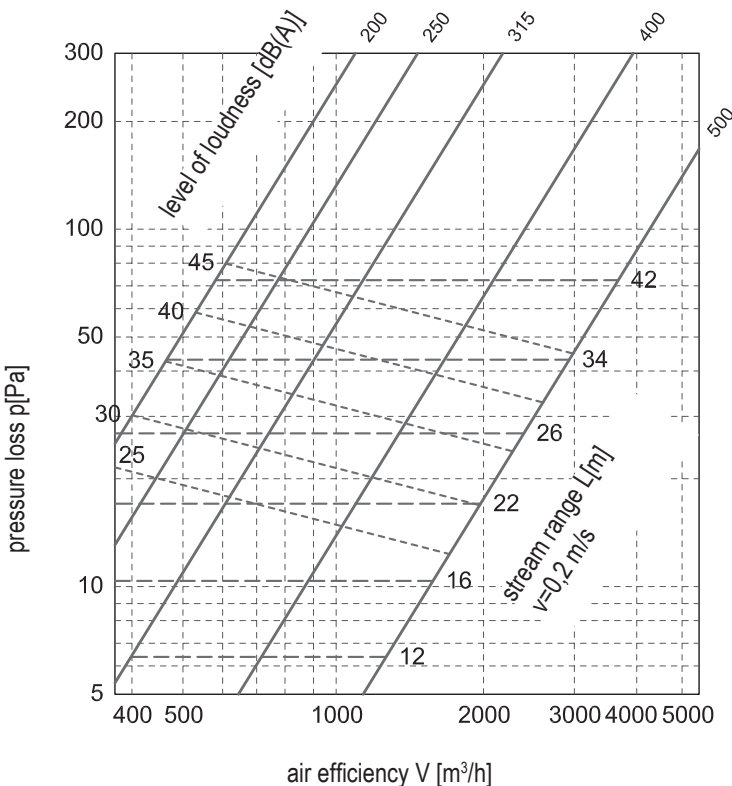
The figure shows airflow capacity V (m³/h), pressure loss p (Pa), airflow scope L (m) for end speed of 0.25 m/s, and volume level [db(A)].

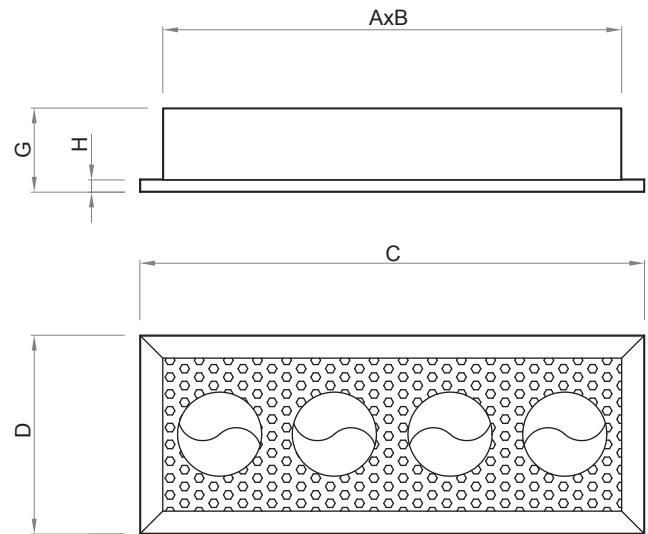
The data below relate to focused supply. For diffused supply, use the following:

pressure loss = $\times 0.85$

airflow scope = $\times 0.3$

volume level = - 4





DESCRIPTION

NWMP-1 are rectangular, displacement diffusers for small flows designed for supplying small quantities of air directly to the zone of human presence. NWMP-1 diffusers are installed in steps between floor levels in theatre halls, cinema halls or lecture halls. The air should be supplied at the temperature lower than the temperature in the ventilated room. The airflow can be adjusted by a throttle placed in the feeding channel. .

FEATURES

- supplying small quantities of air directly to the zone of human presence
- airflow stream angle adjusted by sinusoidal RD nozzles (4)
- simple installation
- does not require exploitation service
- diffusers made of aluminium profiles and perforated sheet
- available in standard RAL 9003 colour
- upon customer's request, can be painted in any colour from RAL palette

INSTALLATION

NWMP-1 diffusers are installed directly in steps between floor levels through installation holes using screws, or springs.

STANDARD SIZES

Size	A [mm]	B [mm]	C [mm]	D [mm]	G [mm]	H [mm]
300x100	300	100	350	150	55	8

ORDER REFERENCE

NWMP-1 - 300x100	RAL9003
type	colour
Size	

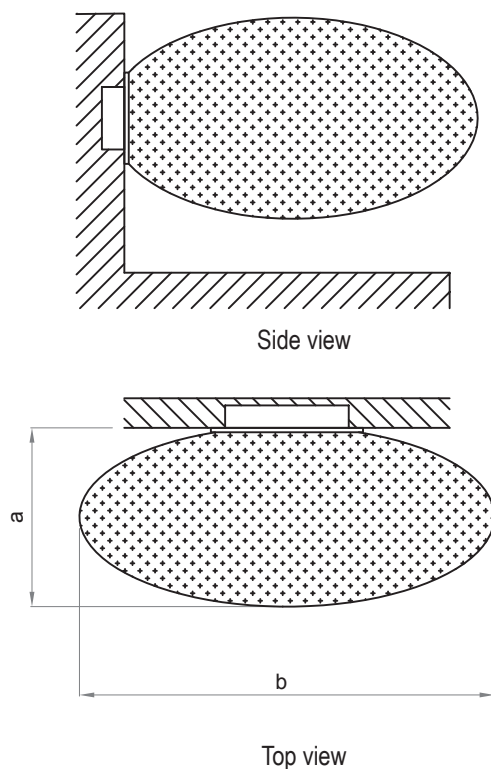
9.1 NWMP-1

displacement diffusers for small flows

AIR SUPPLY LAY OUT

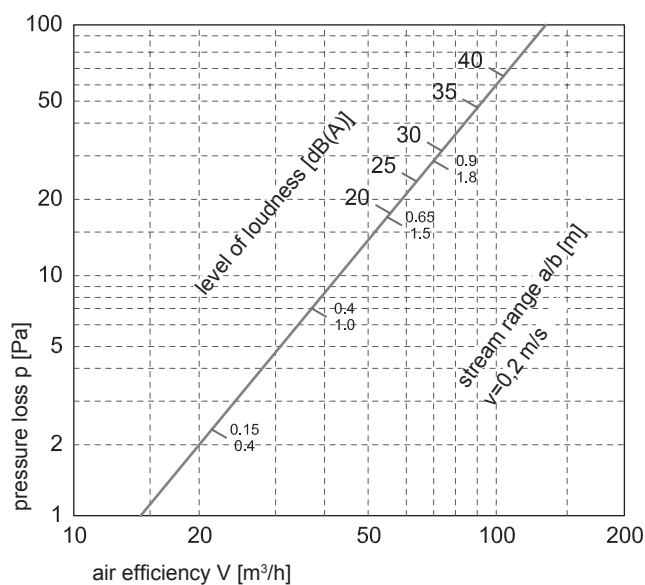
Figures below show the way the air is diffused in the room.

Figures a and b show the size of zone where air speed comes to 0.2 m/s for air supply at the temperature lower by 3°C than the temperature in the ventilate room.



FEATURES

The figure shows airflow capacity V (m³/h), pressure loss p (Pa), airflow scope a and b (m) for end speed of 0.2 m/s, and volume level [dB(A)].





DESCRIPTION

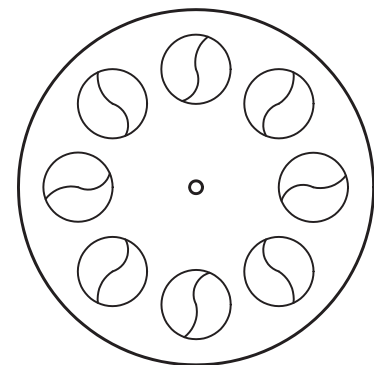
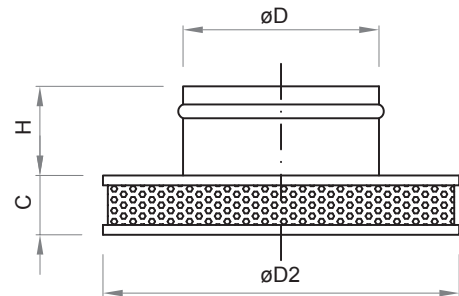
NWMP-2 are displacement diffusers for small flows designed for supplying small quantities of air directly to the zone of human presence. NWMP-1 diffusers are installed in steps between floor levels in theatre halls, cinema halls or lecture halls. The air should be supplied at the temperature lower than the temperature in the ventilated room. The airflow can be adjusted by a throttle placed in the feeding channel.

FEATURES

- supplying small quantities of air directly to the zone of human presence
- airflow stream angle adjusted by sinusoidal RD nozzles (8)
- simple installation
- does not require exploitation service
- diffusers made of zinc-coated steel sheet
- available in standard RAL 9003 colour
- upon customer's request, can be painted in any colour from RAL palette

INSTALLATION

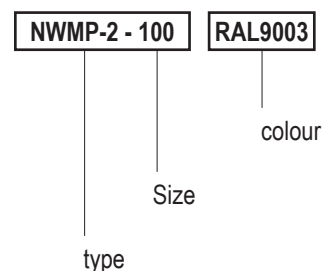
NWMP-2 diffusers are installed directly in steps between floor levels through installation holes using screws, or springs.



STANDARD SIZES

Size	Ø D [mm]	Ø D2 [mm]	C [mm]	H [mm]
100	99	180	30	45

ORDER REFERENCE



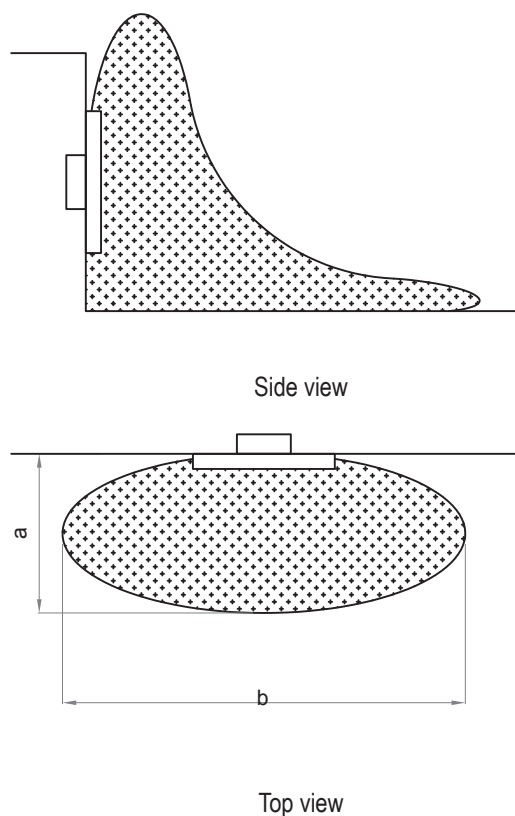
9.2 NWMP-2

displacement diffusers for small flows

AIR SUPPLY LAY OUT

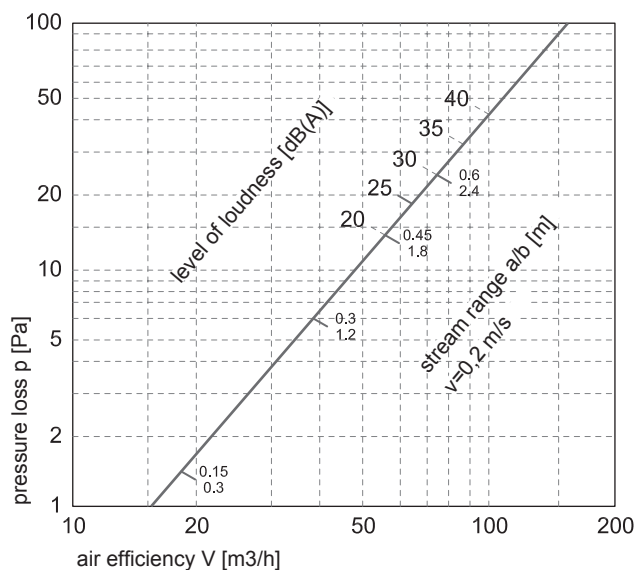
Figures below show the way the air is diffused in the room.

Figures a and b show the size of zone where air speed comes to 0.2 m/s for air supply at the temperature lower by 3°C than the temperature in the ventilate room.



FEATURES

The figure shows airflow capacity V (m³/h), pressure loss p (Pa), airflow scope a and b (m) for end speed of 0.2 m/s, and volume level [db(A)].





DESCRIPTION

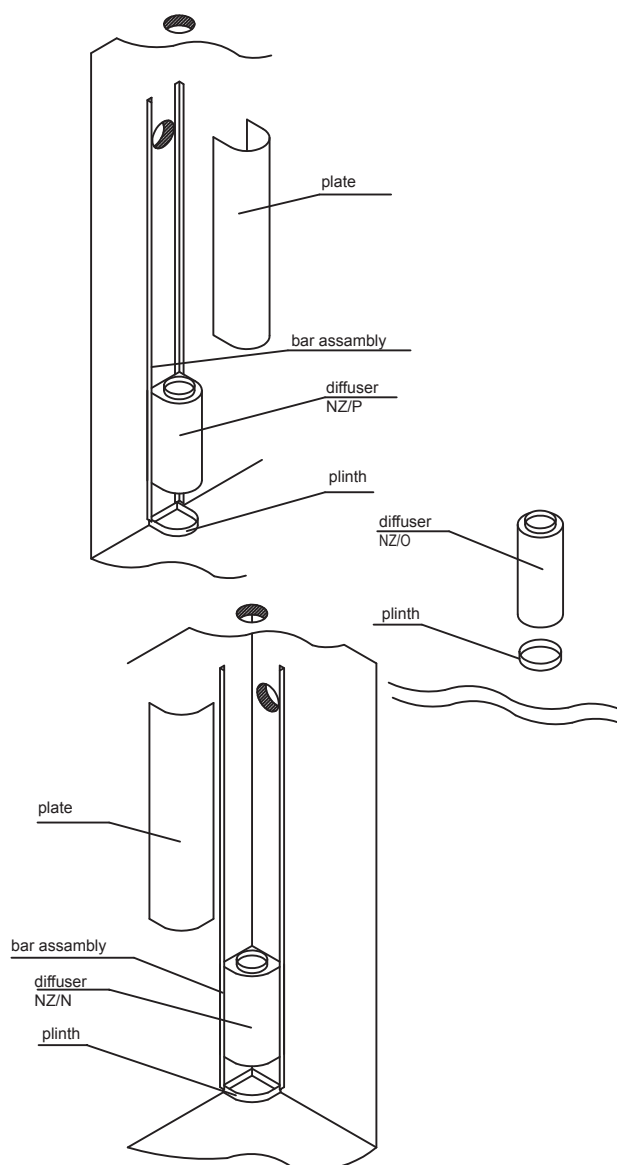
NZ are source diffusers designed for displacement ventilation. They are ideal for high facilities, like gyms, lecture halls, or at warmth sources. The scope of the airflow comes up to 12m. Due to small speed of air supply, they can be located directly in human presence zones. To maintain proper stability and airflow scope, the temperature of supplied air should be lower than the temperature in the ventilated facility.

FEATURES

- wide range of shapes and sizes allows for appropriate choice
- diffuser made of double coating of perforated steel
- adjustments possible by a throttle
- available in standard RAL 9003 colour
- upon customer's request, outlets can be made available in any chosen colour from RAL palette
- We can make different kind of perforations.

INSTALLATION

NZ source diffusers are designed for installation in the floor. They can be set at the wall (version P), in corners (version N), or in the middle of the facility (O). Depending on the purpose and installation surface, use appropriate installation slings. NZ should be connected to the round ventilation duct.



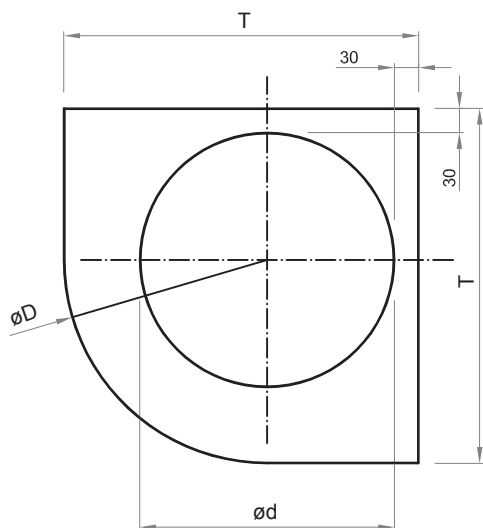
ORDER REFERENCE

NZ / P - 400 - 1000		RAL9003
type	size	colour
		height [mm]
		version: N - corner, P - half-round, O - round

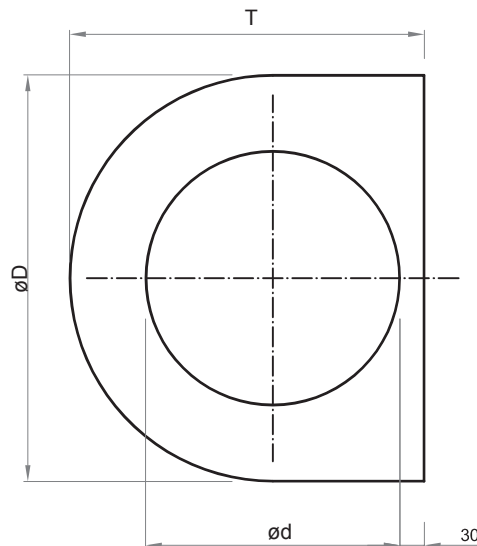
9.3 NZ

source diffusers

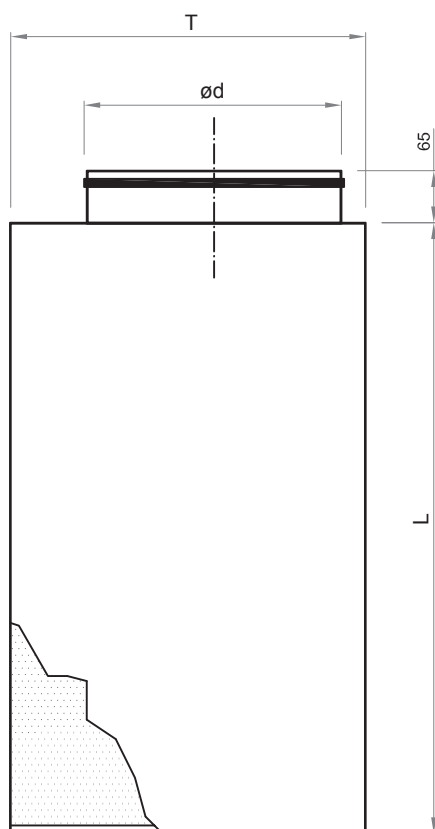
CORNER DIFFUSER



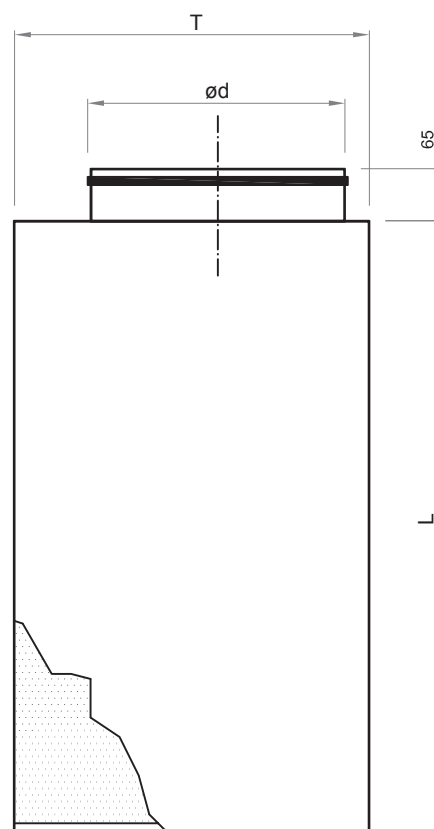
HALF-ROUND DIFFUSER



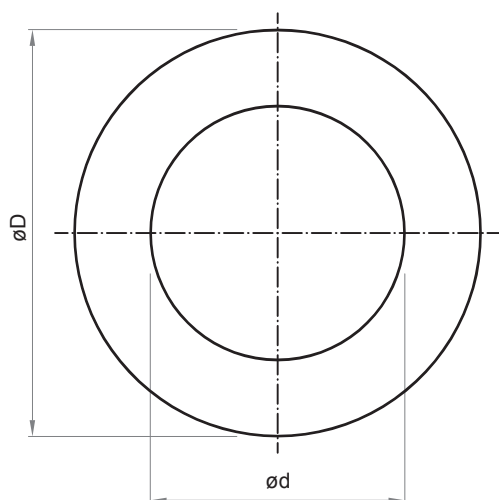
NZ/N



NZ/P



ROUND DIFFUSER



STANDARD SIZES

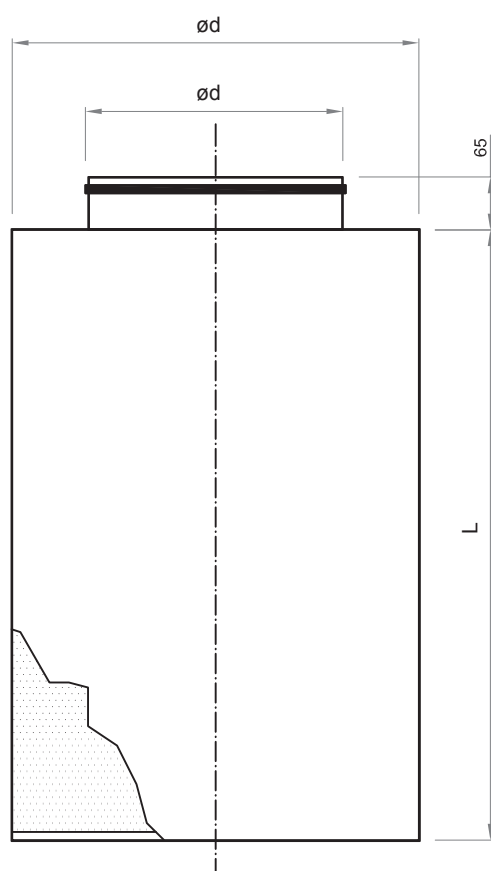
Size	Ød [mm]	ØD [mm]	T [mm]	L [mm]
250	158	250	234	500 - 750 - 1000
300	198	300	279	500 - 750 - 1000
400	248	400	354	500 - 750 - 1000
450	298	450	404	500 - 750 - 1000
500	313	500	436.5	500 - 750 - 1000
600	398	600	529	500 - 750 - 1000
650	448	650	579	500 - 750 - 1000
700	498	700	629	500 - 750 - 1000
830	628	830	759	500 - 750 - 1000
1000	628	1000	844	500 - 750 - 1000

FEATURES

The figure shows airflow capacity V (m³/h), pressure loss p (Pa), air-flow scope L (m) for end speed of 0.25 m/s, and volume level [db(A)].

The airflow scope L relates to isothermal air supply and diffuser height 750 mm. For other cases, the airflow stream scope should be recalculated using the figures below.

NZ/O

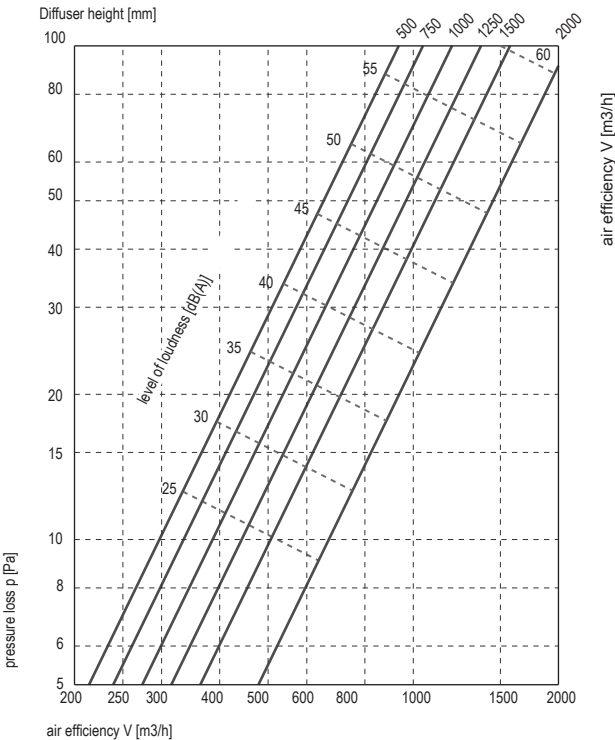


9.3 NZ

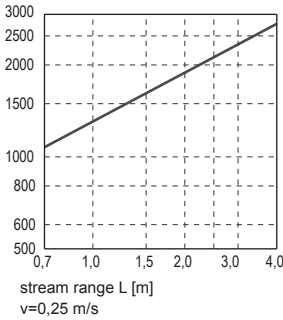
source diffusers

FEATURES NZ/O

Diffuser size 250



diffuser height
isothermal flow



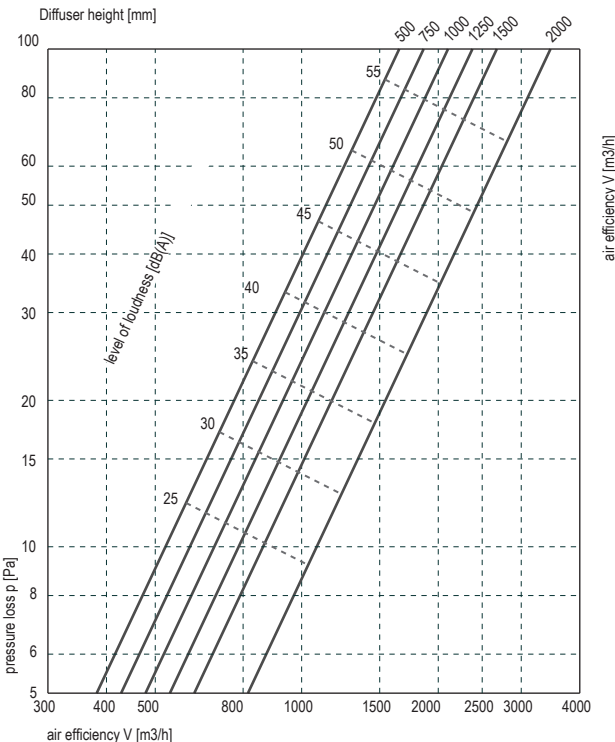
correction factor range

length of diffuser	500	750	1000	1250	1500	2000
a	1,2	1,0	0,9	0,8	0,73	0,65

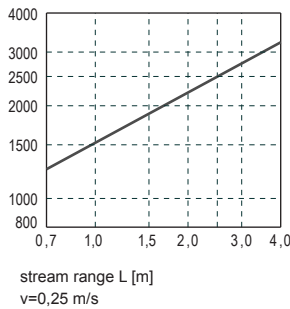
correction factor range

$\Delta T(K)$	-1	-2	-3	-4
a	1,15	1,3	1,4	1,5

Diffuser size 300



diffuser height
isothermal flow



correction factor range

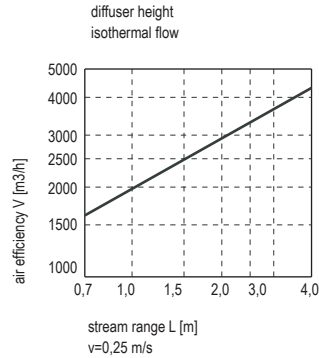
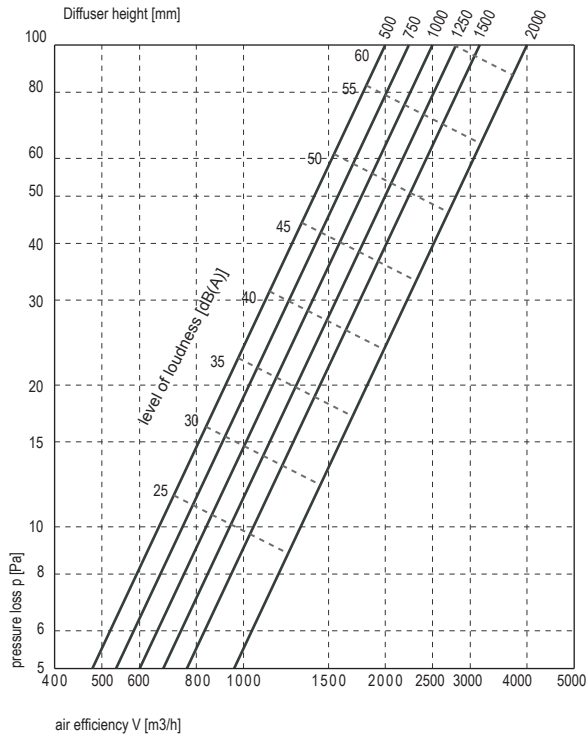
length of dif-fuser	500	750	1000	1250	1500	2000
a	1,2	1,0	0,9	0,8	0,73	0,65

correction factor range

$\Delta T(K)$	-1	-2	-3	-4
a	1,15	1,3	1,4	1,5

FEATURES NZ/O

Diffuser size 400



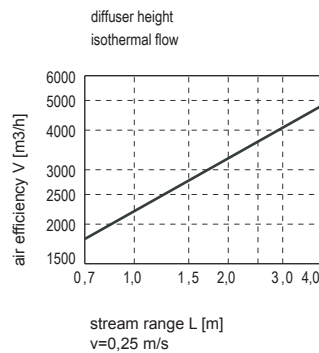
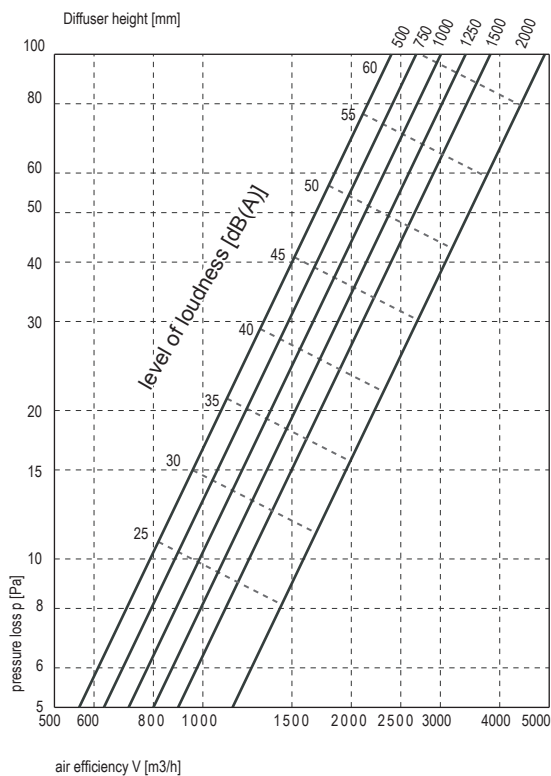
correction factor range

length of diffuser	500	750	1000	1250	1500	2000
a	1,2	1,0	0,9	0,8	0,73	0,65

correction factor range

ΔT (K)	-1	-2	-3	-4
a	1,15	1,3	1,4	1,5

Diffuser size 450



correction factor range

length of dif-fuser	500	750	1000	1250	1500	2000
a	1,2	1,0	0,9	0,8	0,73	0,65

correction factor range

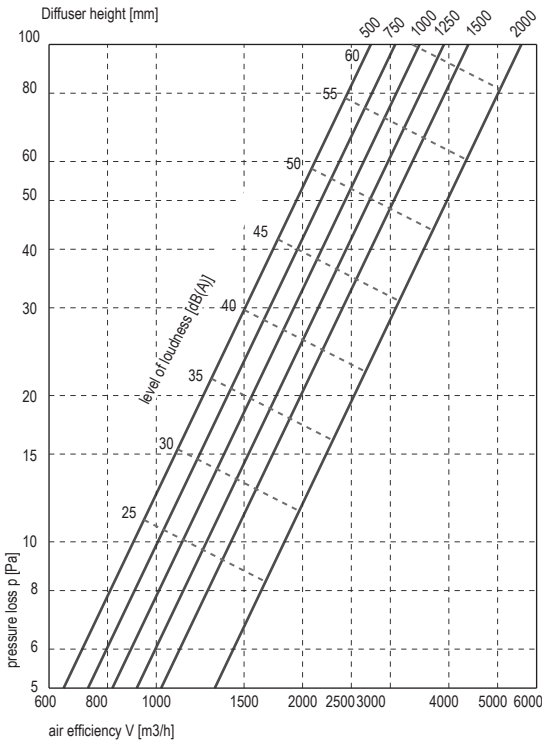
ΔT (K)	-1	-2	-3	-4
a	1,15	1,3	1,4	1,5

9.3 NZ

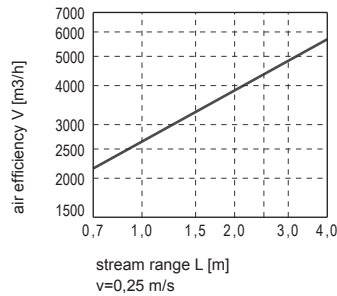
source diffusers

FEATURES NZ/O

Diffuser size 500



diffuser height
isothermal flow



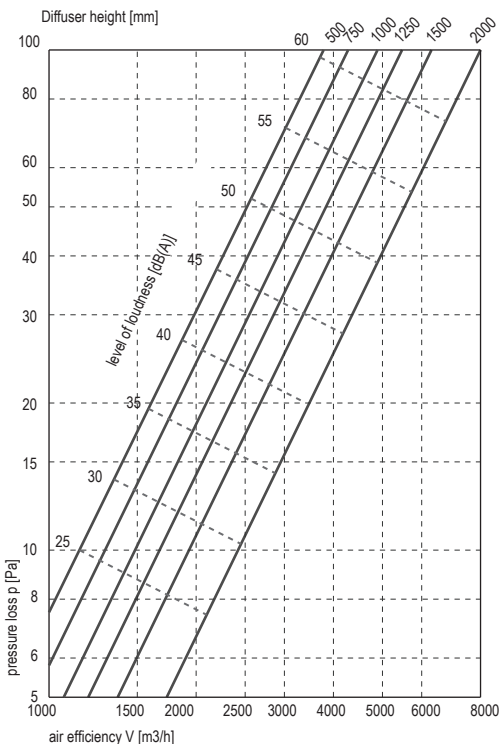
correction factor range

length of diffuser	500	750	1000	1250	1500	2000
a	1,2	1,0	0,9	0,8	0,73	0,65

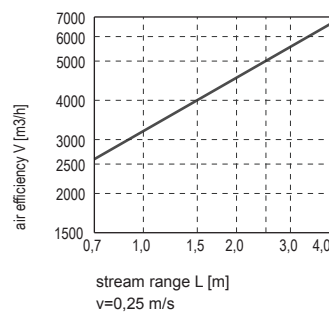
correction factor range

$\Delta T(K)$	-1	-2	-3	-4
a	1,15	1,3	1,4	1,5

Diffuser size 600



diffuser height
isothermal flow



correction factor range

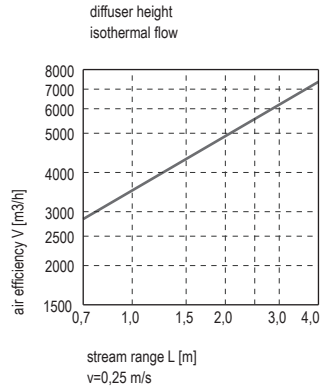
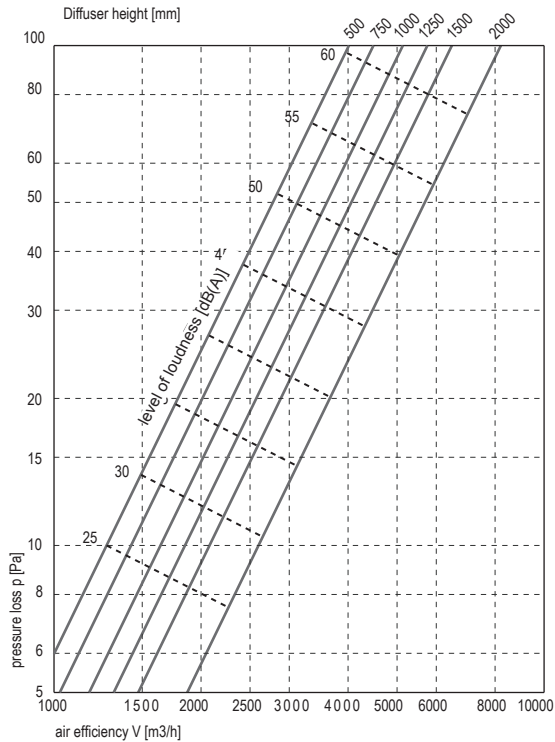
length of diffuser	500	750	1000	1250	1500	2000
a	1,2	1,0	0,9	0,8	0,73	0,65

correction factor range

$\Delta T(K)$	-1	-2	-3	-4
a	1,15	1,3	1,4	1,5

FEATURES NZ/O

Diffuser size 650



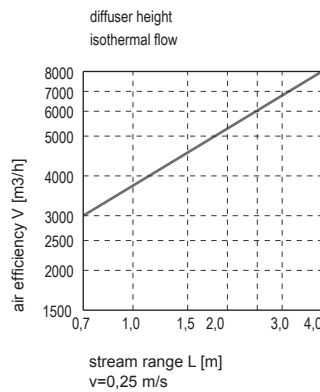
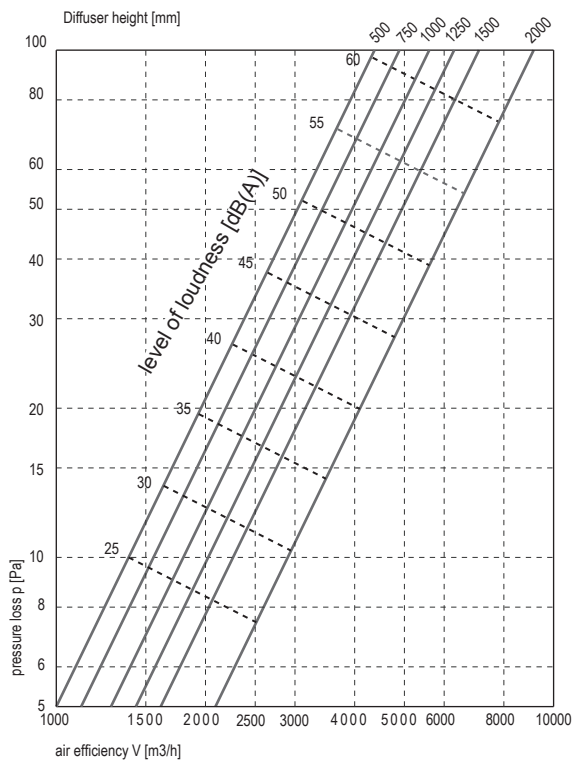
correction factor range

length of diffuser	500	750	1000	1250	1500	2000
a	1,2	1,0	0,9	0,8	0,73	0,65

correction factor range

ΔT (K)	-1	-2	-3	-4
a	1,15	1,3	1,4	1,5

Diffuser size 700



correction factor range

length of diffuser	500	750	1000	1250	1500	2000
a	1,2	1,0	0,9	0,8	0,73	0,65

correction factor range

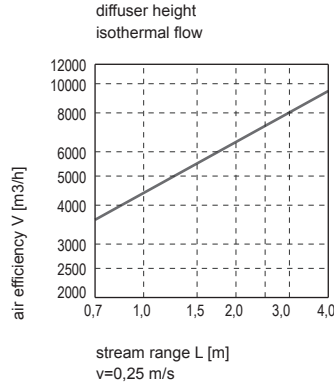
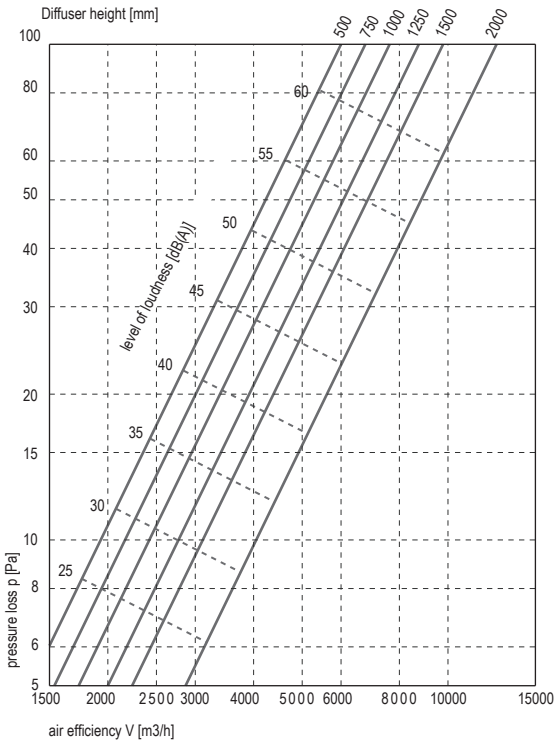
ΔT (K)	-1	-2	-3	-4
a	1,15	1,3	1,4	1,5

9.3 NZ

source diffusers

FEATURES NZ/O

Diffuser size 830



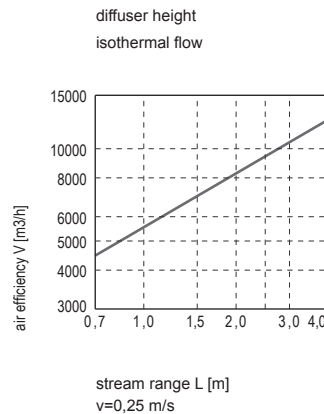
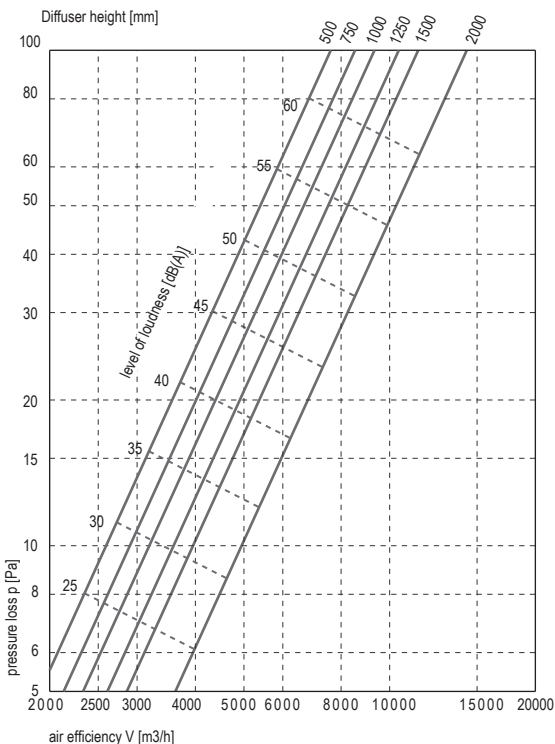
correction factor range

length of diffuser	500	750	1000	1250	1500	2000
a	1,2	1,0	0,9	0,8	0,73	0,65

correction factor range

$\Delta T(K)$	-1	-2	-3	-4
a	1,15	1,3	1,4	1,5

Diffuser size 1000



correction factor range

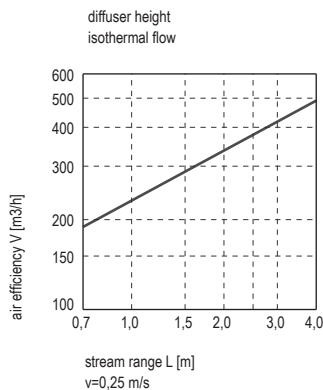
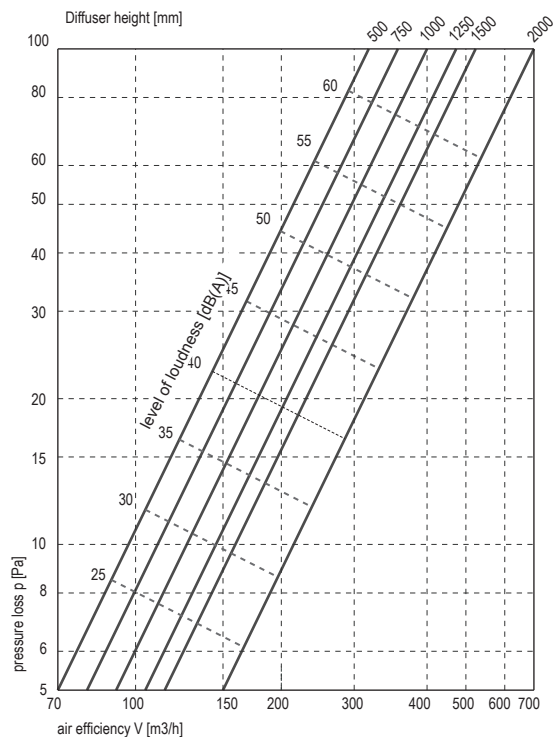
length of diffuser	500	750	1000	1250	1500	2000
a	1,2	1,0	0,9	0,8	0,73	0,65

correction factor range

$\Delta T(K)$	-1	-2	-3	-4
a	1,15	1,3	1,4	1,5

FEATURES NZ/P

Diffuser size 250



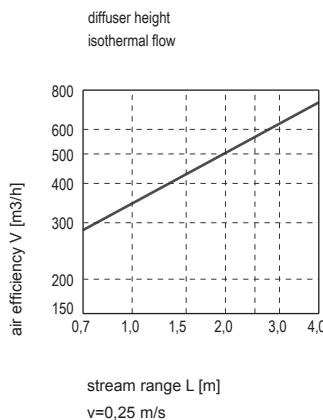
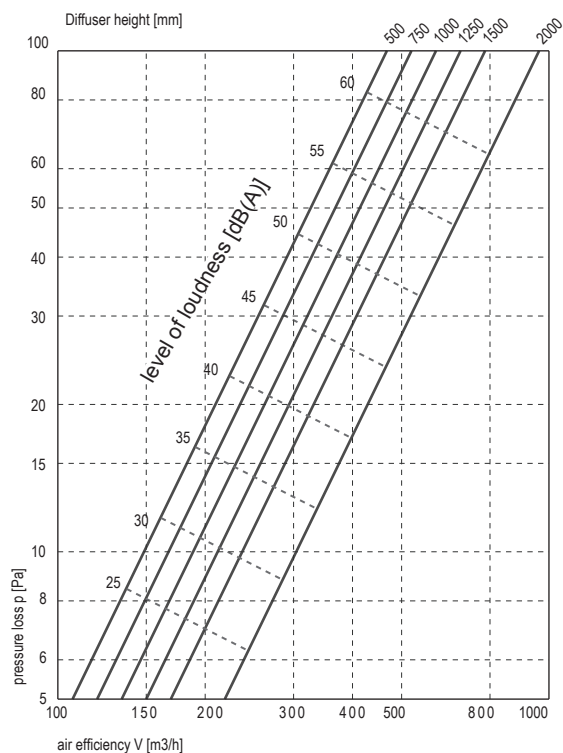
correction factor range

length of diffuser	500	750	1000	1250	1500	2000
a	1,2	1,0	0,9	0,8	0,73	0,65

correction factor range

$\Delta T(K)$	-1	-2	-3	-4
a	1,15	1,3	1,4	1,5

Diffuser size 300



correction factor range

length of diffuser	500	750	1000	1250	1500	2000
a	1,2	1,0	0,9	0,8	0,73	0,65

correction factor range

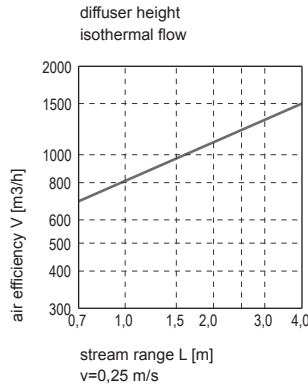
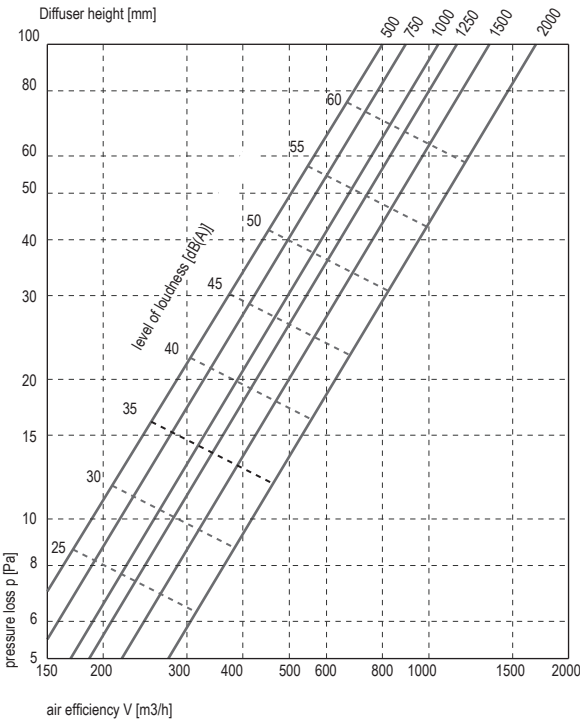
$\Delta T(K)$	-1	-2	-3	-4
a	1,15	1,3	1,4	1,5

9.3 NZ

source diffusers

FEATURES NZ/P

Diffuser size 400



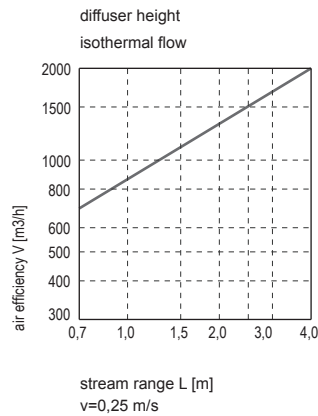
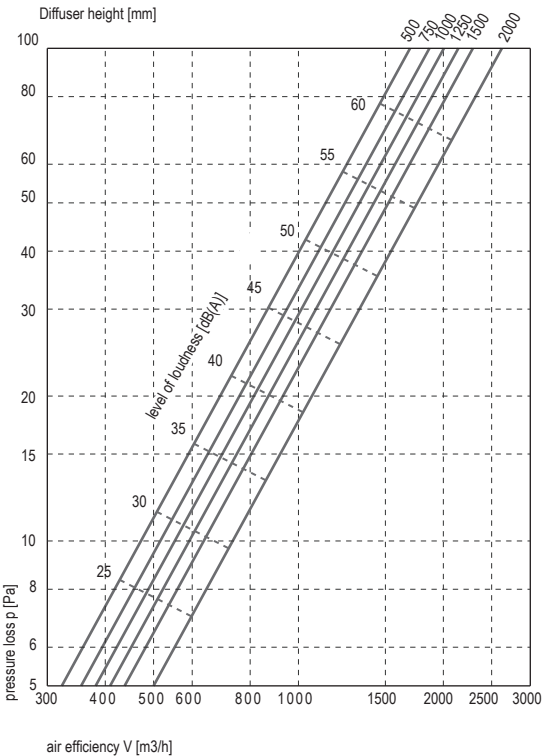
correction factor range

length of diffuser	500	750	1000	1250	1500	2000
a	1,2	1,0	0,9	0,8	0,73	0,65

correction factor range

ΔT(K)	-1	-2	-3	-4
a	1,15	1,3	1,4	1,5

Diffuser size 450



correction factor range

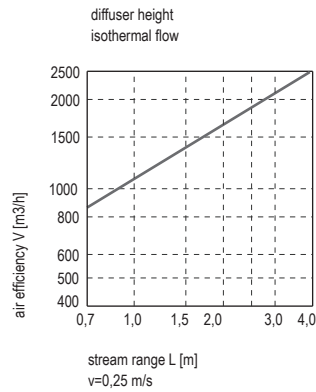
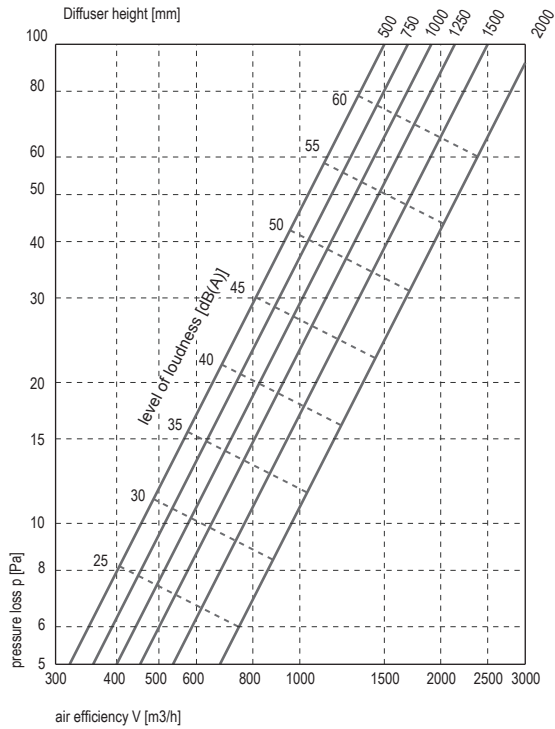
length of diffuser	500	750	1000	1250	1500	2000
a	1,2	1,0	0,9	0,8	0,73	0,65

correction factor range

ΔT(K)	-1	-2	-3	-4
a	1,15	1,3	1,4	1,5

FEATURES NZ/P

Diffuser size 500



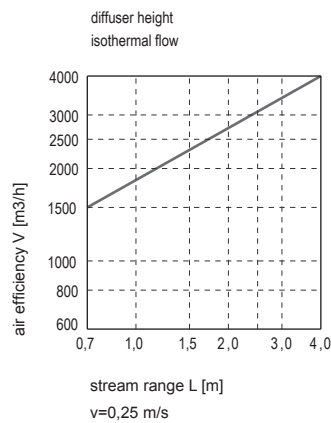
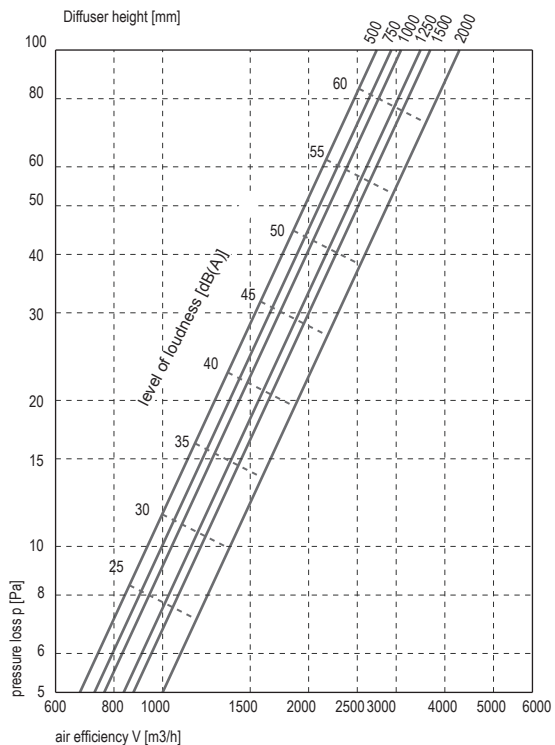
correction factor range

length of diffuser	500	750	1000	1250	1500	2000
a	1,2	1,0	0,9	0,8	0,73	0,65

correction factor range

ΔT (K)	-1	-2	-3	-4
a	1,15	1,3	1,4	1,5

Diffuser size 600



correction factor range

length of diffuser	500	750	1000	1250	1500	2000
a	1,2	1,0	0,9	0,8	0,73	0,65

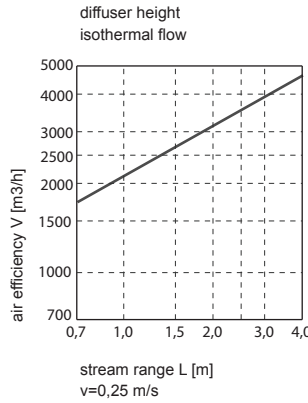
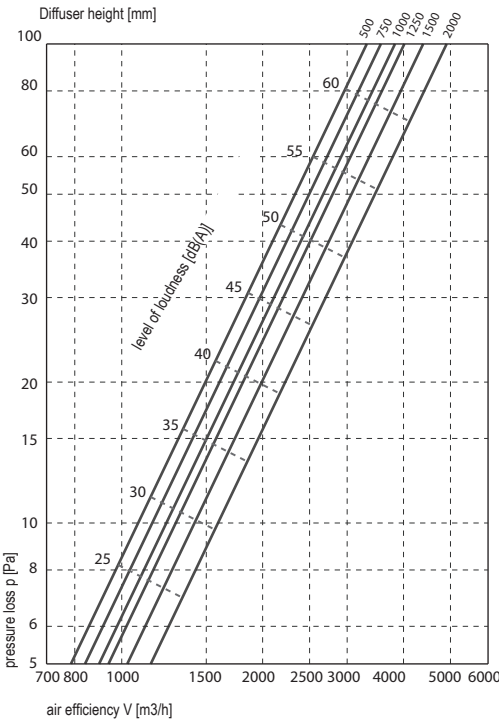
correction factor range

ΔT (K)	-1	-2	-3	-4
a	1,15	1,3	1,4	1,5

source diffusers

FEATURES NZ/P

Diffuser size 650



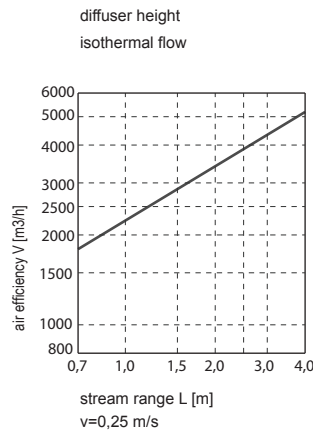
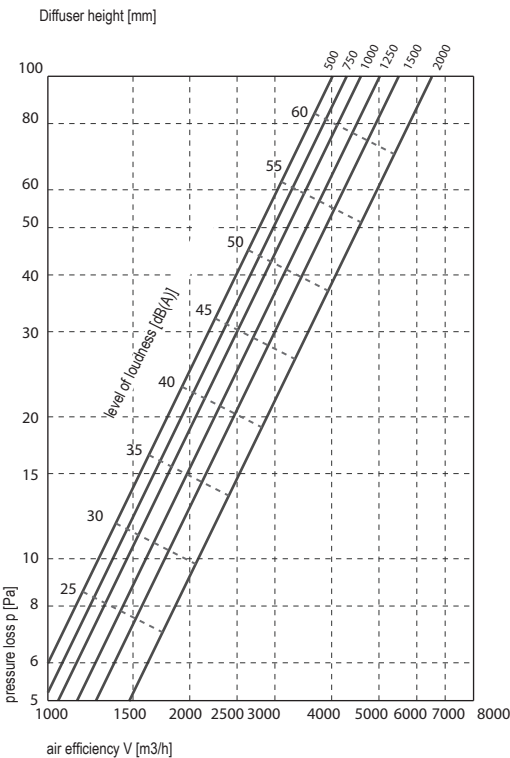
correction factor range

length of diffuser	500	750	1000	1250	1500	2000
a	1,2	1,0	0,9	0,8	0,73	0,65

correction factor range

ΔT(K)	-1	-2	-3	-4
a	1,15	1,3	1,4	1,5

Diffuser size 700



correction factor range

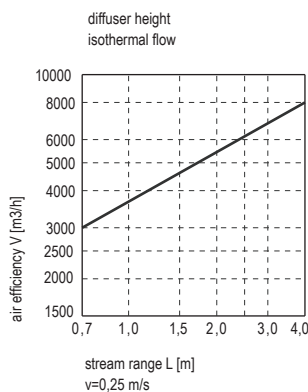
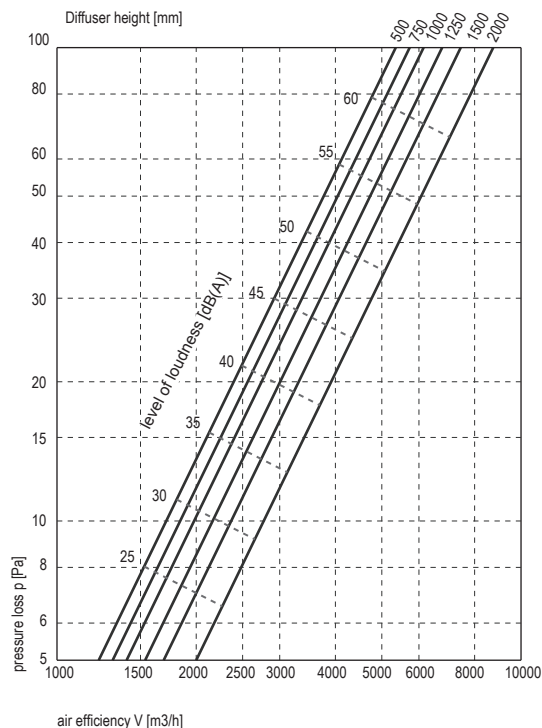
length of diffuser	500	750	1000	1250	1500	2000
a	1,2	1,0	0,9	0,8	0,73	0,65

correction factor range

ΔT(K)	-1	-2	-3	-4
a	1,15	1,3	1,4	1,5

FEATURES NZ/P

Diffuser size 800



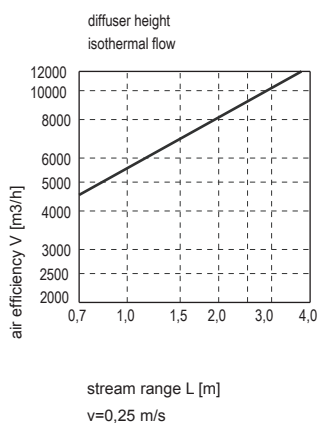
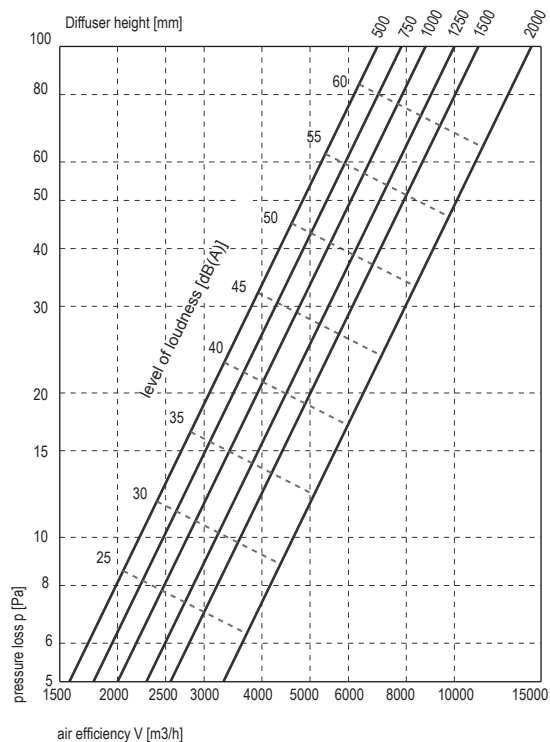
correction factor range

length of diffuser	500	750	1000	1250	1500	2000
a	1,2	1,0	0,9	0,8	0,73	0,65

correction factor range

ΔT (K)	-1	-2	-3	-4
a	1,15	1,3	1,4	1,5

Diffuser size 1000



correction factor range

length of diffuser	500	750	1000	1250	1500	2000
a	1,2	1,0	0,9	0,8	0,73	0,65

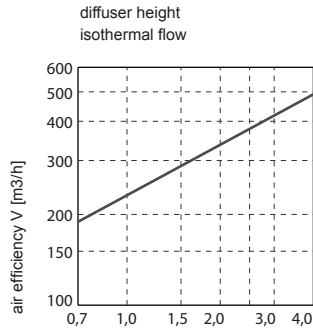
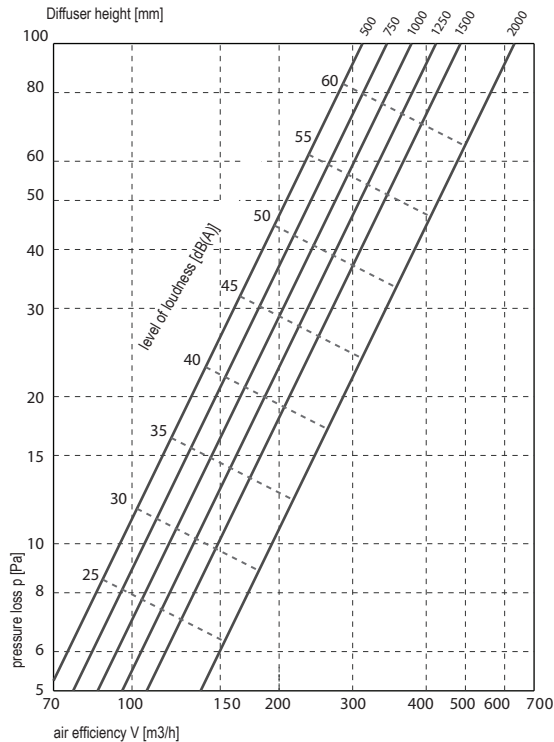
correction factor range

ΔT (K)	-1	-2	-3	-4
a	1,15	1,3	1,4	1,5

source diffusers

FEATURES NZ/N

Diffuser size 250



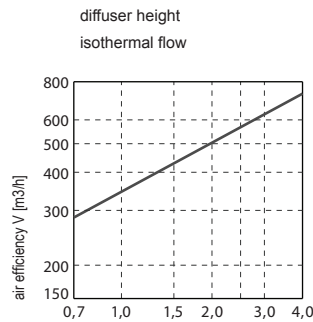
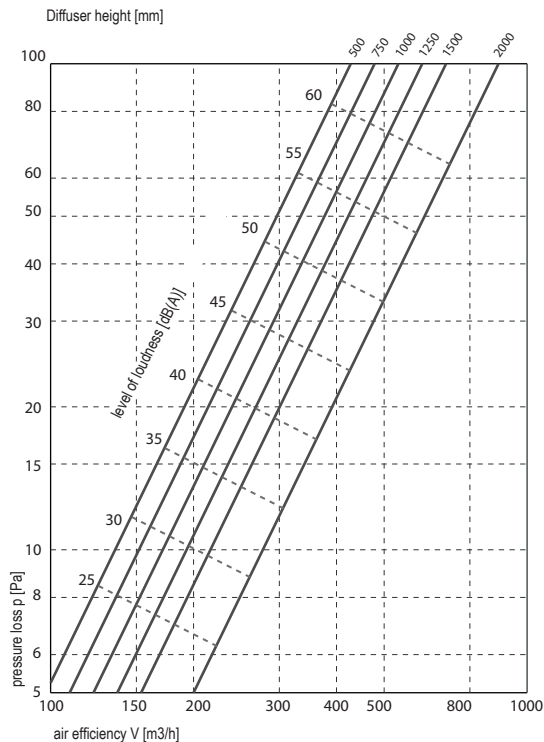
correction factor range

length of diffuser	500	750	1000	1250	1500	2000
a	1,2	1,0	0,9	0,8	0,73	0,65

correction factor range

$\Delta T(K)$	-1	-2	-3	-4
a	1,15	1,3	1,4	1,5

Diffuser size 300



correction factor range

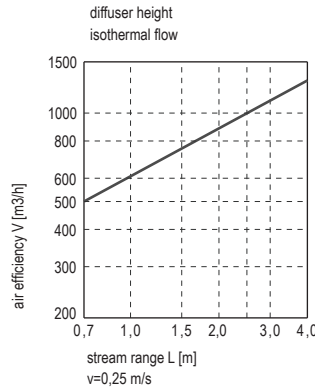
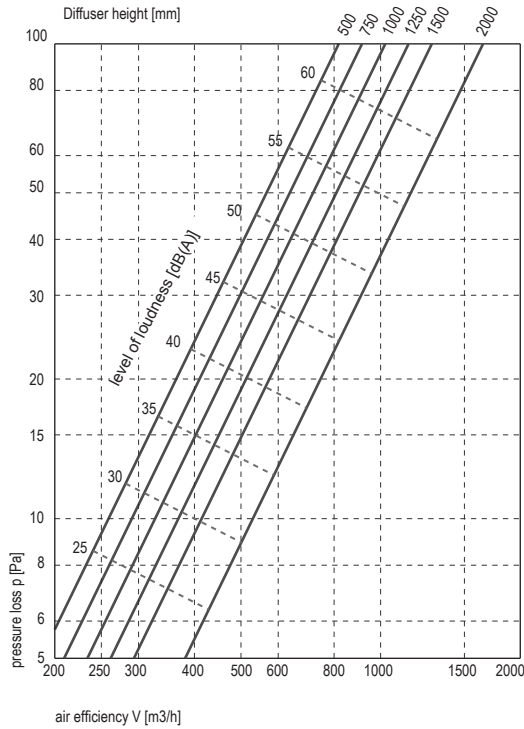
length of diffuser	500	750	1000	1250	1500	2000
a	1,2	1,0	0,9	0,8	0,73	0,65

correction factor range

$\Delta T(K)$	-1	-2	-3	-4
a	1,15	1,3	1,4	1,5

FEATURES NZ/P

Diffuser size 400



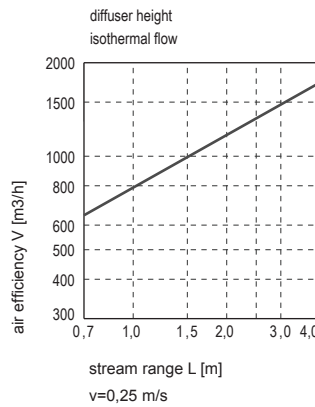
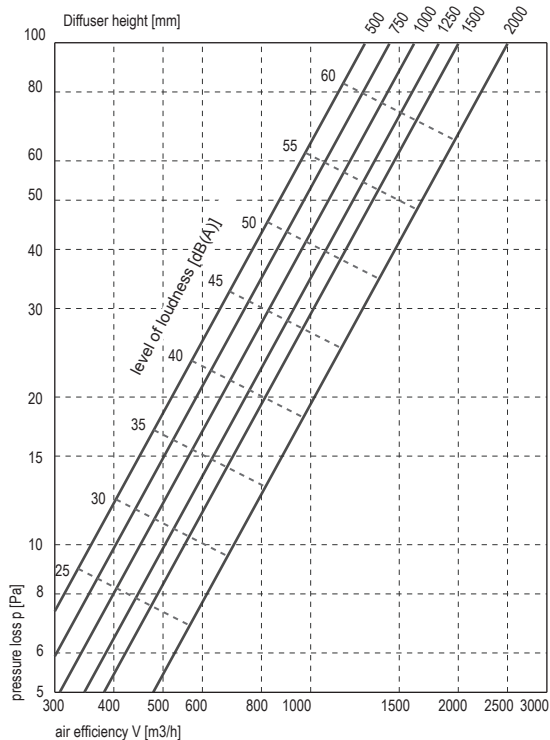
correction factor range

length of diffuser	500	750	1000	1250	1500	2000
a	1,2	1,0	0,9	0,8	0,73	0,65

correction factor range

ΔT (K)	-1	-2	-3	-4
a	1,15	1,3	1,4	1,5

Diffuser size 450



correction factor range

length of diffuser	500	750	1000	1250	1500	2000
a	1,2	1,0	0,9	0,8	0,73	0,65

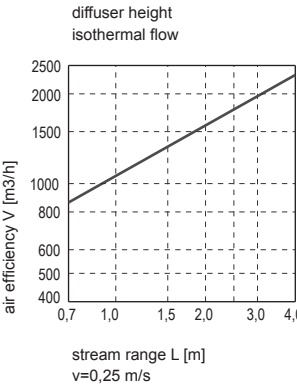
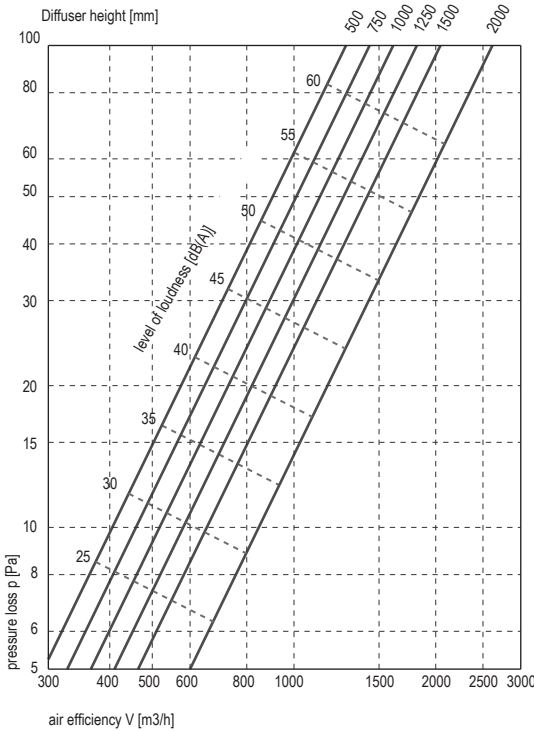
correction factor range

ΔT (K)	-1	-2	-3	-4
a	1,15	1,3	1,4	1,5

source diffusers

FEATURES NZ/N

Diffuser size 500



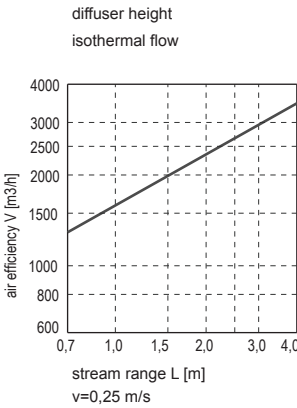
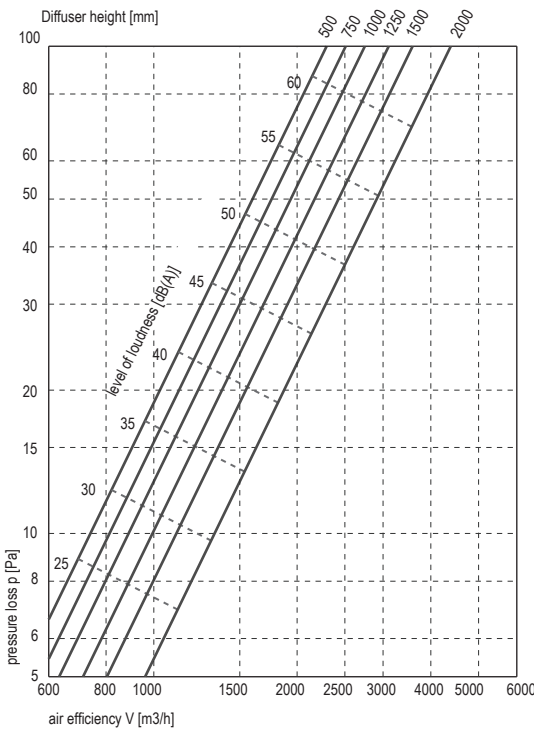
correction factor range

length of diffuser	500	750	1000	1250	1500	2000
a	1,2	1,0	0,9	0,8	0,73	0,65

correction factor range

$\Delta T(K)$	-1	-2	-3	-4
a	1,15	1,3	1,4	1,5

Diffuser size 600



correction factor range

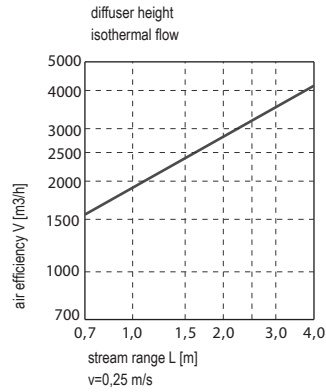
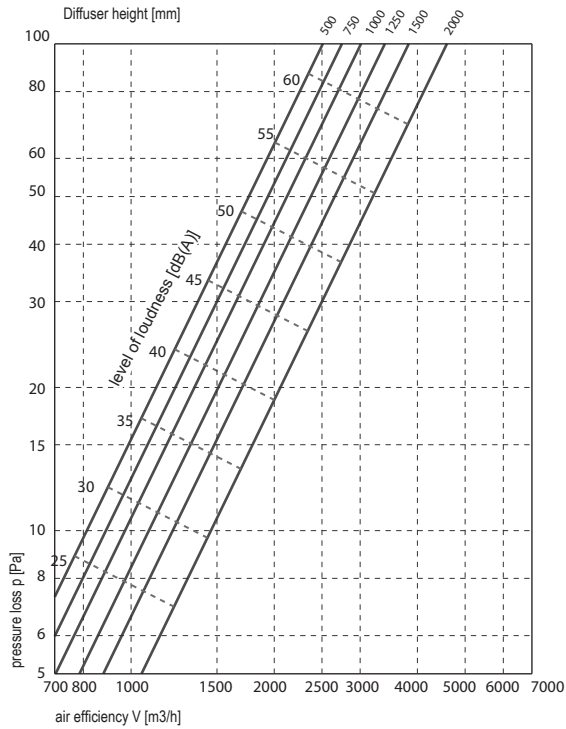
length of diffuser	500	750	1000	1250	1500	2000
a	1,2	1,0	0,9	0,8	0,73	0,65

correction factor range

$\Delta T(K)$	-1	-2	-3	-4
a	1,15	1,3	1,4	1,5

FEATURES NZ/N

Diffuser size 650



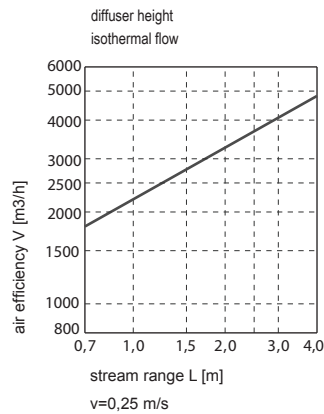
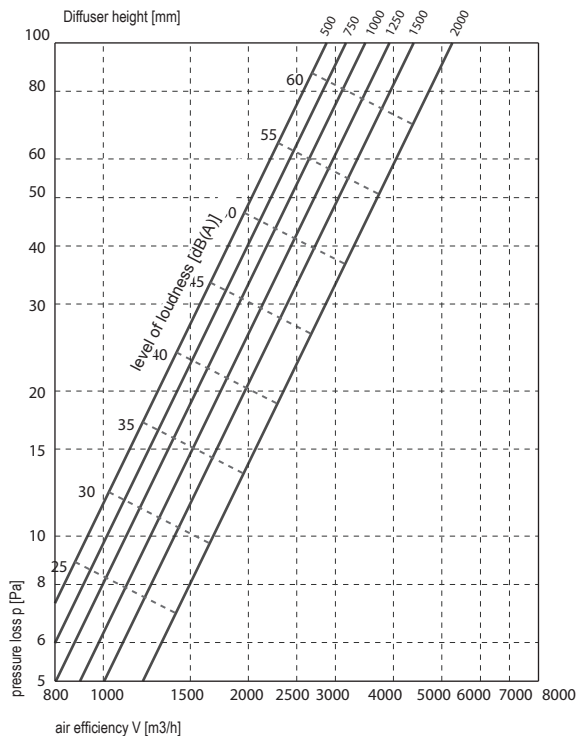
correction factor range

length of diffuser	500	750	1000	1250	1500	2000
a	1,2	1,0	0,9	0,8	0,73	0,65

correction factor range

ΔT (K)	-1	-2	-3	-4
a	1,15	1,3	1,4	1,5

Diffuser size 700



correction factor range

length of diffuser	500	750	1000	1250	1500	2000
a	1,2	1,0	0,9	0,8	0,73	0,65

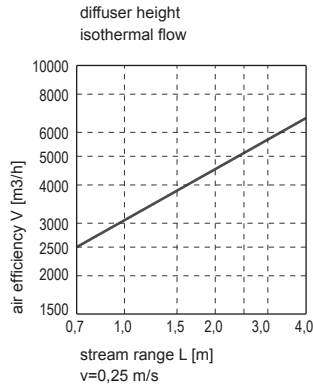
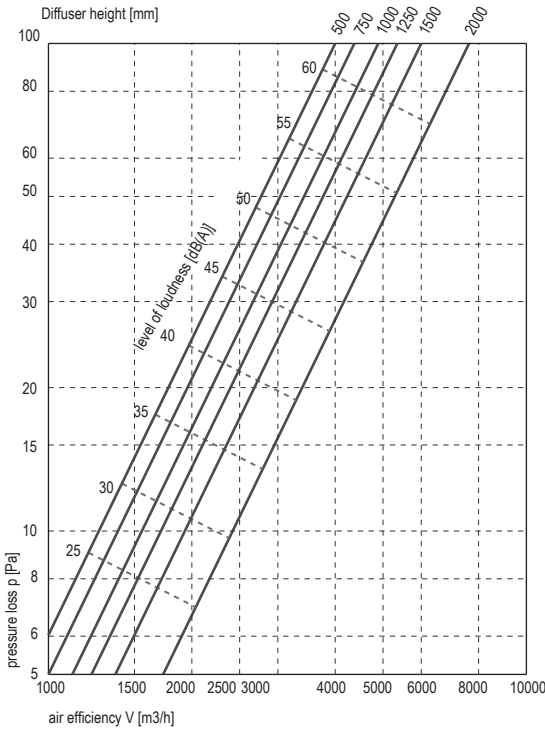
correction factor range

ΔT (K)	-1	-2	-3	-4
a	1,15	1,3	1,4	1,5

source diffusers

FEATURES NZ/N

Diffuser size 800



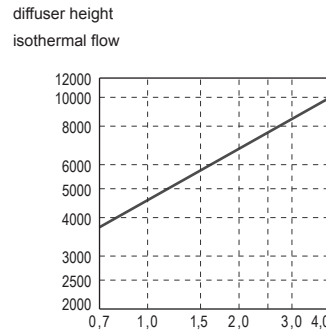
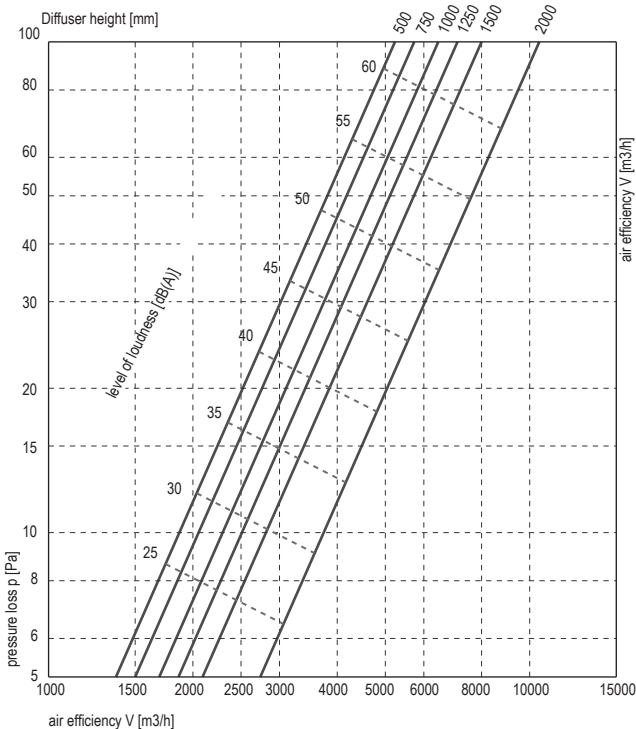
correction factor range

length of diffuser	500	750	1000	1250	1500	2000
a	1,2	1,0	0,9	0,8	0,73	0,65

correction factor range

$\Delta T(K)$	-1	-2	-3	-4
a	1,15	1,3	1,4	1,5

Diffuser size 1000



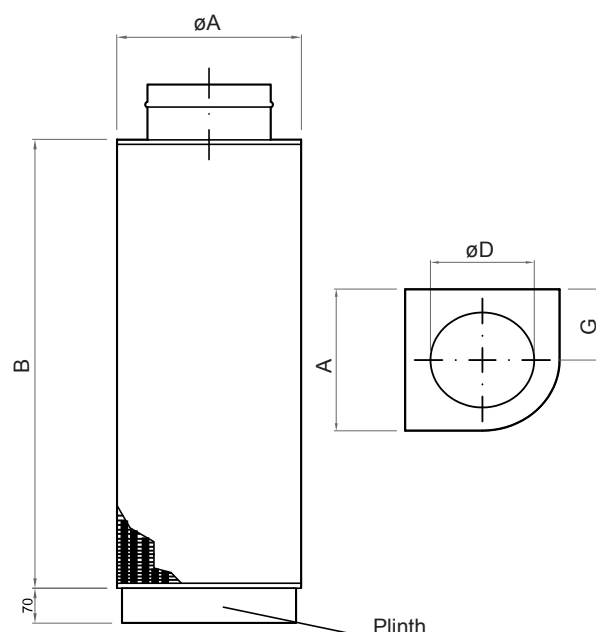
stream range L [m]
 $v=0,25$ m/s

correction factor range

length of diffuser	500	750	1000	1250	1500	2000
a	1,2	1,0	0,9	0,8	0,73	0,65

correction factor range

$\Delta T(K)$	-1	-2	-3	-4
a	1,15	1,3	1,4	1,5



DESCRIPTION

NWN are corner displacement diffusers designed for installation in wall corners. They are designed for slow supply of small quantities of air directly to the zone of human presence. The airflow can be adjusted by adjustable sinusoidal nozzles RD. Additional equipment includes: plinth C to set the diffuser on the floor and a throttle PT with a silencer.

FEATURES

- supplying small quantities of air directly to the zone of human presence
- airflow stream angle adjusted by sinusoidal RD nozzles (4)
- for places where particular air conditions are required
- simple installation
- diffusers made of steel sheet
- available in standard RAL 9003 colour
- upon customer's request, can be painted in any colour from RAL palette
- We can make different kind of perforations.

STANDARD SIZES

Size	A [mm]	B [mm]	Ø D [mm]	G [mm]	Weight [kg]
125	250	600	123	125	5
160	280	600	158	140	7
200	320	900	198	160	14
250	370	900	248	185	18
315	440	1480	313	220	23
400	520	1480	398	260	31

ORDER REFERENCE

NWN - 315 - **C** **RAL9003**

Size

colour

accessories:
PT - throttle with a silencer.,
C - plinth,
R - lid

type

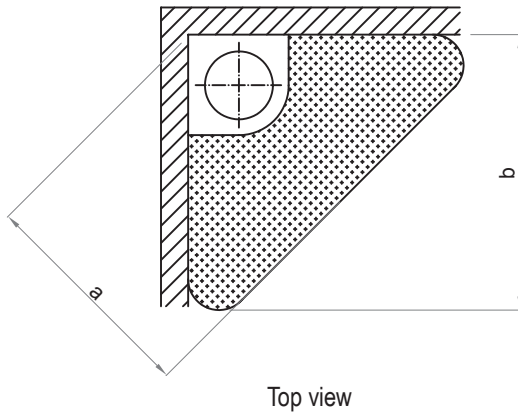
9.4 NWN

corner displacement diffusers

AIR SUPPLY LAY OUT

Figures below show the way the air is diffused in the room.

Figures a and b show the size of zone where air speed comes to 0.2 m/s for air supply at the temperature lower by 3°C than the temperature in the ventilate room.



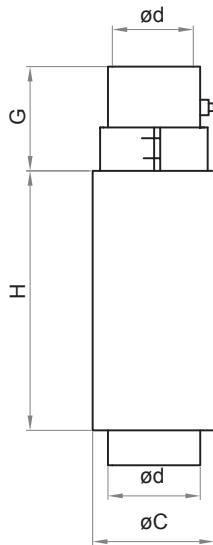
INSTALLATION

NWN diffusers are designed for installation in wall corners by screws. Depending on the purpose and installation surface, use appropriate installation slings. NWN should be connected to the round ventilation duct.

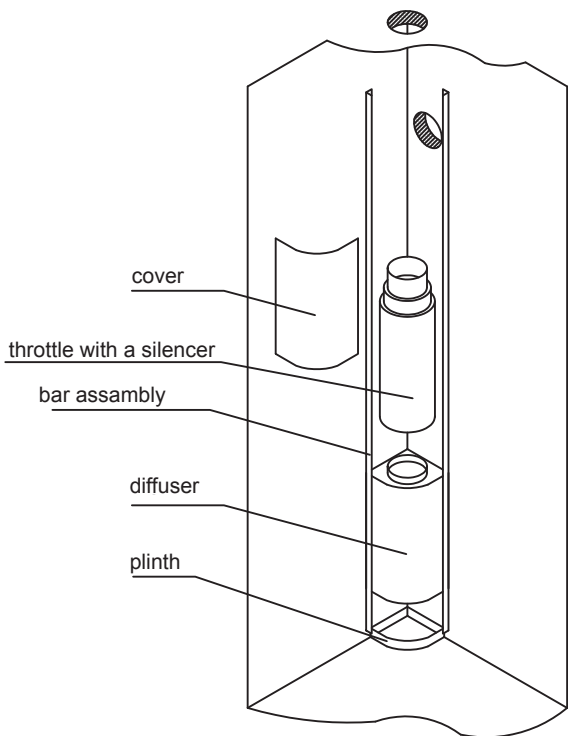
ACCESSORIES

PT - THROTTLE WITH A SILENCER

It is designed for adjusting the airflow going through the diffuser. Additionally equipped with an acoustic silencer.

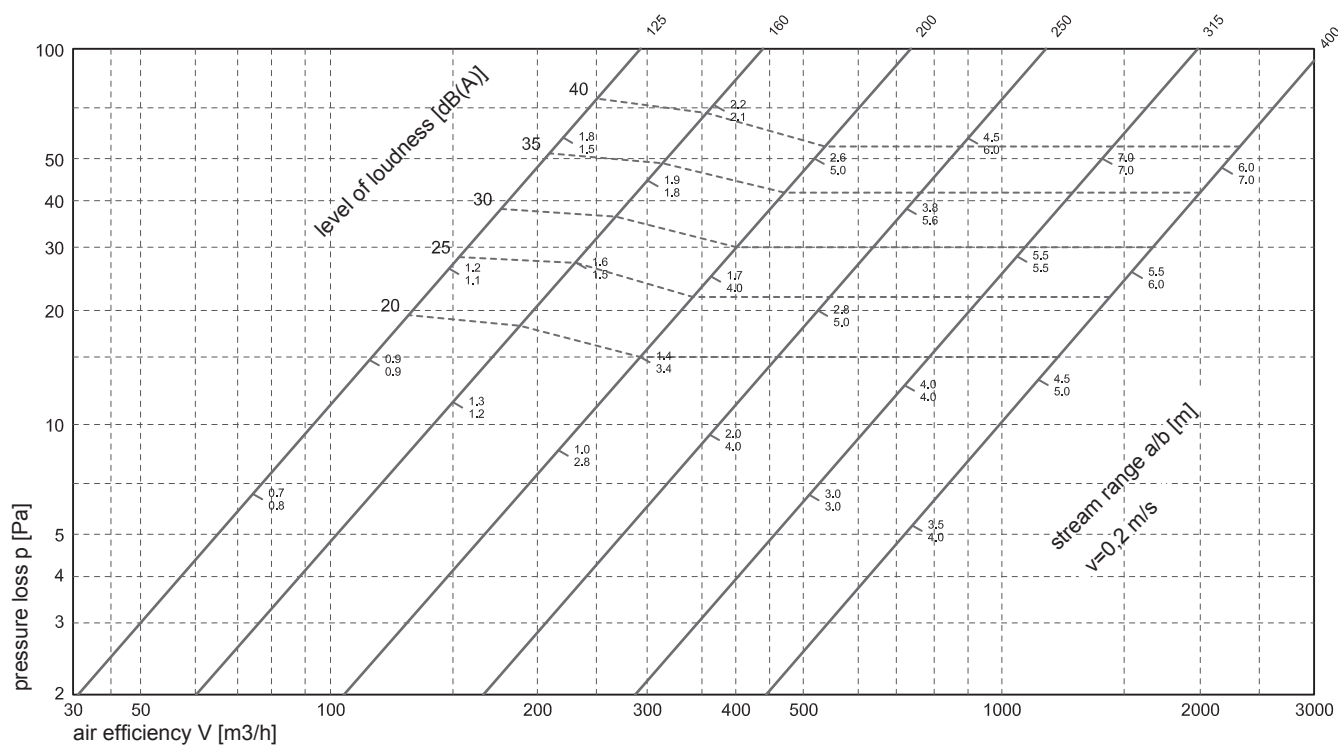


PT	ØC [mm]	Ød [mm]	G [mm]	H [mm]
125	230	125	230	600
160	260	160	230	600
200	300	200	230	600
250	350	250	250	600
315	415	315	260	900
400	500	400	300	900

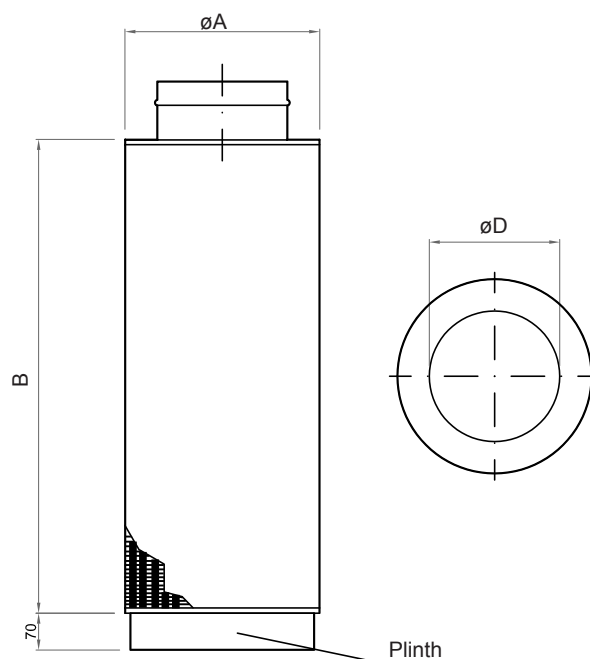


FEATURES

The figure shows airflow capacity V (m³/h), pressure loss p (Pa), airflow scope a and b (m) for end speed of 0.2 m/s, and volume level [dB(A)].



notes



DESCRIPTION

ONW are round displacement diffusers designed for installation the floor. They are designed for slow supply of larger quantities of air directly to the zone of human presence. The airflow can be adjusted by adjustable sinusoidal nozzles RD. Additional equipment includes: plinth C to set the diffuser on the floor and a throttle PT with a silencer.

FEATURES

- supplying larger quantities of air directly to the zone of human presence
- airflow stream angle adjusted by sinusoidal RD nozzles (4)
- for places where particular air conditions are required
- simple installation
- the possibility of cleaning the air vents
- diffusers made of steel sheet
- available in standard RAL 9003 colour
- upon customer's request, can be painted in any colour from RAL palette
- We can make different kind of perforations.

STANDARD SIZES

Size	Ø A [mm]	B [mm]	Ø D [mm]	Weight [kg]
125	245	600	123	7
160	280	600	158	10
200	320	900	198	15
250	370	900	248	18
315	440	1480	313	23
400	520	1980	398	29
500	620	1980	498	36
630	750	1980	628	45

ORDER REFERENCE

ONW - 250	-	PT	RAL9003
Size			colour
type			accessories: PT - throttle with a silencer C - plinth

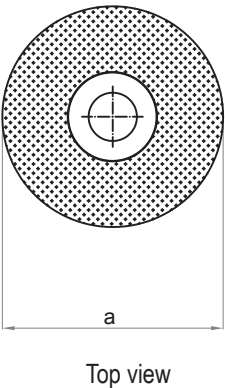
9.5 ONW

round displacement diffusers

AIR SUPPLY LAY OUT

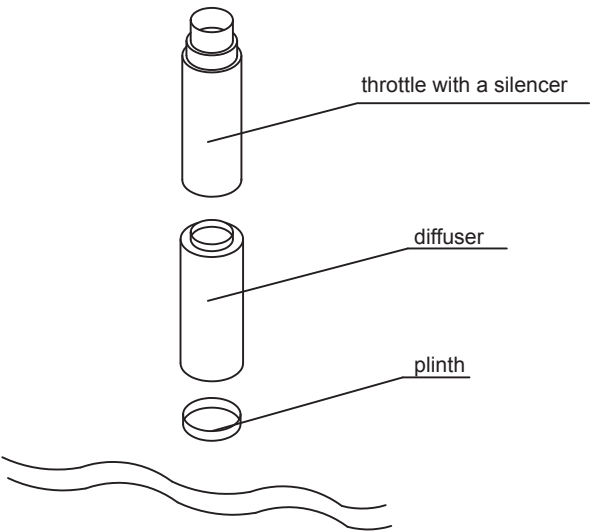
Figures below show the way the air is diffused in the room.

Figures a and b show the size of zone where air speed comes to 0.2 m/s for air supply at the temperature lower by 3°C than the temperature in the ventilate room.



INSTALLATION

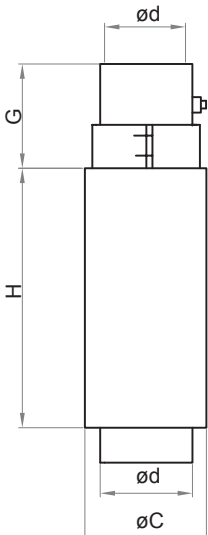
ONW diffusers are designed for installation in the floors. Depending on the purpose and installation surface, use appropriate installation slings. NWN should be connected to the round ventilation duct.



ACCESSORIES

PT - THROTTLE WITH A SILENCER

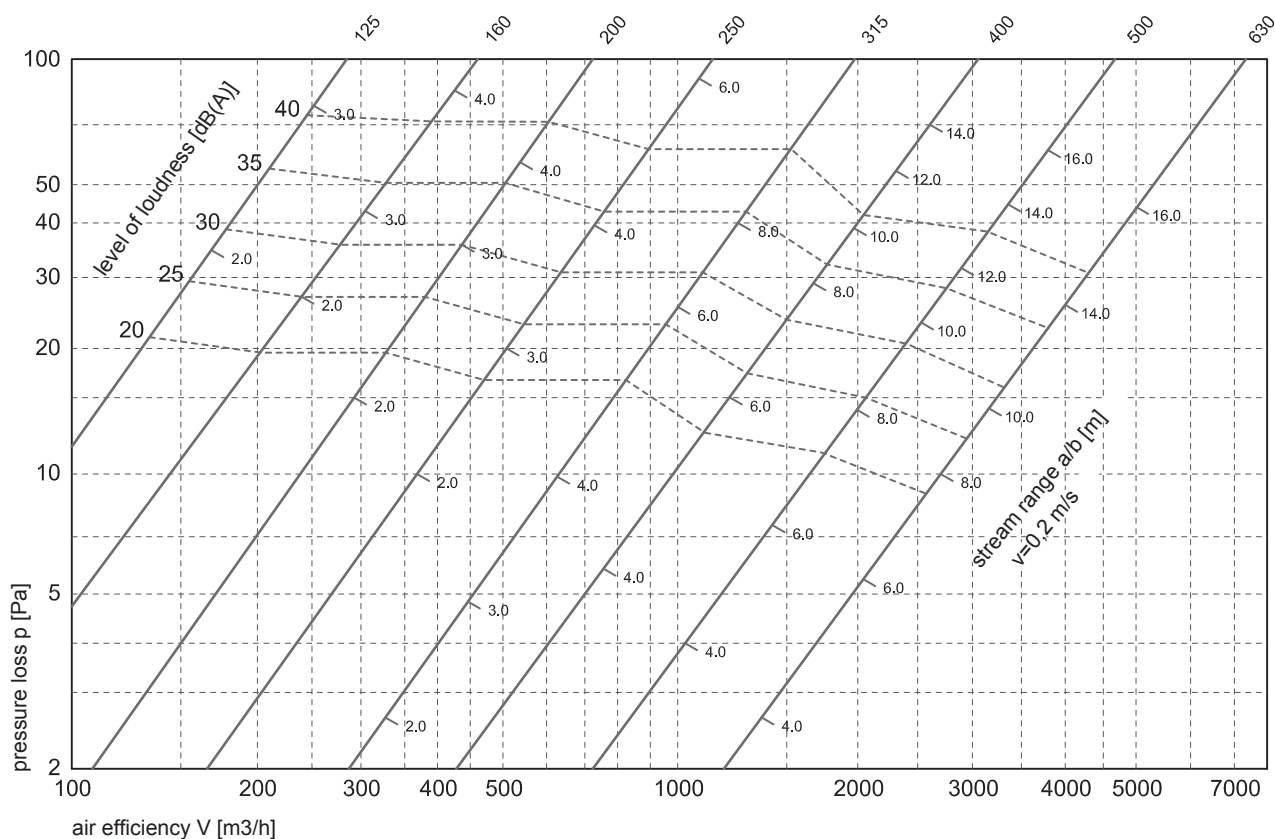
It is designed for adjusting the airflow going through the diffuser. Additionally equipped with an acoustic silencer.



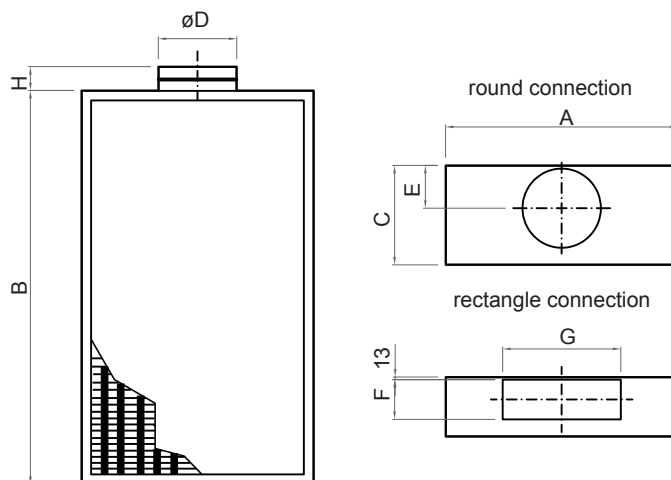
PT	ØC [mm]	Ød [mm]	G [mm]	H [mm]
125	230	125	230	600
160	260	160	230	600
200	300	200	230	600
250	350	250	250	600
315	415	315	260	900
400	500	400	300	900
500	600	500	300	900
630	730	630	300	900

FEATURES

The figure shows airflow capacity V (m³/h), pressure loss p (Pa), air-flow scope a (m) for end speed of 0.2 m/s, and volume level [db(A)].



notes



DESCRIPTION

PNWD are rectangular displacement diffusers designed for installation at the wall, ceiling, or installation recess. They are designed for slow supply of large quantities of air directly to the zone of human presence.

They are used in industrial facilities. The airflow can be adjusted by large number of adjustable sinusoidal nozzles RD. The airflow can be adjusted by a throttle placed in the feeding channel.

PNWD diffusers are made in 6 standard sizes: 4 sizes with round connection and 2 sizes with rectangular connection.

FEATURES

- supplying large quantities of air directly to the zone of human presence
- airflow stream angle adjusted by a large number of sinusoidal RD nozzles
- for places where particular air conditions are required
- simple adjustment
- easy cleaning
- simple installation on the wall or ceiling
- diffusers made of zinc-coated steel sheet
- available in standard RAL 9003 colour
- upon customer's request, can be painted in any colour from RAL palette
- We can make different kind of perforations.

STANDARD SIZES

Size	A [mm]	B [mm]	C [mm]	Ø D [mm]	E [mm]	FxG [mm]	H [mm]	Weight [kg]
200	590	1180	300	198	115	-	40	23
250	590	1980	350	248	140	-	40	41
315	1180	1980	420	313	170	-	40	78
400	1180	1980	500	398	215	-	55	80
200-600	1180	1980	300	-	115	200-600	55	73
250-800	1180	1980	350	-	140	250-800	55	75

ORDER REFERENCE

PNWD - 200	RAL9003
type	colour
Size	

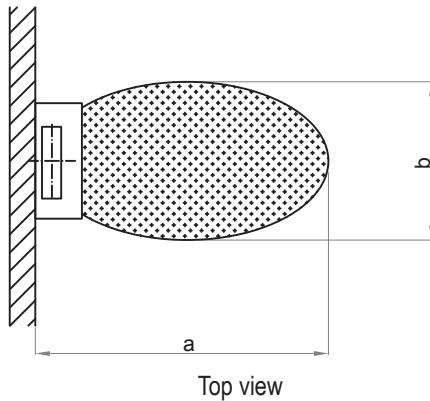
9.6 PNWD

rectangular displacement diffusers for recess and ceiling

AIR SUPPLY LAY OUT

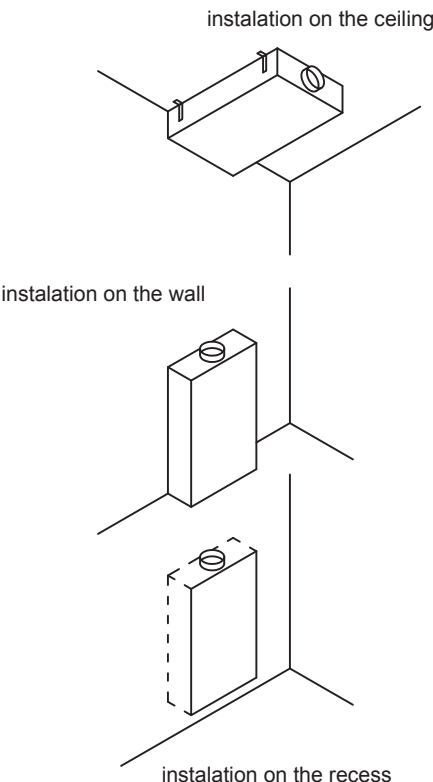
Figures below show the way the air is diffused in the room.

Figures a and b show the size of zone where air speed comes to 0.2 m/s for air supply at the temperature lower by 3°C than the temperature in the ventilated room.



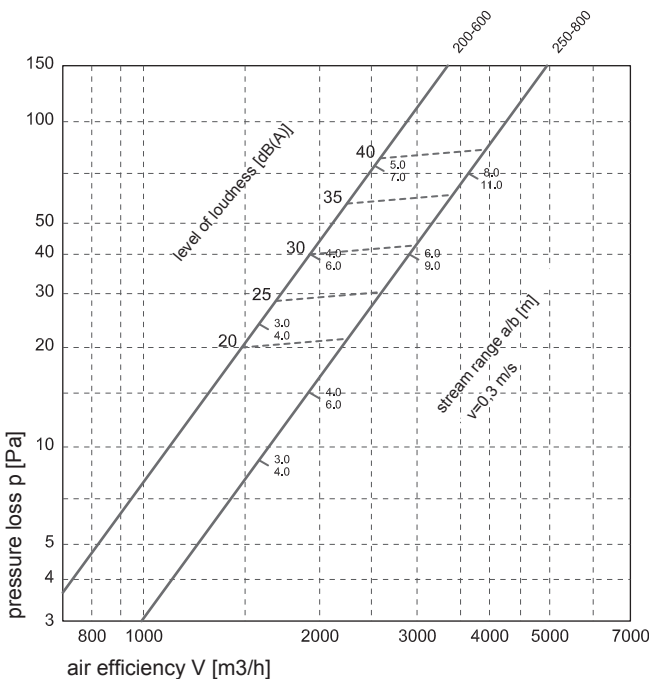
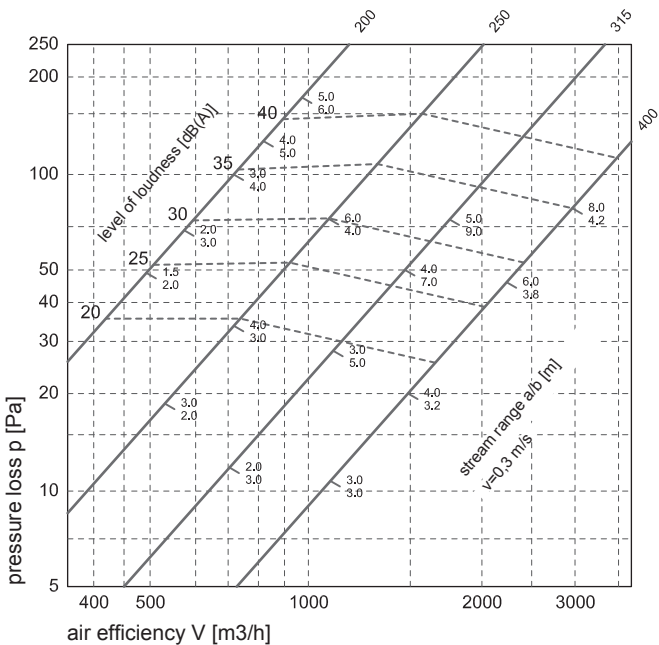
INSTALLATION

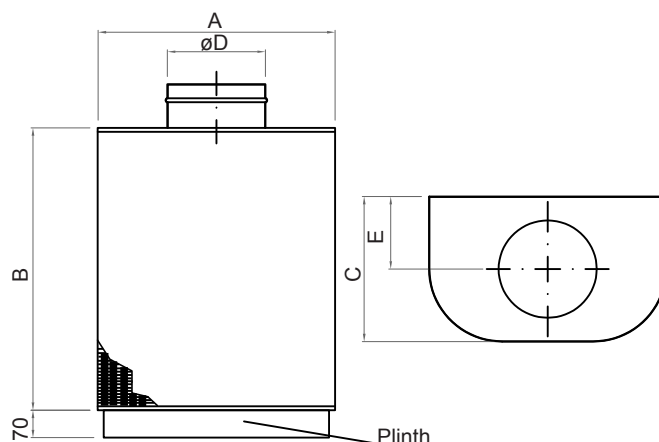
PNWD diffusers are designed for installation on the wall, ceiling or installation recess. Depending on the purpose and installation surface, use appropriate installation slings. PNWN should be connected to the round or rectangular ventilation duct,



FEATURES

The figure shows airflow capacity V (m³/h), pressure loss p (Pa), airflow scope a and b (m) for end speed of 0.3 m/s, and volume level [db(A)].





DESCRIPTION

PNWM are rectangular displacement diffusers designed for installation on the wall over the floor. They are designed for slow supply of larger quantities of air directly to the zone of human presence. The airflow can be adjusted by adjustable sinusoidal nozzles RD. Additional equipment includes: plinth C to set the diffuser on the floor and a throttle PT with a silencer.

FEATURES

- supplying larger quantities of air directly to the zone of human presence
- airflow stream angle adjusted by sinusoidal RD nozzles
- for places where particular air conditions are required
- simple installation
- diffusers made of zinc-coated steel sheet
- available in standard RAL 9003 colour
- upon customer's request, can be painted in any colour from RAL palette
- We can make different kind of perforations.

STANDARD SIZES

Size	A [mm]	B [mm]	C [mm]	Ø D [mm]	E [mm]	Weight [kg]
125	300	320	190	123	95	8
160	400	420	260	158	130	14
200	400	520	260	198	130	18
250	600	720	310	2 48	155	25
315	800	920	380	313	190	33
400	1000	1200	460	398	230	45

ORDER REFERENCE

PNWM - 315 - **PT** **RAL9003**

type

Size

colour

accessories:
PT - throttle with a silencer,
P - plate,
C - plinth,

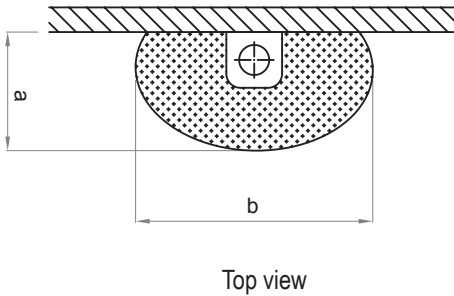
9.7 PNWM

rectangular displacement diffusers for walls and floors

AIR SUPPLY LAY OUT

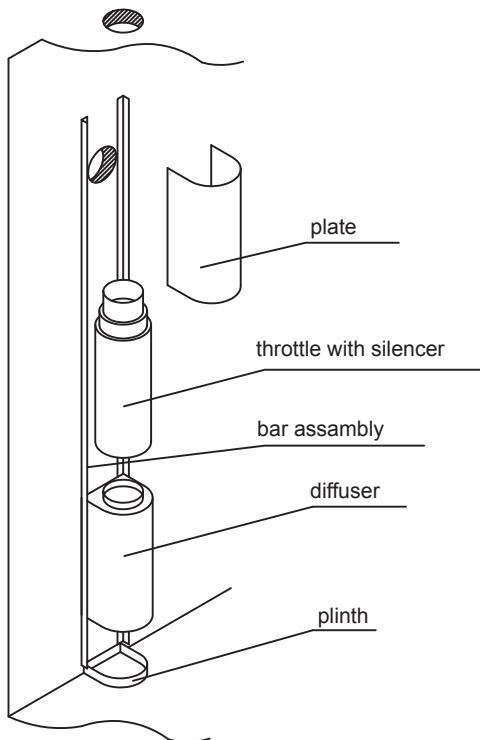
Figures below show the way the air is diffused in the room.

Figures a and b show the size of zone where air speed comes to 0.2 m/s for air supply at the temperature lower by 3°C than the temperature in the ventilate room.



INSTALLATION

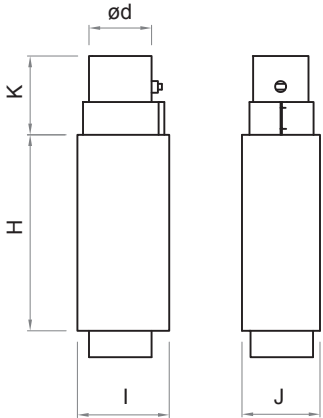
PNWM diffusers are designed for installation in wall corners by screws. Depending on the purpose and installation surface, use appropriate installation slings. PNWN should be connected to the round ventilation duct.



ACCESSORIES

PT - THROTTLE WITH SILENCER

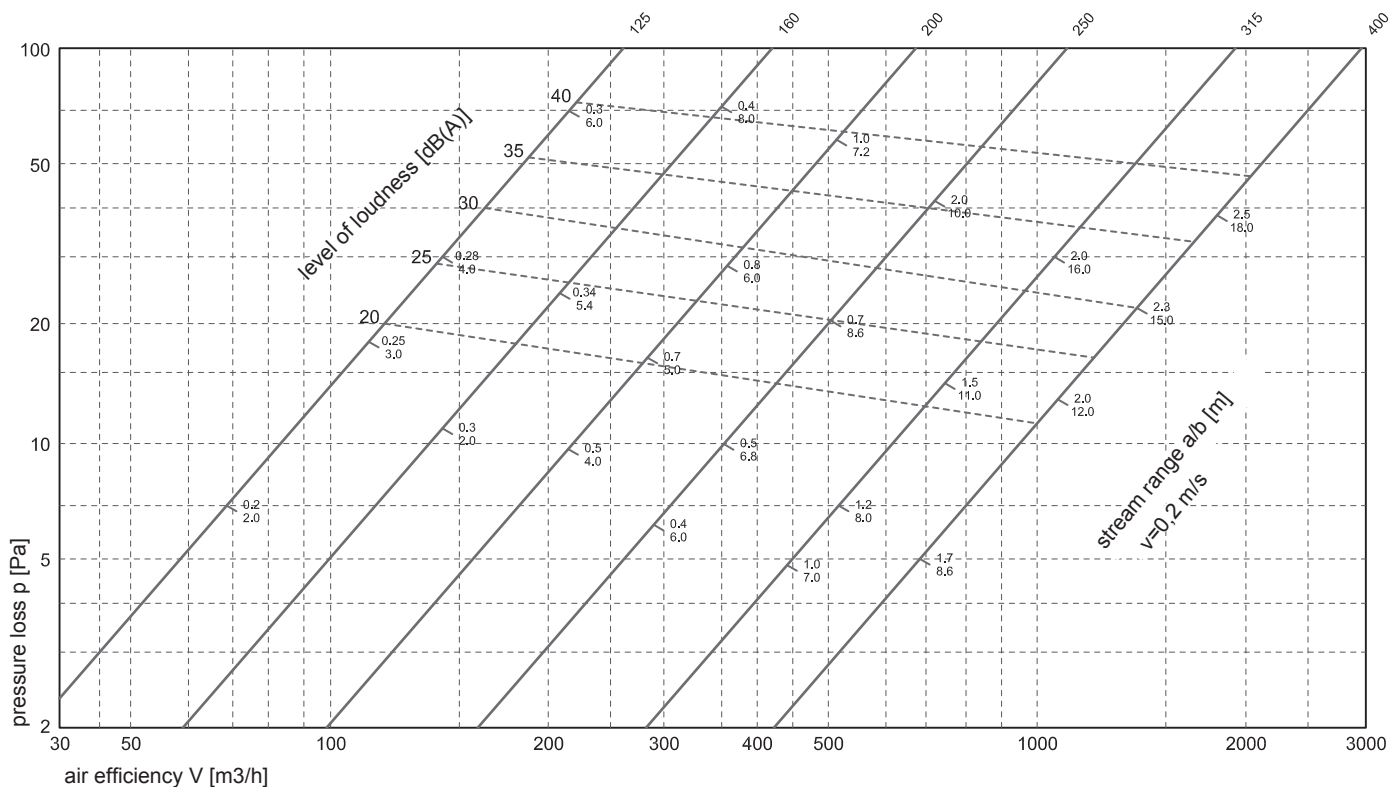
It is designed for adjusting the airflow going through the diffuser. Additionally equipped with an acoustic silencer.



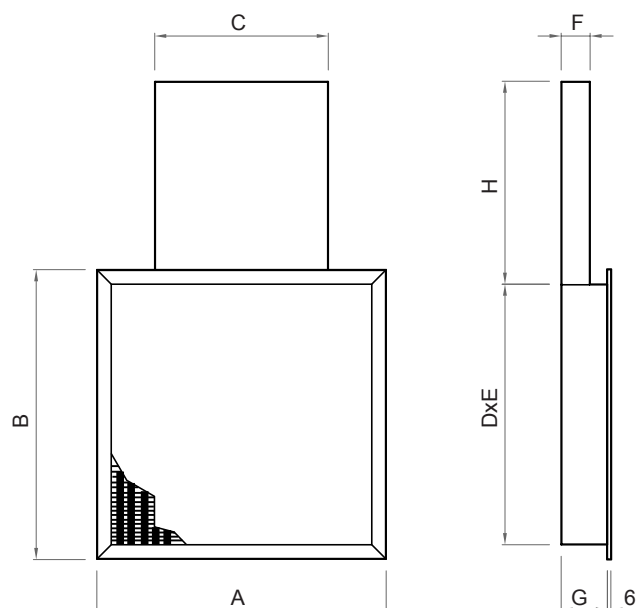
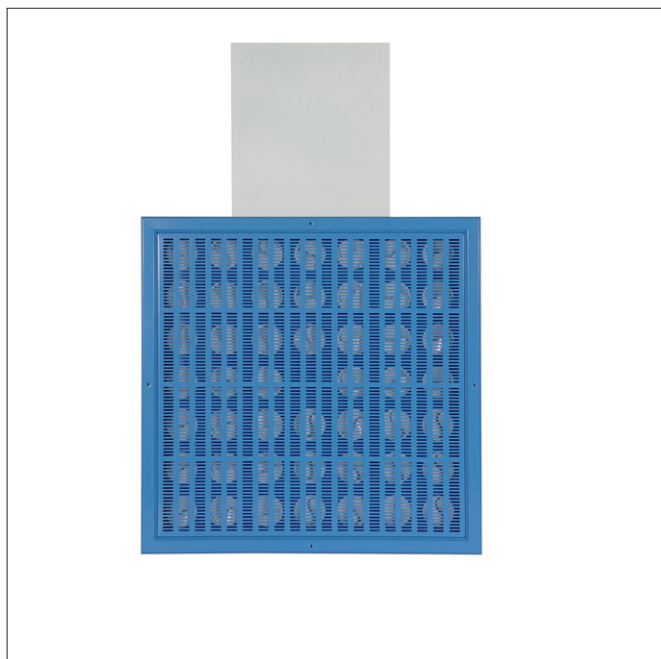
PT	H [mm]	I [mm]	J [mm]	K [mm]	Ød [mm]
125	600	220	165	230	125
160	600	265	200	230	160
200	600	295	240	230	200
250	600	345	290	230	250

FEATURES

The figure shows airflow capacity V (m³/h), pressure loss p (Pa), airflow scope a and b (m) for end speed of 0.2 m/s, and volume level [db(A)].



notes



DESCRIPTION

PNWS are rectangular displacement diffusers designed for installation in the wall. They are designed for slow supply of larger quantities of air directly to the zone of human presence. The airflow can be adjusted by adjustable sinusoidal nozzles RD. Additional equipment includes connection duct (K).

FEATURES

- supplying larger quantities of air directly to the zone of human presence
- airflow stream angle adjusted by sinusoidal RD nozzles
- simple installation
- easy cleaning
- diffusers made of zinc-coated steel sheet
- available in standard RAL 9003 colour
- upon customer's request, can be painted in any colour from RAL palette

STANDARD SIZES

Size	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	H [mm]
400	400	400	250	350	350	50	100	350
500	500	500	300	450	450	50	100	350
600	600	600	350	550	550	50	100	350
900	600	900	500	850	550	70	120	350

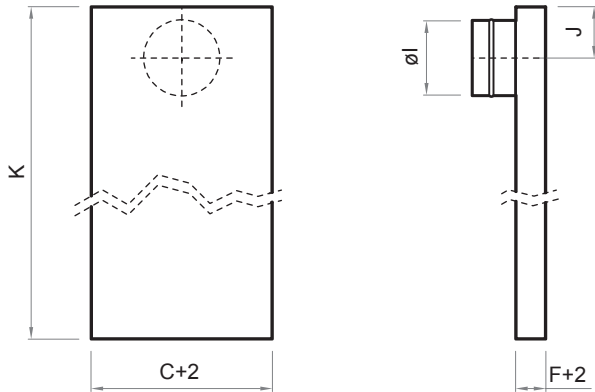
ORDER REFERENCE

PNWS - 500	-	K	RAL9003
type		Size	colour
			accessories: K - connection duct

9.8 PNWS

rectangular displacement diffusers for walls

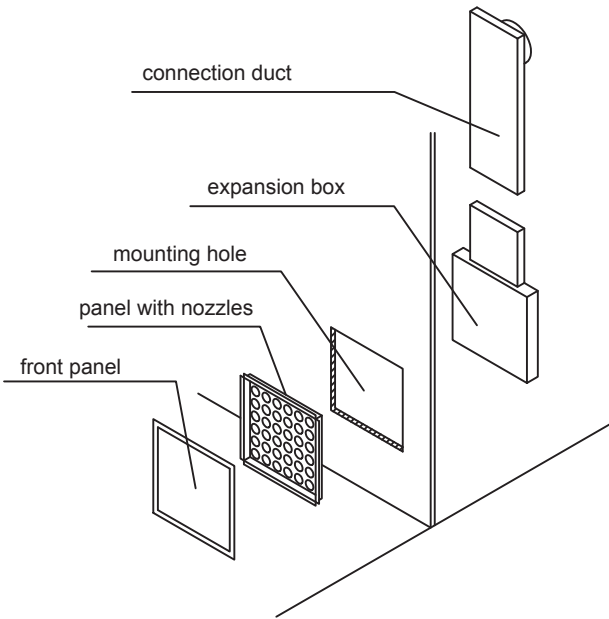
CONNECTION DUCT K



Size	C [mm]	F [mm]	K [mm]	Ø I [mm]	J [mm]
400	250	50	2000	98	70
500	300	50	2000	123	85
600	350	50	2000	158	105
900	500	70	2000	198	125

INSTALLATION

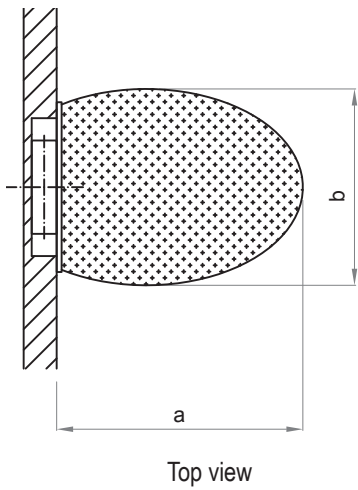
PNWS diffusers are designed for installation prepared wall recess. The front panel should be fixed by screws through installation holes to the wall. Connection duct K should slide on the rectangular connector of the diffuser.



AIR SUPPLY LAY OUT

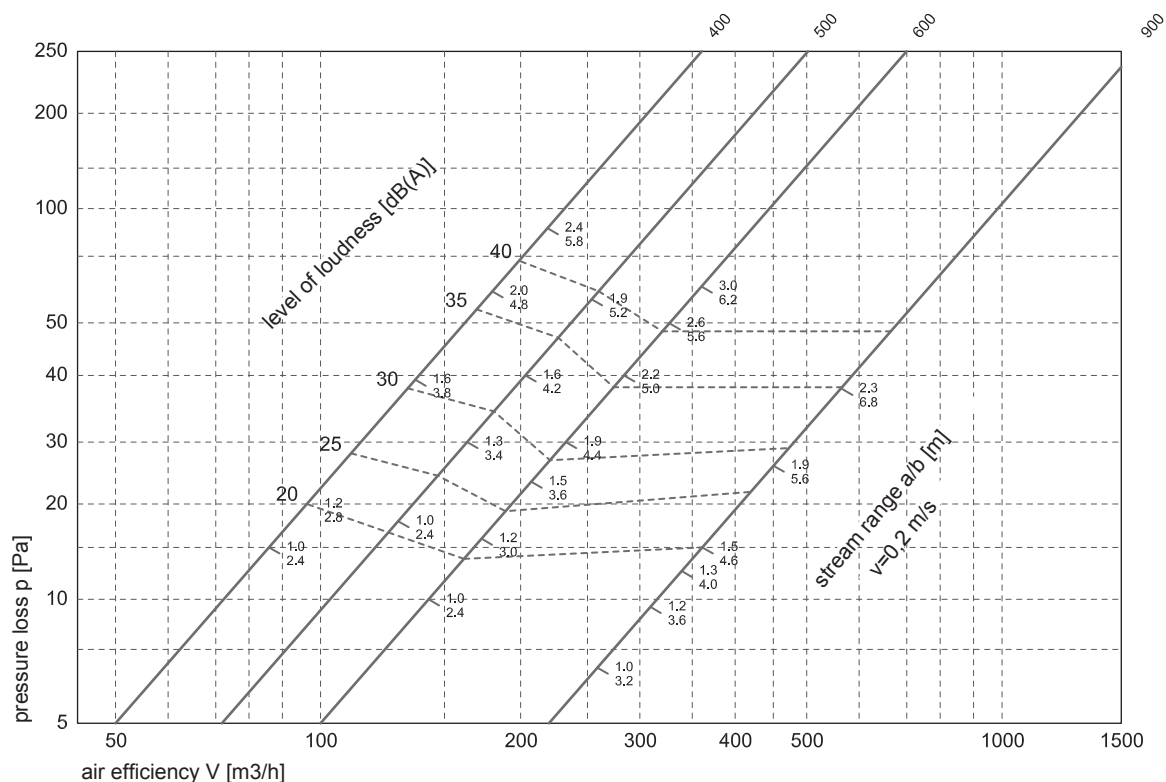
Figures below show the way the air is diffused in the room.

Figures a and b show the size of zone where air speed comes to 0.2 m/s for diffuser placed 0.5 m over the floor, and air supply at the temperature lower by 3°C than the temperature in the ventilate room.

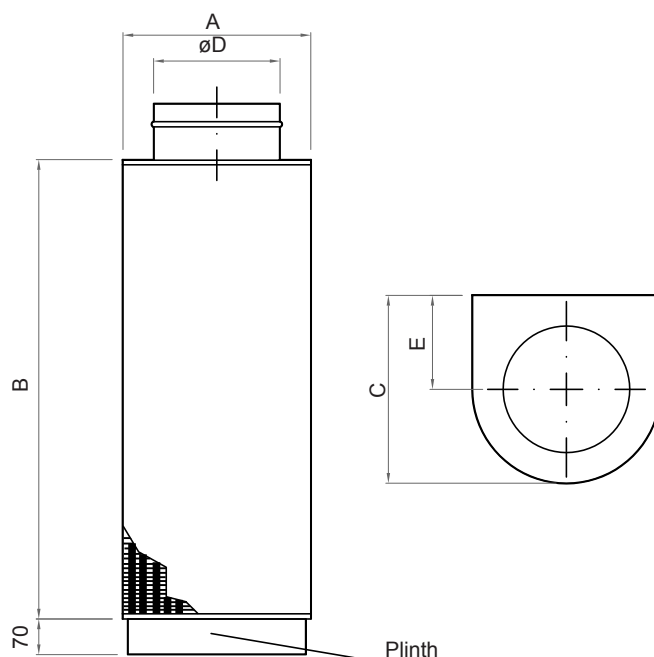


FEATURES

The figure shows airflow capacity V (m³/h), pressure loss p (Pa), airflow scope a and b (m) for end speed of 0.2 m/s, and volume level [db(A)].



notes



DESCRIPTION

PONW are half-round displacement diffusers designed for installation on the wall. They are designed for slow supply of larger quantities of air directly to the zone of human presence. The airflow can be adjusted by adjustable sinusoidal nozzles RD. Additional equipment includes: plinth C to set the diffuser on the floor and a throttle PT with a silencer.

FEATURES

- supplying larger quantities of air directly to the zone of human presence
- airflow stream angle adjusted by sinusoidal RD nozzles (4)
- for places where particular air conditions are required
- simple installation
- easy cleaning
- diffusers made of steel zinc-coated sheet
- available in standard RAL 9003 colour
- upon customer's request, can be painted in any colour from RAL palette

STANDARD SIZES

Size	A [mm]	B [mm]	C [mm]	Ø D [mm]	E [mm]	Weight [kg]
125	250	600	250	123	125	7
160	280	600	280	158	140	10
200	320	900	320	198	160	15
250	370	900	370	248	185	18
315	440	1480	440	313	220	23
400	520	1980	530	398	265	29
500	620	1980	620	498	310	36
630	750	1980	750	628	375	45

ORDER REFERENCE

PONW - 250 - **C** **RAL9003**

type
Size
accessories
PT - throttle with a silencer.,
P - plate,
C - plinth,
colour

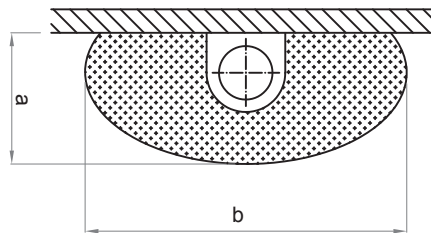
9.9 PONW

half-round displacement diffusers

AIR SUPPLY LAY OUT

Figures below show the way the air is diffused in the room.

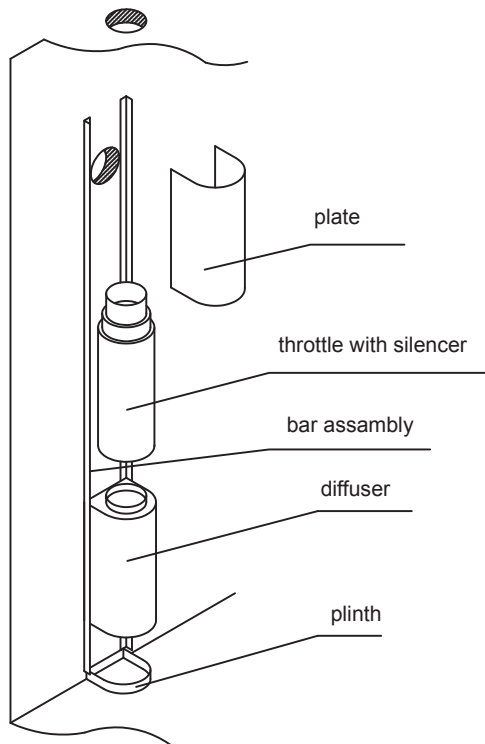
Figures a and b show the size of zone where air speed comes to 0.2 m/s for air supply at the temperature lower by 3°C than the temperature in the ventilate room.



Top view

INSTALLATION

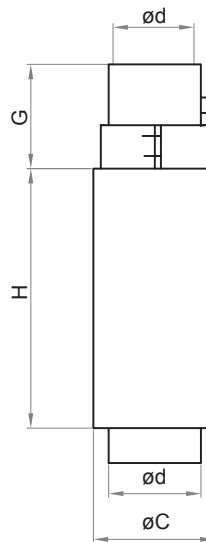
PONW diffusers are designed for installation in the walls using screws. Depending on the purpose and installation surface, use appropriate installation slings. PONW should be connected to the round ventilation duct.



ACCESSORIES

PT - THROTTLE WITH A SILENCER

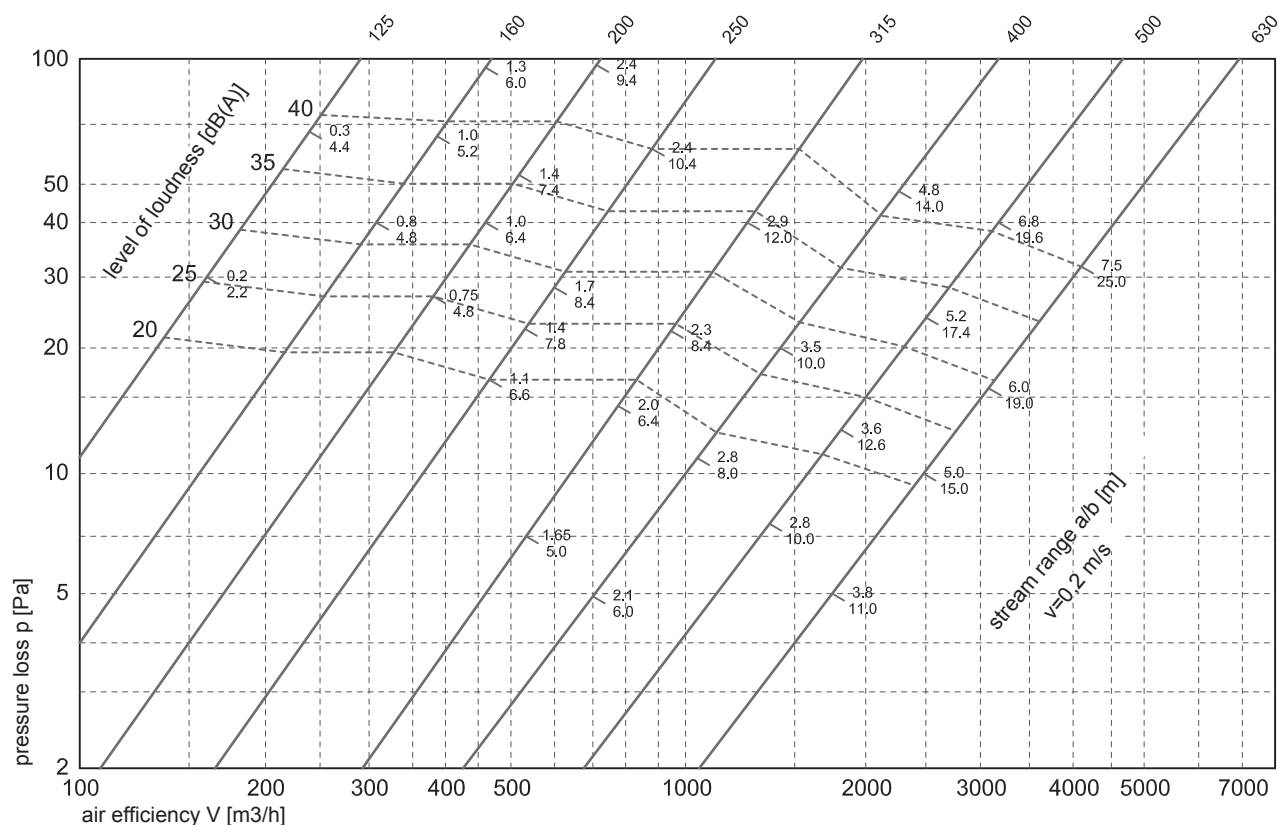
It is designed for adjusting the airflow going through the diffuser. Additionally equipped with an acoustic silencer.



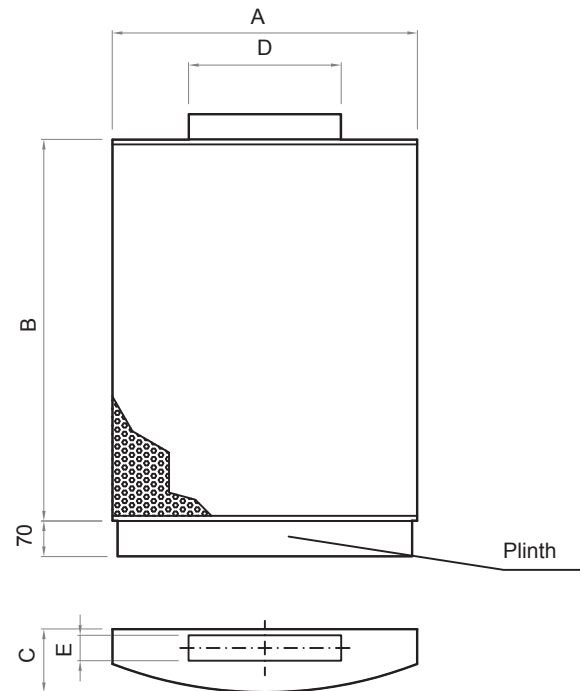
PT	ØC [mm]	Ød [mm]	G [mm]	H [mm]
125	230	125	230	600
160	260	160	230	600
200	300	200	230	600
250	350	250	250	600
315	415	315	260	900
400	500	400	300	900
500	600	500	300	900
630	730	630	300	900

FEATURES

The figure shows airflow capacity V (m³/h), pressure loss p (Pa), air-flow scope a (m) for end speed of 0.2 m/s, and volume level [db(A)].



notes



DESCRIPTION

WNWS are convex displacement diffusers designed for installation on the wall over the floor. They are designed for slow supply of larger quantities of air directly to the zone of human presence. The airflow can be adjusted by adjustable sinusoidal nozzles RD. The airflow can be adjusted by a throttle placed in the feeding channel. Additional equipment includes: plinth C to set the diffuser on the floor and a plinth C to set the diffuser on the floor.

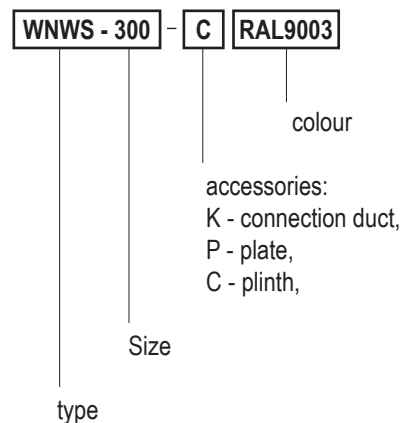
STANDARD SIZES

Size	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	Weight [kg]
200	400	550	125	200	50	9
300	600	750	125	300	50	15
400	900	750	185	400	90	23

FEATURES

- supplying larger quantities of air directly to the zone of human presence
- airflow stream angle adjusted by sinusoidal RD nozzles
- for places where particular air conditions are required
- simple installation
- easy cleaning
- diffusers made of zinc-coated steel sheet
- available in standard RAL 9003 colour
- upon customer's request, can be painted in any colour from RAL palette

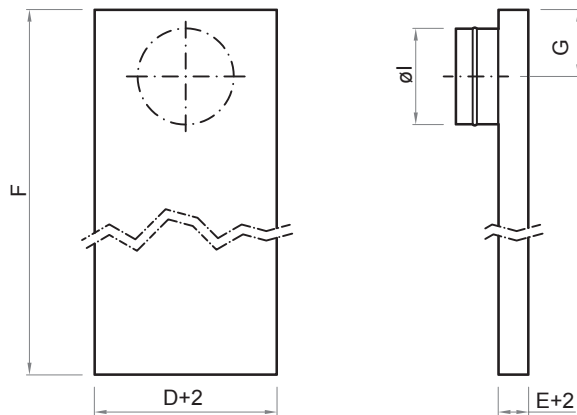
ORDER REFERENCE



9.10 WNWS

convex displacement diffusers for walls

CONNECTION DUCT K

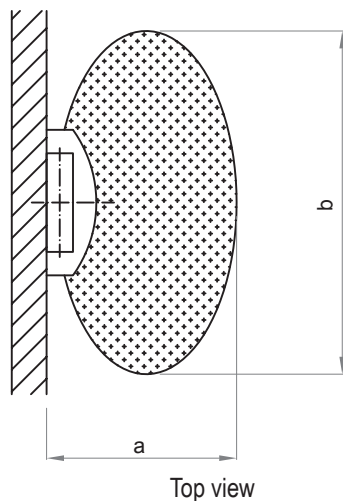


Size	D [mm]	E [mm]	F [mm]	G [mm]	Ø I [mm]
200	200	50	max. 2000	90	123
300	300	50	max.2200	110	158
400	400	90	max.2200	130	198

AIR SUPPLY LAY OUT

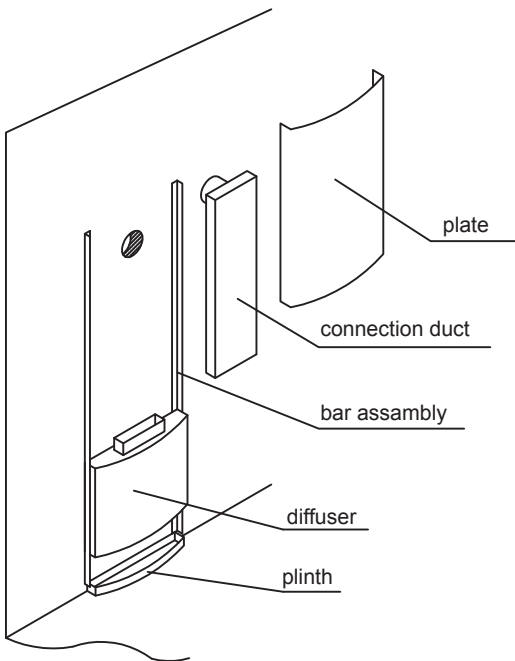
Figures below show the way the air is diffused in the room.

Figures a and b show the size of zone where air speed comes to 0.2 m/s for air supply at the temperature lower by 3°C than the temperature in the ventilate room.



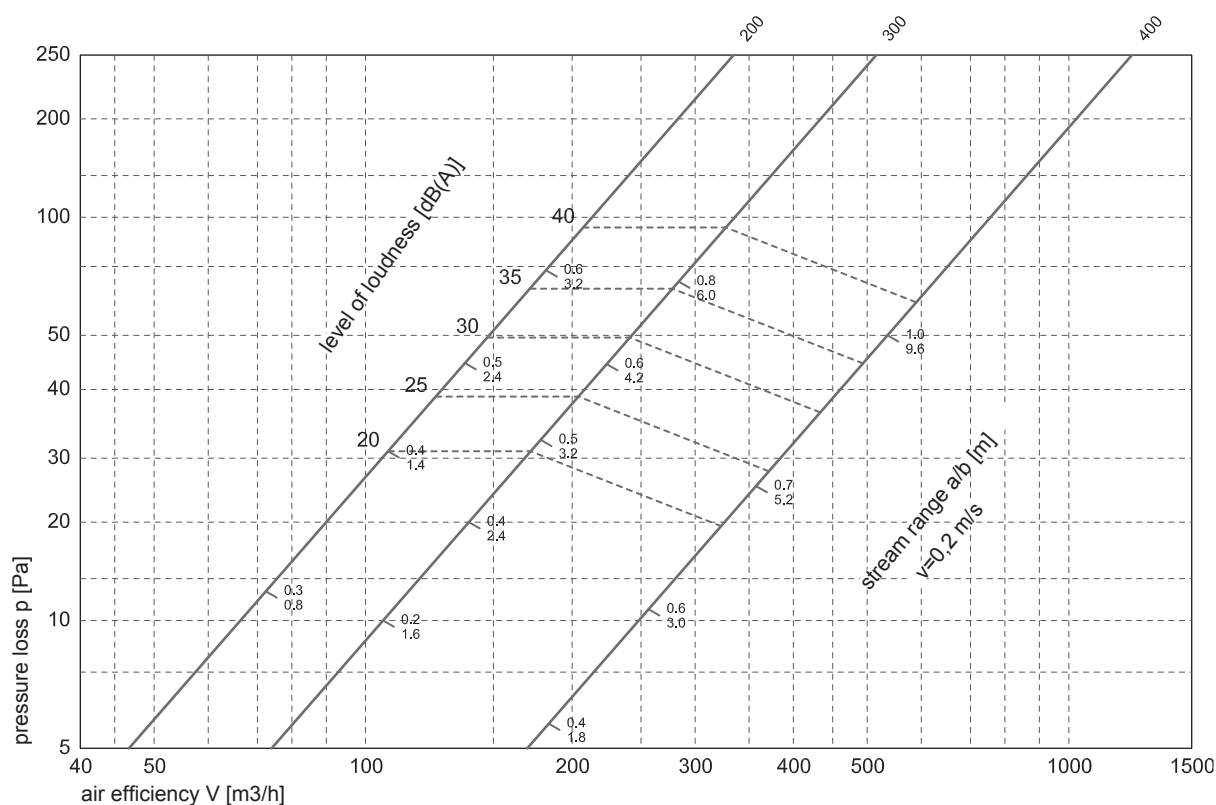
INSTALLATION

WNWS diffusers are designed for installation in walls by screws. Depending on the purpose and installation surface, use appropriate installation slings. Connection duct K should slide on the rectangular connector of the diffuser.

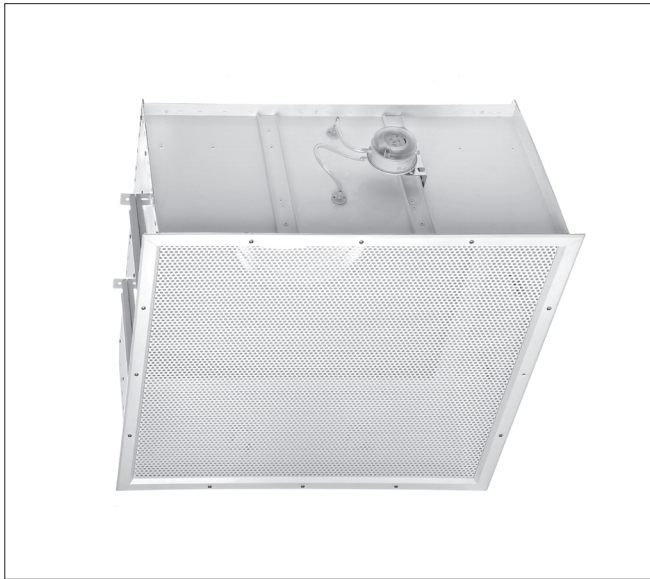


FEATURES

The figure shows airflow capacity V (m³/h), pressure loss p (Pa), air-flow scope a and b (m) for end speed of 0.2 m/s, and volume level [db(A)].



notes



DESCRIPTION

Ceiling diffusers NFA/OG with absolute filter HEPA are design for air supply into rooms about highest requirements of the cleanes and sterility in medicine, biology and laboratory- technique.

NFA/OG diffusers are made of steel sheet available in standard RAL 9003 colour, with top round connection. Additionally diffuser casing equiped with side structural reinforcement. System of the filter fastening assures hermetic and steady embedment in the box. Diffuser is also additionally equiped into endings making possible qualification of the pollution of the filter.

The filter elements are absolute filters H13 and H14 class in PN-EN 1822 (PN-B-76003) standard with frame made of discharge aluminium profiles with neopren seal.

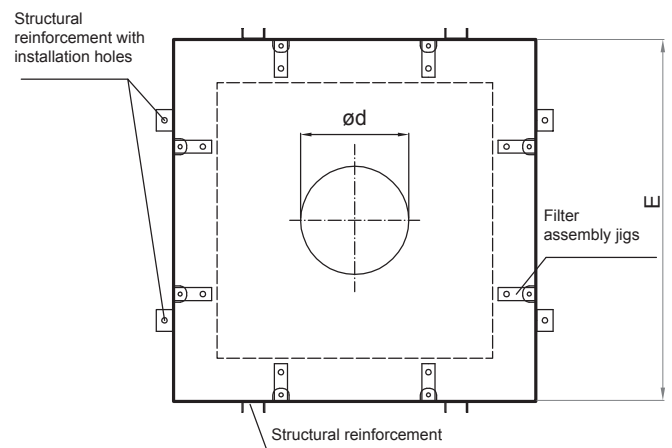
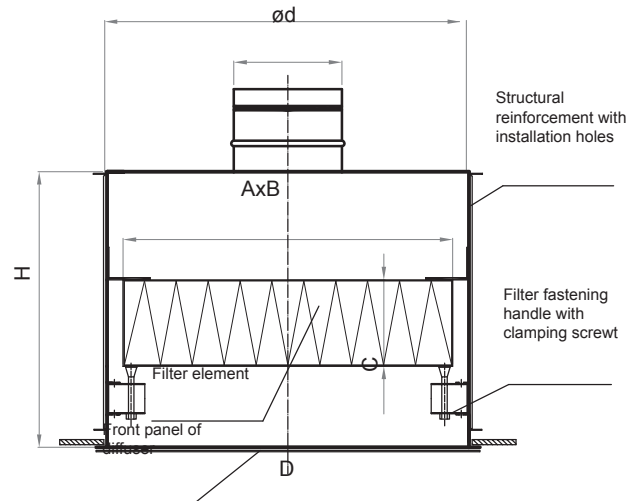
NFA/OG equiped with four versions of supply elements (front panels):

- AN square diffuser
 - KWBP perforated air grate
 - ANW swirl diffuser with adjustable blades
 - NW swirl difuser
- painted in standard RAL 9003.

We use HEPA filters with advanced, **mini-pleat** filter technology. With this technology, we could give up the 150 thick filters because they have the same performance as filters with a thickness of 80

KRÓTKA CHARAKTERYSTYKA

- diffusers in standard without pressure controller
- front panel made of zinc-coated steel sheet
- upon customer's request, diffusers can be made in any size and colour from RAL palette



STANDARD SIZES

Diffuser Size	Filter size [mm]		Ød [mm]					H [mm]	□D [mm]	E [mm]
	A×B	C								
1a	305×305	80	123	148	158	198		296	385	335
2a	457×457	80	148	158	198	248	298	296	537	487
3a	575×575	80	198		248		298	296	655	605
4a	610×610	80	198		248		298	296	690	640
4c		292	298					510		

- AxB - filter size
 C - filter thickness
 H - diffuser height
 □D - front panel size
 Ød - connection diameter

10.1 NFA/OG

ceiling diffusers with absolute filter

ORDER REFERENCE

NFA/OG - KWBP - 1a - 123 - H14/8 - P **RAL9003**

front panel colour

— diffuser without pressure controller
P diffuser with pressure controller

filter thickness:
8 - 80mm;
29 - 292mm;

filter class::
H13; H14

connection size ød

size

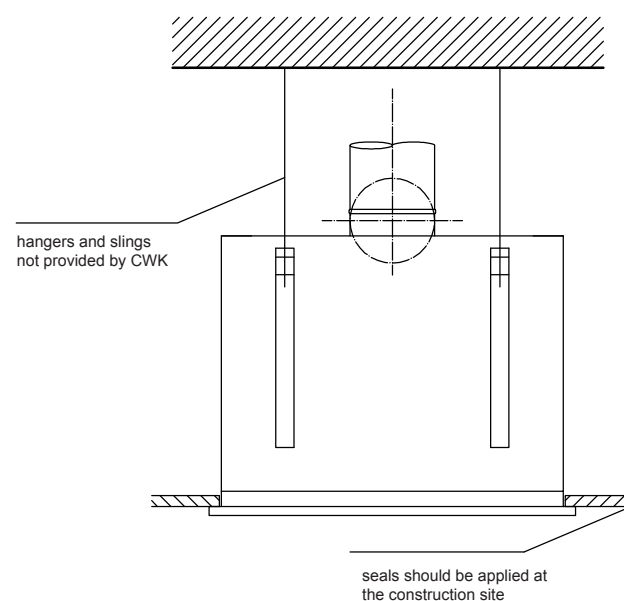
front panel type:
- AN square diffuser
- KWBP perforated air grate
- ANW-R swirl diffuser with adjustable blades decorative frame
- NW-R swirl diffuser with decorative frame

type

INSTALLATION

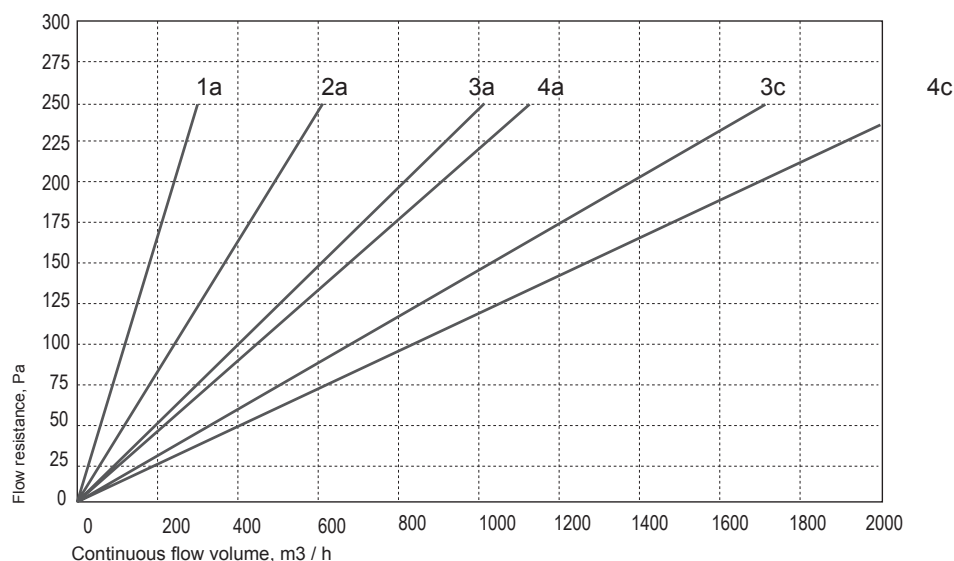
NFA/OG diffusers are designed for installation between the ceiling and underslung ceiling. It can be mounted onto the ceiling by appropriate hangers (bars, pins...) and installation slings or fixed directly to the underslung ceiling. Upon customer's request, diffusers can be equipped with factory slings

INSTALLATION IN THE ROOF



ORDER REFERENCE

The graphs shows the performance of air V (m³ / h) and pressure loss Δp (Pa).





DESCRIPTION

Ceiling diffusers NFA/OB with absolute filter HEPA are design for air supply into rooms about highest requirements of the cleanliness and sterility in medicine, biology and laboratory- technique.

NFA/OB diffusers are made of steel sheet available in standard RAL 9003 colour, with side round connection. Additionally diffuser casing equipped with side structural reinforcement. System of the filter fastening assures hermetic and steady embedment in the box. Diffuser is also additionally equipped into endings making possible qualification of the pollution of the filter.

The filter elements are absolute filters H13 and H14 class in PN-EN 1822 (PN-B-76003) standard with frame made of discharge aluminium profiles with neopren seal.

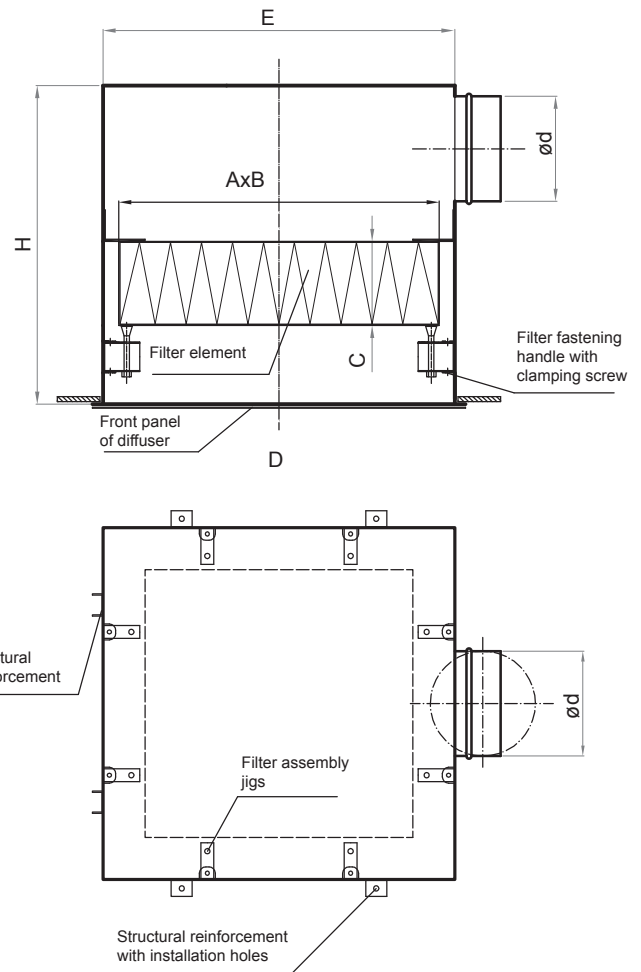
NFA/OB equipped with four versions of supply elements (front panels):

- AN square diffuser
 - KWBP perforated air grate
 - ANW swirl diffuser with adjustable blades
 - NW swirl diffuser
- painted in standard RAL 9003.

We use HEPA filters with advanced, **mini-pleat** filter technology. With this technology, we could give up the 150 thick filters because they have the same performance as filters with a thickness of 80

FEATURES

- diffusers in standard without pressure controller
- front panel made of zinc-coated steel sheet
- upon customer's request, diffusers can be made in any size and colour from RAL palette



STANDARD DIMENSIONS

Size	Filter size [mm]		Ød [mm]	H [mm]	□D [mm]	E [mm]
	AxB	C				
1a	305×305	80	123	365	340	335
2a	457×457	80	198	440	490	487
3a	575×575	80	198	440	610	605
4a	610×610	80	198	440	645	640
4c		292	348	805		

- AxB - filter size
 C - filter thickness
 H - diffuser height
 □D - front panel size
 Ød - connection diameter

CWIKTM
AIR DIFFUSERS

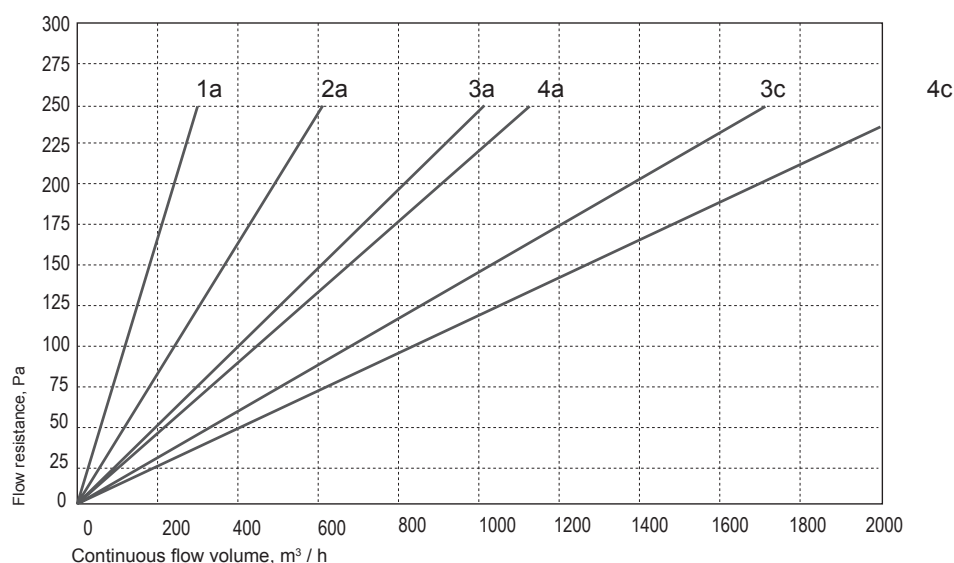
ORDER REFERENCE

type

Upon customer's request, diffusers can be equipped with factory slings

Diagram illustrating the storage container for CWK components. The container is a rectangular box with a lid. The lid is shown open, revealing the interior. The container is supported by two vertical hangers and slings, which are labeled "hangers and slings not provided by CWK". The container is placed on a base, and the lid is sealed with a sealant, labeled "seals should be applied at the construction site".

The figure shows airflow capacity V (m^3/h) and pressure loss Δp (Pa).





DESCRIPTION

Ceiling diffusers NFA/BO with absolute filter HEPA are design for air supply into rooms about highest requirements of the cleanes and sterility in medicine, biology and laboratory- technique.

NFA/BO diffusers are made of steel sheet available in standard RAL 9003 colour, with lowered side round connection. Additionally diffuser casing equiped with side structural reinforcement. System of the filter fastening assures hermetic and steady embedment in the box. Diffuser is also additionally equiped into endings making possible qualification of the pollution of the filter.

The filter elements are absolute filters H13 and H14 class in PN-EN 1822 (PN-B-76003) standard with frame made of discharge aluminium profiles with neopren seal.

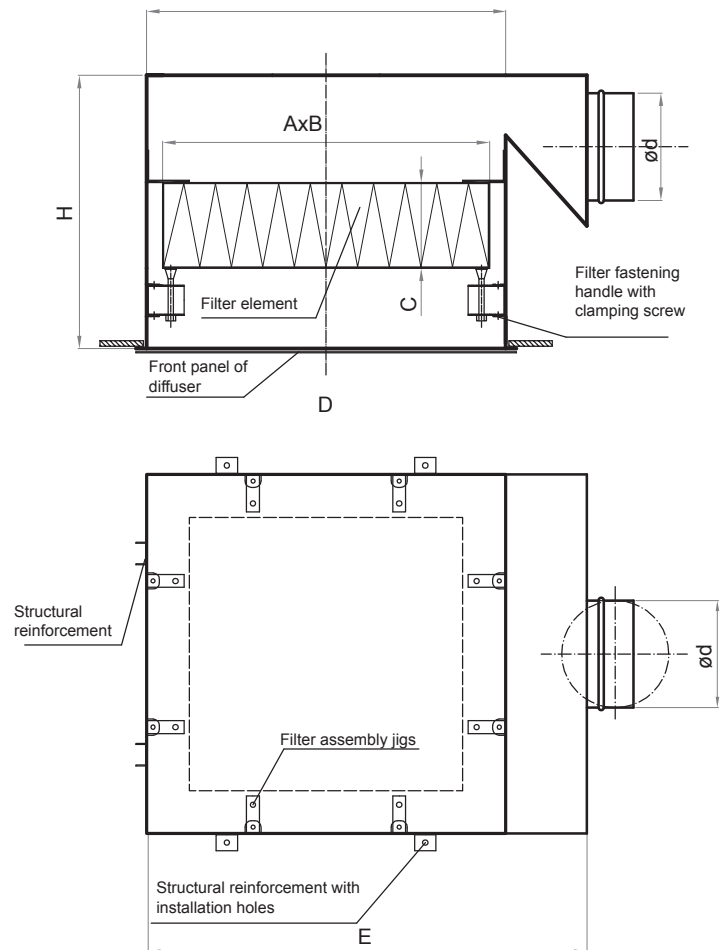
NFA/BO equiped with four versions of supply elements (front panels):

- AN square diffuser
 - KWBP perforated air grate
 - ANW swirl diffuser with adjustable blades
 - NW swirl difuser
- painted in standard RAL 9003.

We use HEPA filters with advanced, **mini-pleat** filter technology. With this technology, we could give up the 150 thick filters because they have the same performance as filters with a thickness of 80

FEATURES

- Special box for low rooms
- diffusers in standard without pressure controller
- upon customer's request, diffusers can be made in any size and colour from RAL palette



Size	Filter size [mm]		Ød [mm]		H [mm]		□D [mm]	E [mm]
	A×B	C						
1a	305×305	80	123	148	310	325	390	335
2a	457×457	80	148	158	325	330	590	487
3a	575×575	80	198		350		690	605
3c		292	298		615			
4a	610x610	80	198		350		740	640
			248		375			
			298		400			
4c		292	298		615			

AxB - filter size
 C - filter thickness
 H - diffuser height
 □D - front panel size
 Ød - connection diameter

10.3 NFA/BO

ceiling diffusers with absolute filter

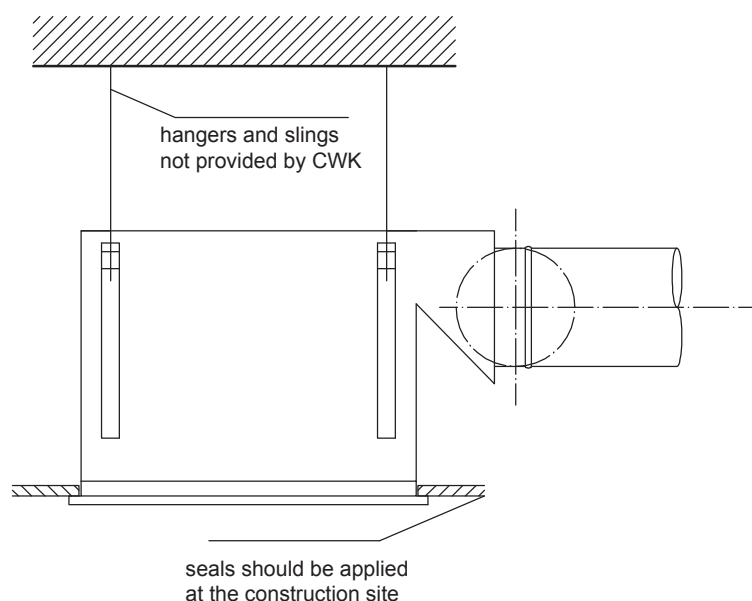
ORDER REFERENCE

NFA/BO - AN - 1 - 123 - H14/8 - P						RAL9003
type	size					front panel colour
	connection size $\varnothing$ d					
	filter class: H13; H14					
	filter thickness: 8 - 80mm; 29 - 292mm;					
	diffuser without pressure controller P diffuser with pressure controller					
front panel type:	square diffuser					
	perforated air grate					
	swirl diffuser with adjustable blades decorative frame					
	swirl diffuser with adjustable blades decorative frame					

INSTALLATION

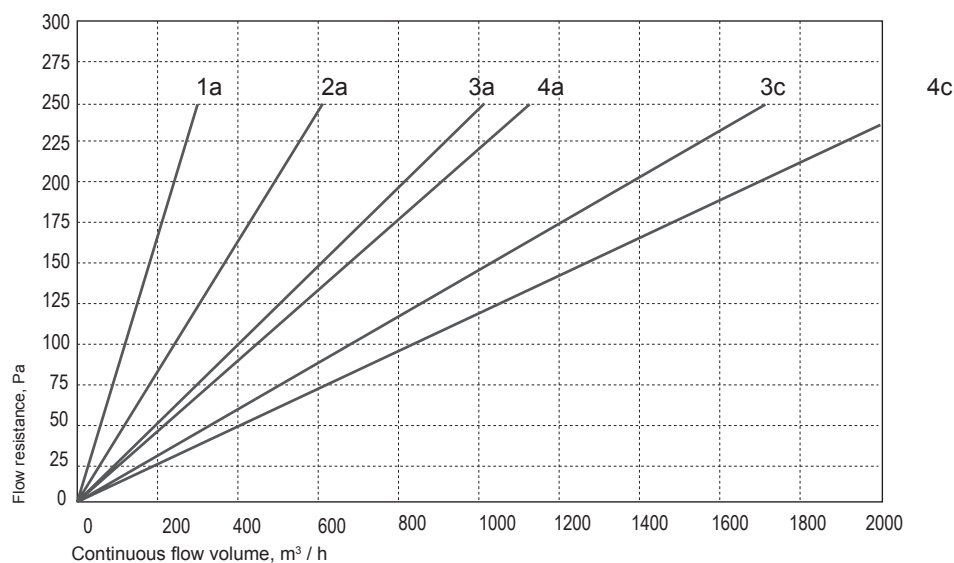
NFA/BO diffusers are designed for installation between the ceiling and underslung ceiling. It can be mounted onto the ceiling by appropriate hangers (bars, pins...) and installation slings or fixed directly to the underslung ceiling.

Upon customer's request, diffusers can be equipped with factory slings



ORDER REFERENCE

The figure shows airflow capacity V (m³/h) and pressure loss Δp (Pa).





DESCRIPTION

Ceiling diffusers NFA/PB with absolute filter HEPA are design for air supply into rooms about highest requirements of the cleanes and sterility in medicine, biology and laboratory- technique.

NFA/PB diffusers are made of steel sheet available in standard RAL 9003 colour, with side rectangular connection. Additionally diffuser casing equiped with side structural reinforcement. System of the filter fastening assures hermetic and steady embedment in the box. Diffuser is also additionally equiped into endings making possible qualification of the pollution of the filter.

The filter elements are absolute filters H13 and H14 class in PN-EN 1822 (PN-B-76003) standard with frame made of discharge aluminium profiles with neopren seal.

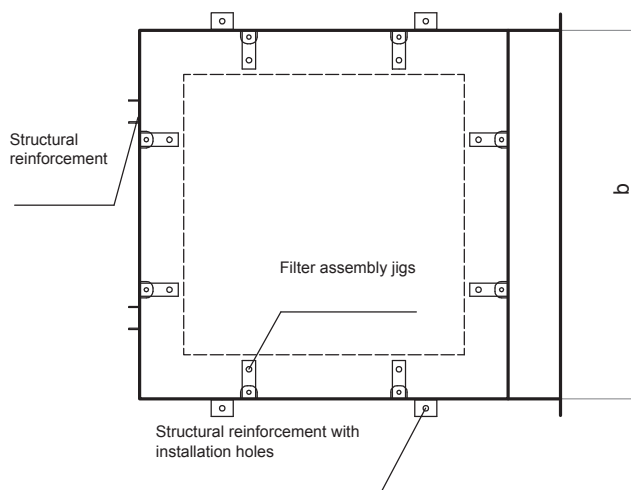
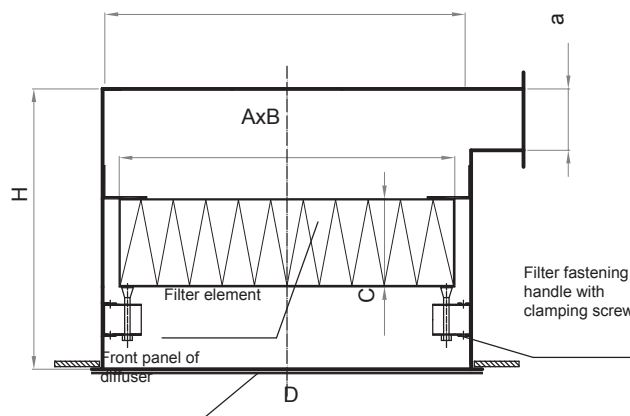
NFA/PB equiped with four versions of supply elements (front panels):

- AN square diffuser
 - KWBP perforated air grate
 - ANW swirl diffuser with adjustable blades
 - NW swirl difuser
- painted in standard RAL 9003.

We use HEPA filters with advanced, **mini-pleat** filter technology. With this technology, we could give up the 150 thick filters because they have the same performance as filters with a thickness of 80

KRÓTKA CHARAKTERYSTYKA

- diffusers in standard without pressure controller
- upon customer's request, diffusers can be made in any size and colour from RAL palette



Size	Filter size [mm]		a [mm]	b [mm]	H [mm]	D [mm]
	AxB	C				
1a	305x305	80	98	340	340	340
2a	457x457	80	98	492	340	490
3a	575x575	80	98	610	340	610
4a	610x610	80	98	645	340	645
4c		292			560	

AxB - filter size

C - filter thickness

a - ferrule internal height dimension

b - ferrule internal width dimension

H - diffuser height

□D - front panel size

CWIKTM
AIR DIFFUSERS

ORDER REFERENCE

RAL9003

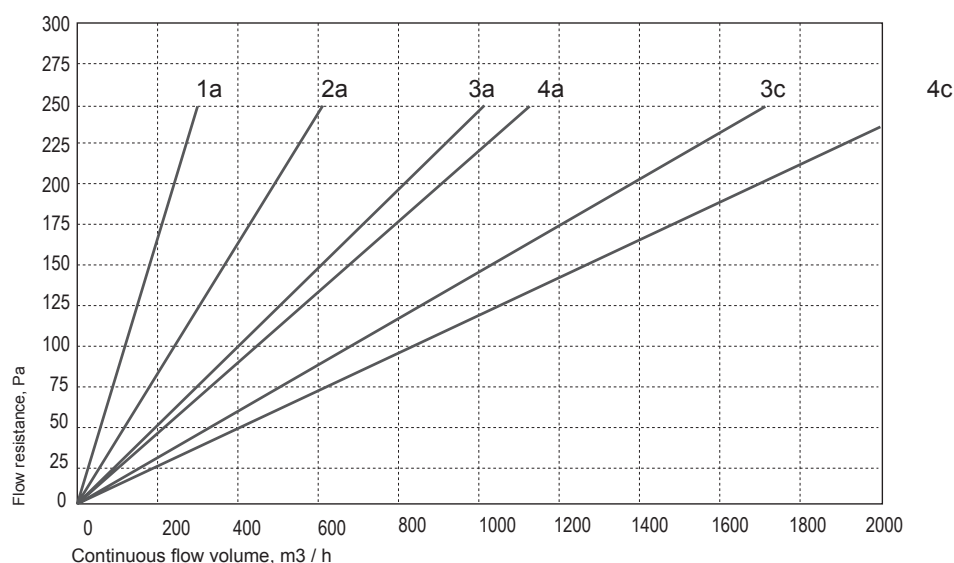
type

Upon customer's request, diffusers can be equipped with factory slings

Diagram illustrating the components of a suspended access platform (SWL) and the required sealing at the construction site.

The diagram shows a rectangular platform suspended by two vertical cables. The cables are labeled "hangers and slings not provided by CWK". The platform is shown in cross-section, revealing internal components and the base. The base is labeled "seals should be applied at the construction site".

The figure shows airflow capacity V (m³/h) and pressure loss Δp (Pa).





DESCRIPTION

The KFA duct housings equipped with a filter element are designed to be installed in rectangular ducts. This device is used for thorough removal of contaminants from the air. The KFA housings are used in ventilation and air conditioning systems which operate in antiseptic environments (e.g. operating theatres).

KFA housings are installed on the air system sections supplying air to a given room. Their location must facilitate easy replacement of filter elements outside an aseptic room.

We use HEPA filters with advanced, mini-pleat filter technology. With this technology, we could give up the 150 thick filters because they have the same performance as filters with a thickness of 80

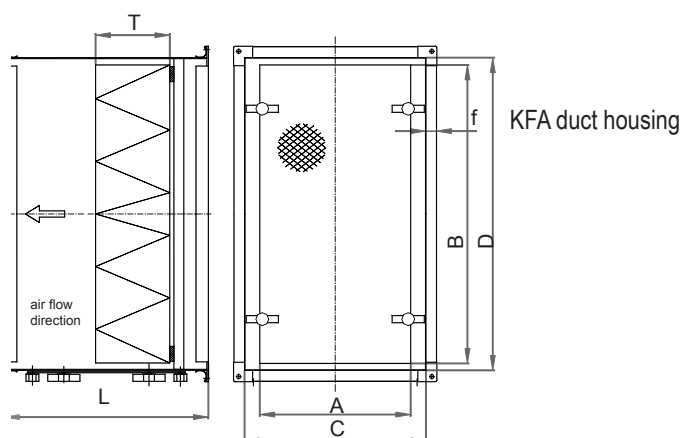
DESIGN

KFA channel housings comprise the following elements:

- housing body;
- inspection cover;
- H13 class filtering element.

The body, inspection cover and filtering element frame are made of galvanized steel sheet. The KFA housing constitutes a part of a rectangular duct and is fitted with 'Euro' flanges, which facilitate easy installation. Fixing the filter element in the sealed housing seat makes it possible to eliminate uncontrolled air flow outside the filter. The KFA housing may be installed in a manner making it possible to replace the filtering element horizontally or vertically. The design of the inspection cover clamps and the filtering element facilitates their easy and fast replacement. On customers' request, the KFA housings can also be fitted with a differential pressure switch, signalling the level of filter pollution.

Size	Filter dimensions			Filter quantity	Filter dimensions			Weight
	A	B	T		n	C	D	
	[mm]			[szt]	[mm]			[kg]
KFA 315x315-80	305	305	80	1	315	315	450	12,7
KFA 630x315-80	610	305			630	315		20,7
KFA 315x630-80	305	610			315	630		19,5
KFA 450x450-80	405	405			450	450		18,6
KFA 630x630-80	610	610			630	630		30,1
KFA 950x630-80	915	610			950	630		32,1
KFA 630x950-80	610	915			630	950		41,4
KFA 1250x630-80	610	610		2	1250	630		45,2
KFA 315x315-292	305	305	292	1	315	315	600	17,1
KFA 630x315-292	610	305			630	315		28,7
KFA 315x630-292	305	610			315	630		27,1
KFA 450x450-292	405	405			450	450		25,5
KFA 630x630-292	610	610			630	630		43,9
KFA 950x630-292	915	610			950	630		51,5
KFA 630x950-292	610	915			630	950		61,0
KFA 1250x630-292	610	610		2	1250	630		70,9



ORDER CODE

KFA - 315x315 - 80 - P

RAL9003

quote the grate colour code

filter dimensions:
80mm; 292mm;

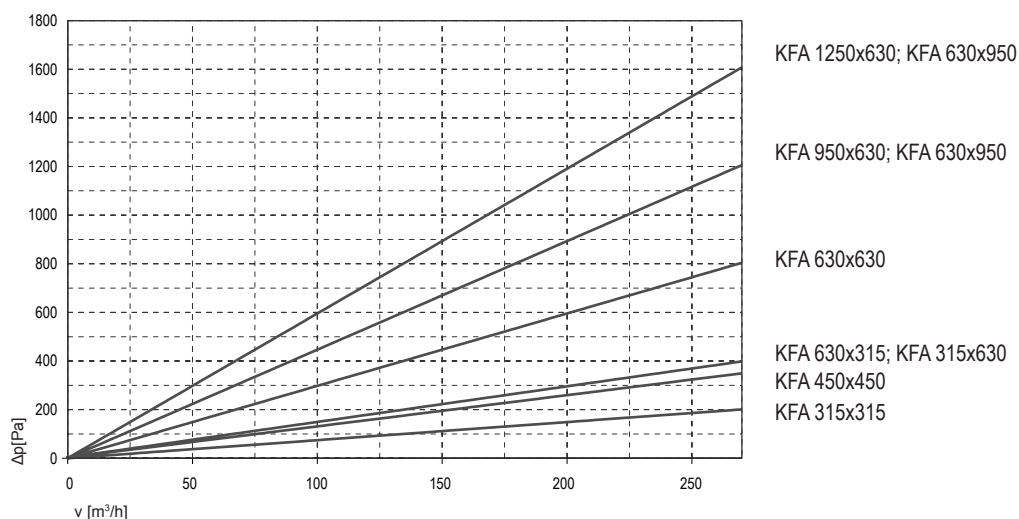
air vent size

type

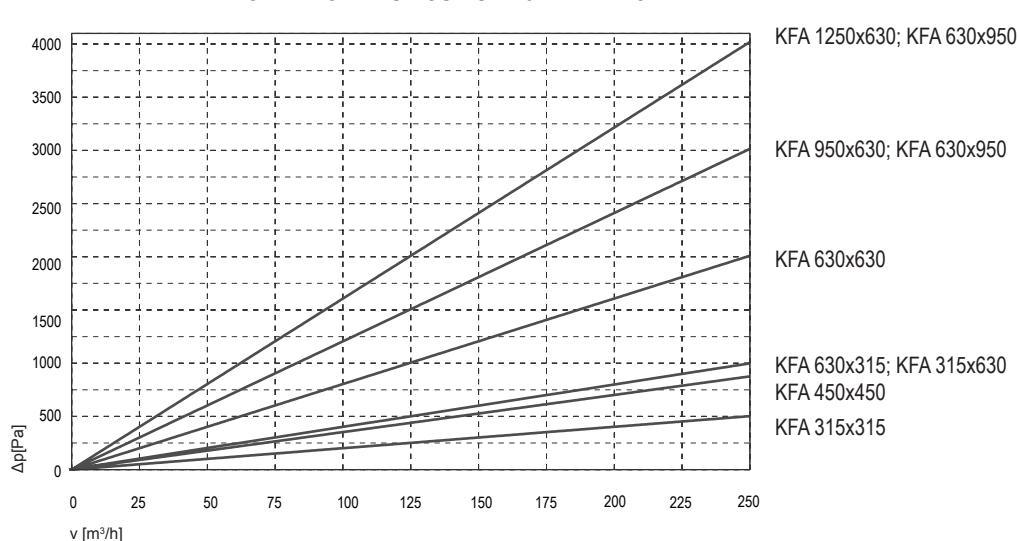
duct absolute filter

FLOW RESISTANCE OF CLEAN H13 CLASS FILTERING ELEMENTS IN THE OUTPUT FUNCTION FOR INDIVIDUAL DEPTHS (ACCORDING TO MANUFACTURER'S DATA).

CHARACTERISTICS FOR 80 MM THICK FILTER



CHARACTERISTICS FOR 292 MM THICK FILTER



OPERATION AND SERVICE

The filter element can be removed from the KFA housing after dismounting the inspection cover and unscrewing the clamps.

If the KFA housing is installed in the position making it possible to slide the filtering element from the bottom, a proper sequence of removing the set screws must be observed in order to avoid the risk of uncontrolled falling out of the filtering element.

While installing a new filtering element attention must be paid to tight fixing of the element's gasket to the housing seat. If the prefilter and insertable fine filter operate correctly, the 'S' class filtering element

must be replaced approximately every 6 months.

In order to ensure correct operation of the installation, it is recommended to use the filtering element pollution indicator (differential pressure control) mounted during the installation phase.



DESCRIPTION

These devices supply air to operating theatres and surgery rooms in hospitals where it is impossible to use the laminar ceiling solutions due to the room height or structural requirements.

SHORT CHARACTERISTIC

- low-turbine induction air-supply;
- air-supply directed at the operating table;
- modular design;
- air vent made of powder-coated sheet metal;
- air-supply through perforated sheet metal;
- H13 class filter;
- filter replacement on the room side;
- duct connection from the top, rear or bottom (optional);
- no need to encase the air vent;
- hygiene certificate;
- customized sizes (individual orders)
- on request it is possible to install pressure gauges

Technical data

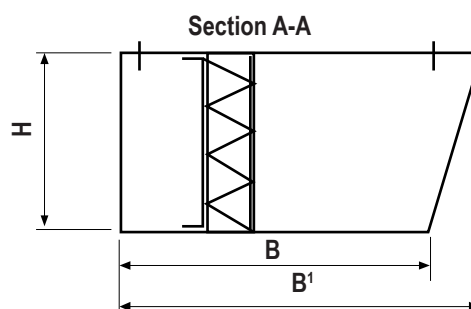
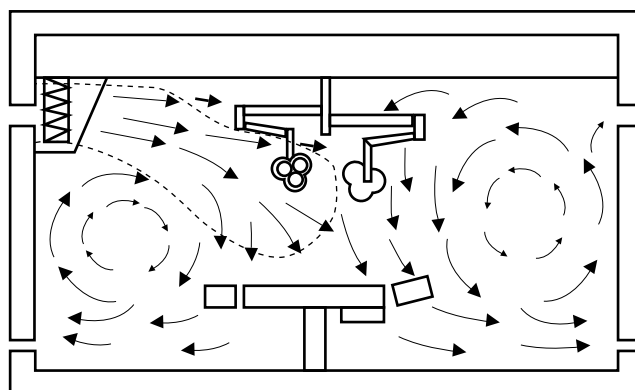
Typ		SNFA1	SNFA2	SNFA3	SNFA4
Nominal stream*	m ³ /h	600	1200	1800	2400
Housing dimensions (LxHxB)	mm	1000x410x720	2000x410x720	3000x410x720	4000x410x720
Dimension B ¹	mm	830	830	830	830
Dimension l x b	mm	800x200	800x200	800x200	800x200
Filter size	mm	610x305x292	610x305x292	610x305x292	610x305x292
Number of filters	szt.	1	2	3	4
Weight	kg	55	110	165	220

FUNCTIONS

The main functions are: isolating the operating theatre from bacteriological and gaseous pollutants, ensuring heat comfort for operating personnel and patients, maintaining proper airflow between neighbouring rooms, decreasing the concentration and remove pollutants from the operating table area and the entire security zone.

CONSTRUCTION

The tight housing is made of powder-coated steel and includes a mounting frame for the internal built-in absolute filter facilitating the connection of the connector pipe from the top, rear or bottom (customized version). The solution also includes in-built connection pipes for pressure difference measurement and filter seating tightness control. H13 class filter. The front air-supply surface consists of an easily demountable grate with perforated sheet metal ensuring easy access to the interior for cleaning and disinfection purposes.



10.6 SNFA

Slant air vents with absolute filters

ORDER CODE

SNFA - 2 - H13 - G - P - RAL9003

type

Size

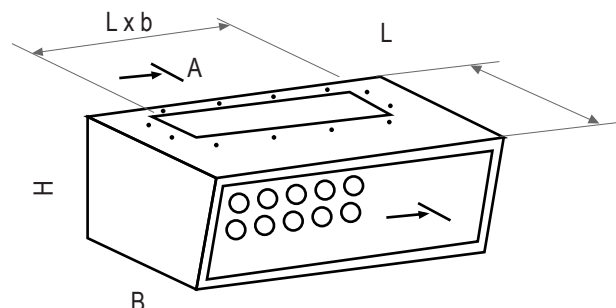
klasa filtra H13, H14

connection pipe seating
G - top
T - rear

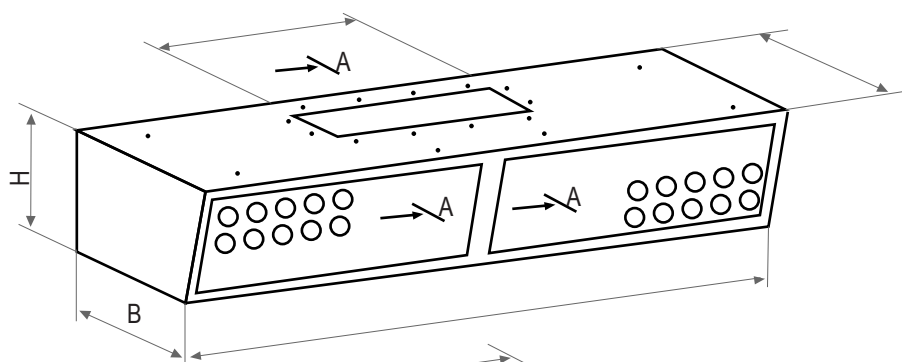
P presostat
K króćce pomiarowe

podać kolor

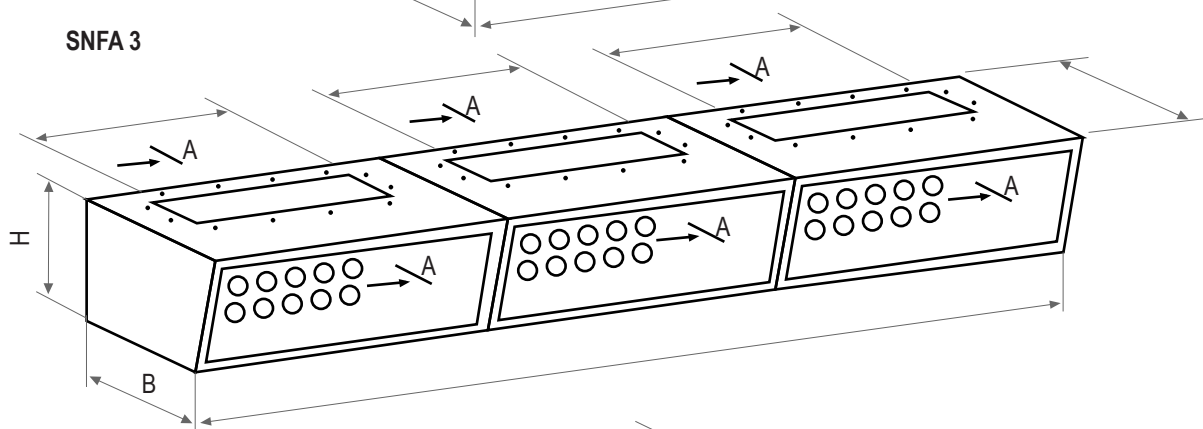
SNFA 1



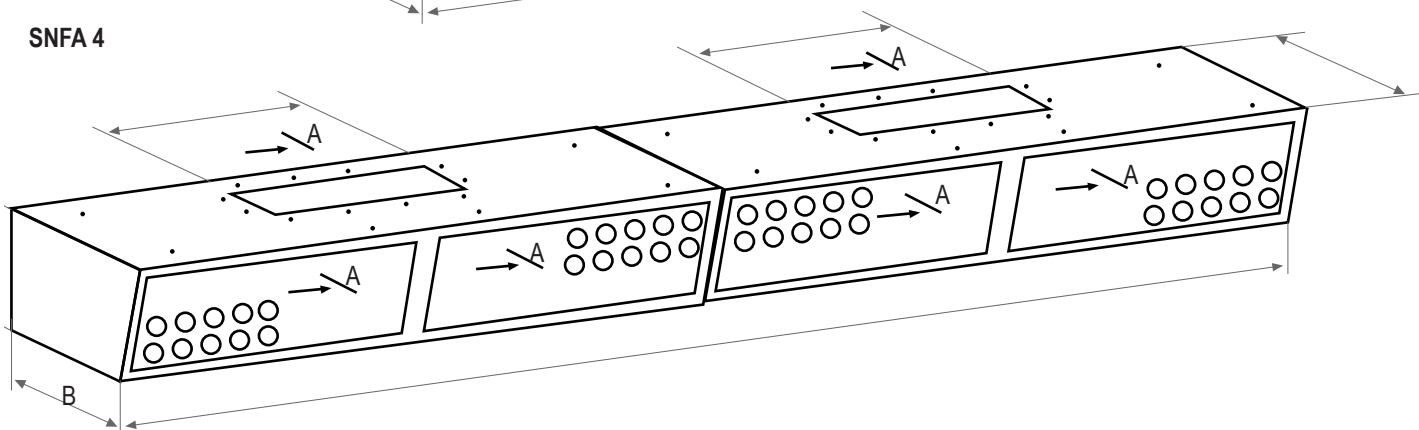
SNFA 2

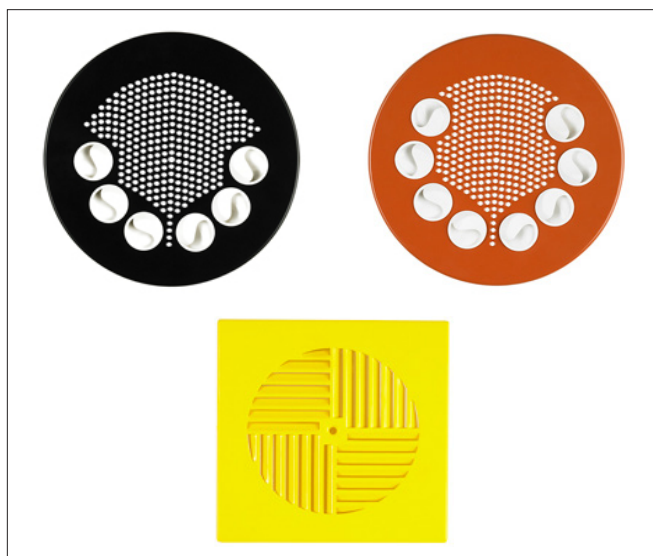


SNFA 3

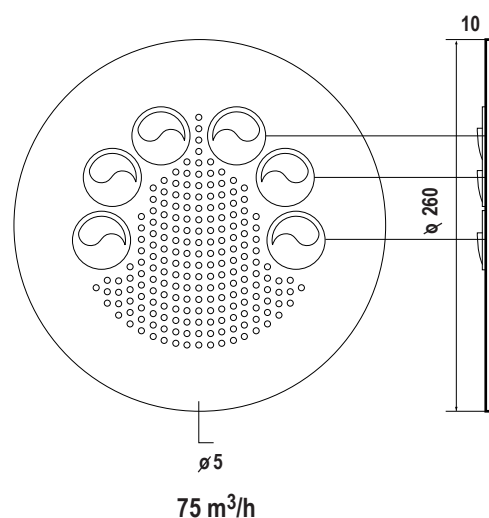


SNFA 4





NP1



DESCRIPTION

Depending on architectural requirements, swirl air vents for platforms may be round or square. In order to achieve the swirling air-flow, the air vent front part is divided into 4 air-supply parts, each with a blade turned by 90° in relation to the neighbouring one (both in the round and square construction). The perforated connector pipe ensures horizontal air supp. concerns. (diffusers NP 3, NPO3). diffusers NP1, 2,3,4,5 can be installed with a round ferrule made from perforated metal, without the perforated metal or with an assembly crossbar.

SHORT CHARACTERISTIC

Swirl air vents for platforms and daises are made of steel sheet and the connector pipe located at the back plus the mounting cross-member are made of galvanized steel. The air vent front is pre-impregnated and powder-coated (white – RAL 9003).

ORDER CODE

NP1 - O - 200 - T - RAL9003

specify colour

accessories:

T- crossmember

R- frame with perforated metal sheet

- only the front plate

size

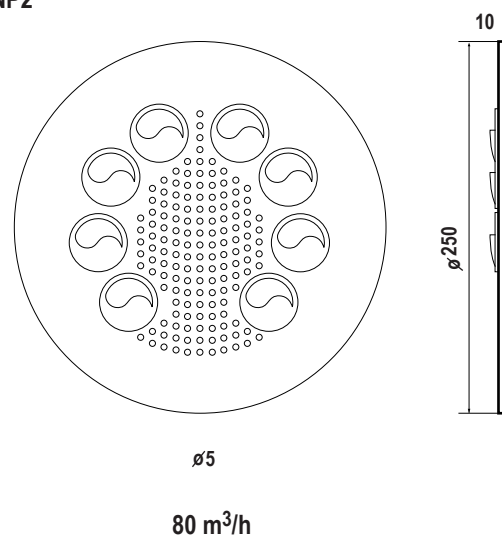
wersja:

O - round,

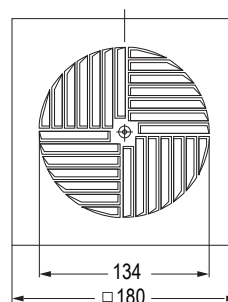
K - square

type

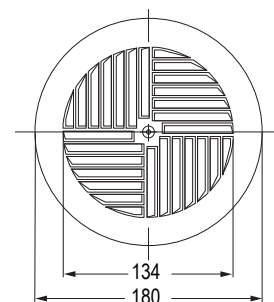
NP2



NP3



NP-0-3



floor/stair air vents

AIR VENT INSTALLATION BY MEANS OF A CONNECTOR PIPE

Drill three openings in the stairs coating, located every 120°. The opening dimension depends on the stairs coating type.

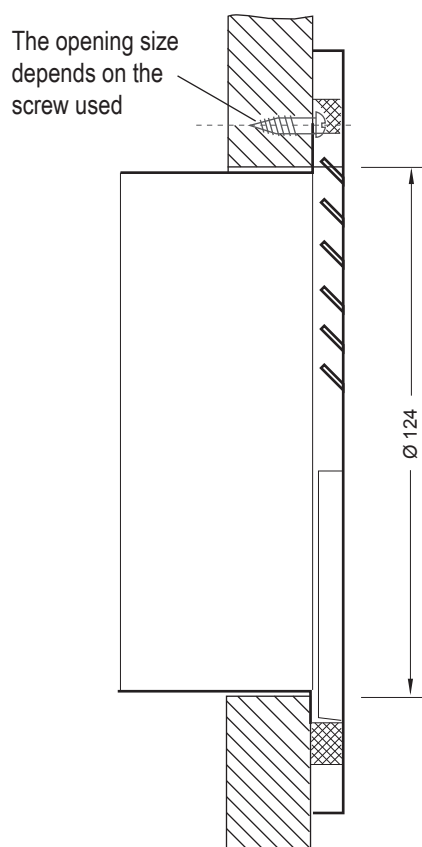
The whole connector pipe must be inserted into the opening in the stairs coating and securely fixed by means of wood screws.

The front of the air vent is mounted by means of the middle screw. A decorative cap is pressed into the screw head.

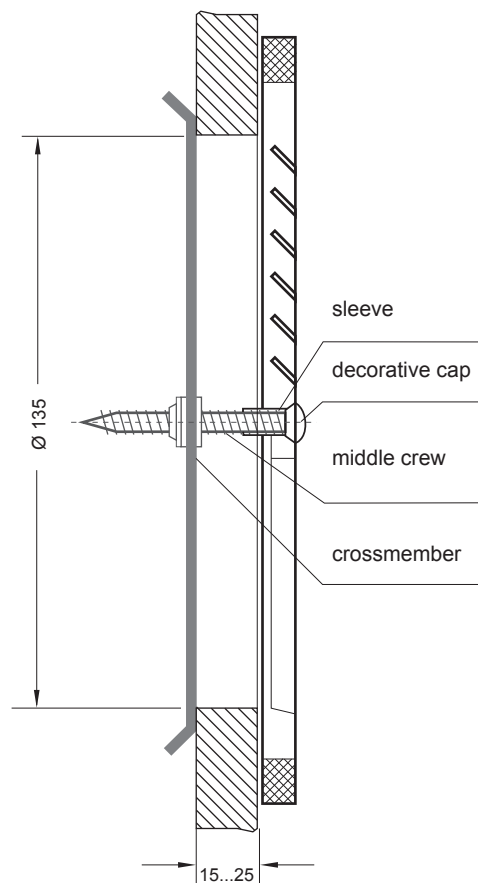
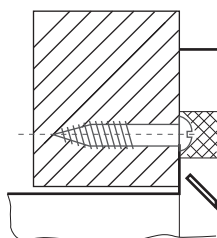
AIR VENT INSTALLATION BY MEANS OF A CROSSMEMBER (AT CONSTRUCTION SITE)

The elements provided (i.e. middle screw, sleeve and crossmember) are mounted at the back of the air vent and inserted into the provided opening.

Securely tighten the front's middle screw. In order to screw its head in, pressed the provided cap into the screw head.



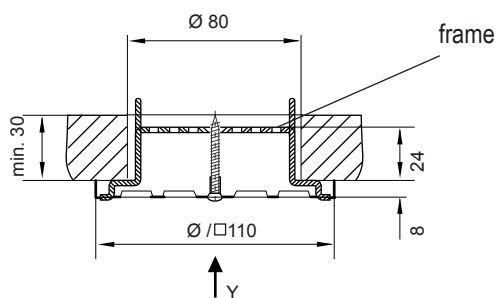
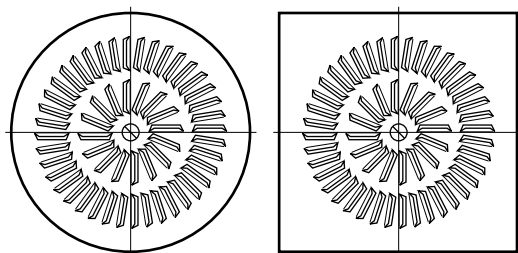
Air vent installation
by means of a connector pipe



Air vent installation
by means of a crossmember

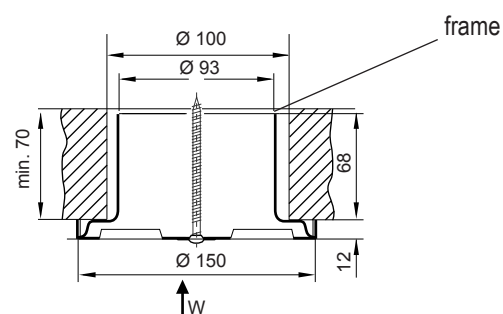
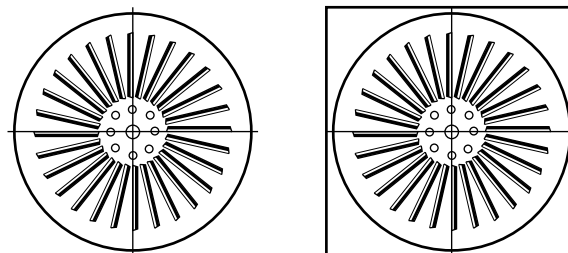
NP-0-4

NP4

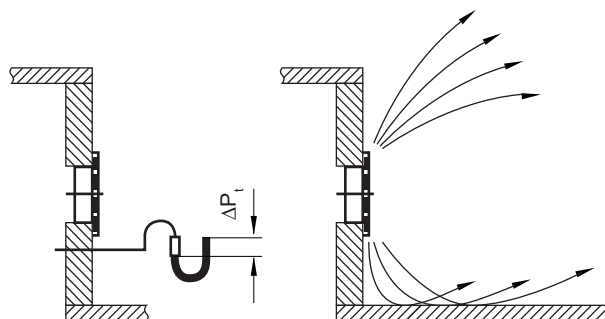
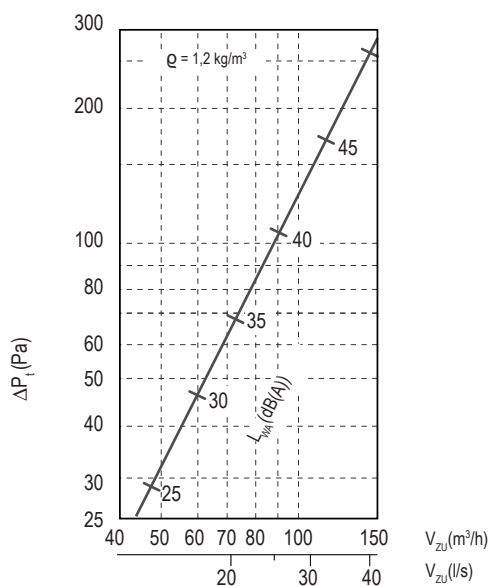


NP-0-5

NP5



NP5



Technical data may vary depending on chair location.

Correction factors

1.)	1	2	3	4	5	6	7
KF(-)	0	+3	+4.8	+6	+7	+8	+9

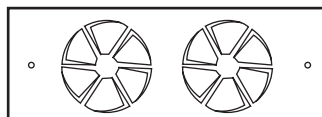
1.) view

floor/stair air vents

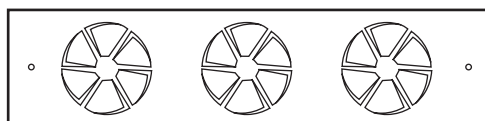
Performance and dimensions



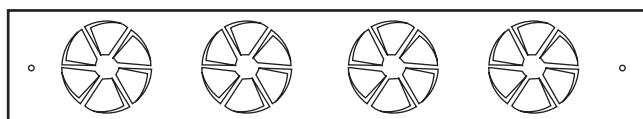
TYPE NP6 - 1



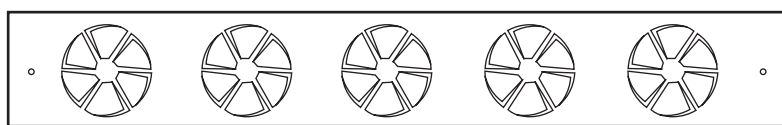
TYPE NP6 - 2



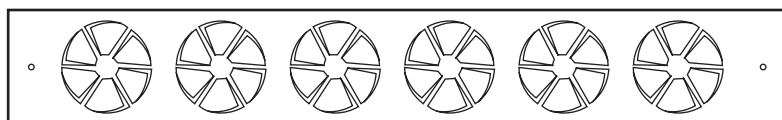
TYPE NP6 - 3



TYPE NP6 - 4



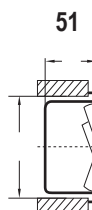
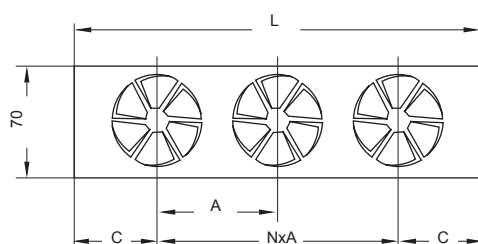
TYPE NP6 - 5



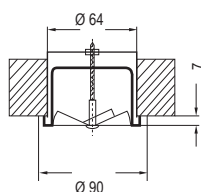
TYPE NP6 - 6

TYPE NP6 - 1

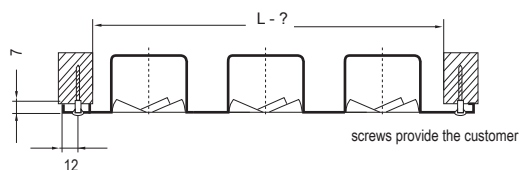
TYPE NP6 - 2....6

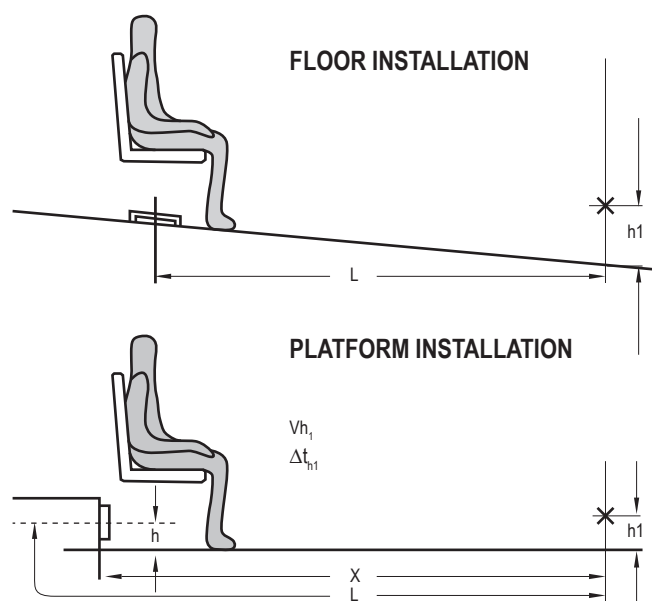


Type	L (mm)	C (mm)	N x A
NP6 - 2	200	63	1 x 74
NP6 - 3	300	63	2 x 87
NP6 - 4	400	71	3 x 86
NP6 - 5	500	66	4 x 92
NP6 - 6	600	65	5 x 74



Decorative cap





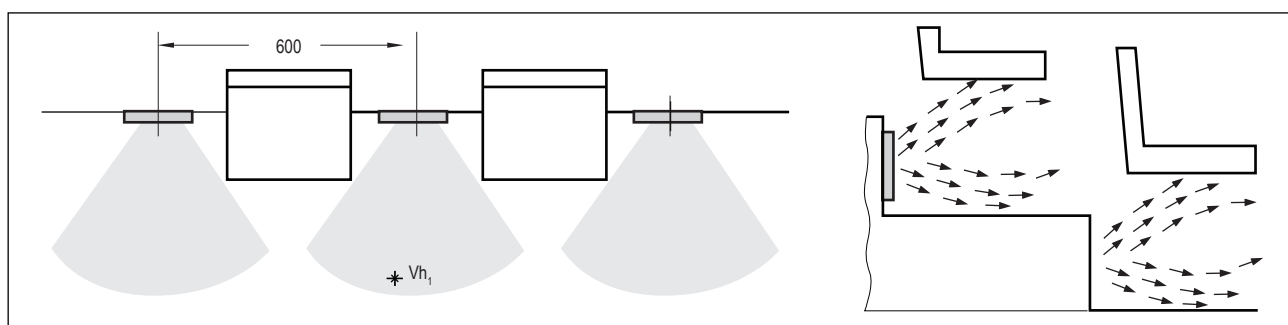
V	w l/s:	Air vent output
V	w m ³ /h:	Air vent output
h	wm:	Installation height over the floor
L	wm:	Distance from the air vent ($L=h+X$ for installation in a step)
h_1	wm:	Height of the measurement point over floor
V_{h1}	w m/s:	Average stream speed in time on height h_1 over the floor
Δt_z	wK:	Difference between the vented Air temperature and room air temperature ¹⁾
Δt_{h1}	wK:	Difference between air stream temperature on height h_1 over the floor and room air temperature ¹⁾
Δp_t	w Pa:	Total pressure loss
L_{WA}	w dB(A):	Sound intensity level in A scale
L_{WNC}		Limit curve of the sound intensity spectrum
L_{WNC}		$L_{WNR} = L_{WNC} + 2$
L_{pA}, L_{pNC}		Sound intensity level in scale A or NC curve in measurements

$$L_{pA} \approx L_{WA} - 8 \text{ dB}$$

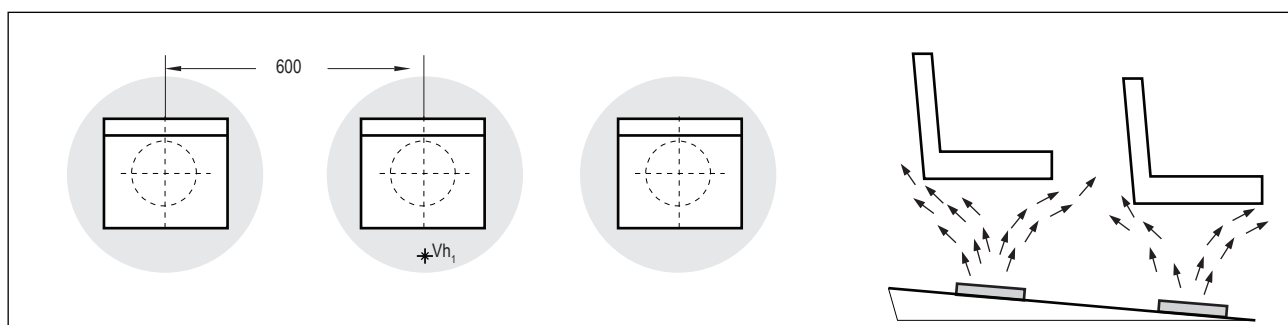
$$L_{pA} \approx L_{WNC} - 8 \text{ dB}$$

INSTALLATION IN THE PLATFORM - ANGULAR AIR-SUPPLY

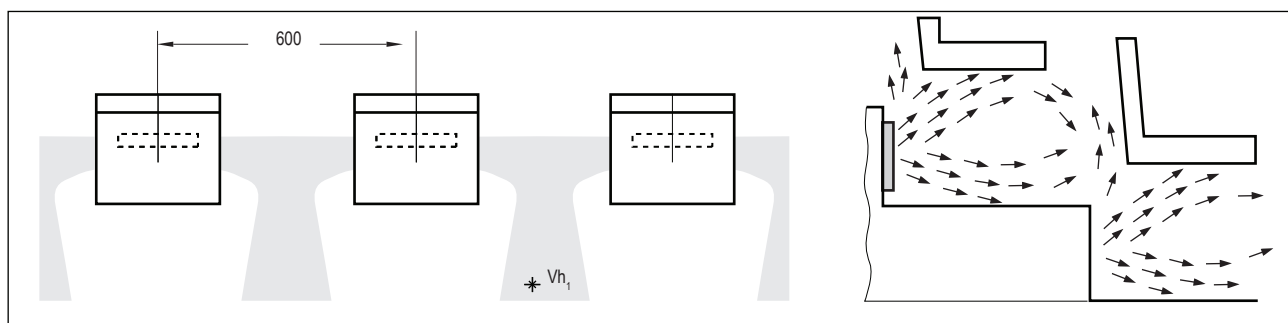
¹⁾ Room temperature measured 1.0 - 1.3 m over the floor!



INSTALLATION IN THE FLOOR - ANGULAR AIR-SUPPLY



INSTALLATION IN THE PLATFORM - HORIZONTAL AIR-SUPPLY



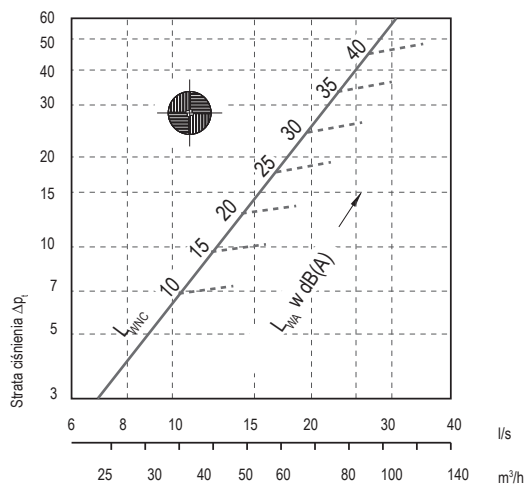
floor/stair air vents

SPECTRUM ANALYSIS – ACOUSTIC DATA

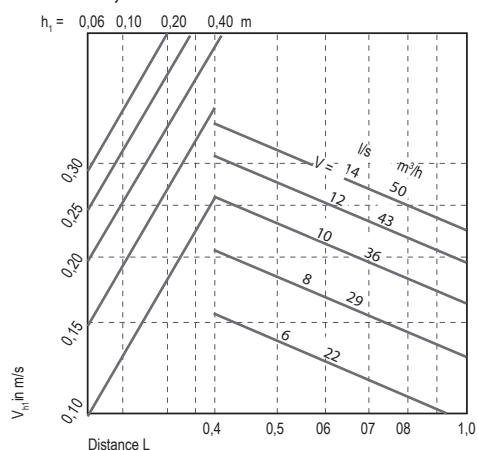
EFFECTIVE OUTFLOW SURFACE

Design	Round air-supply part	Square air-supply part
$A_{eff} \text{ w m}^2$	0.00354	0.00445

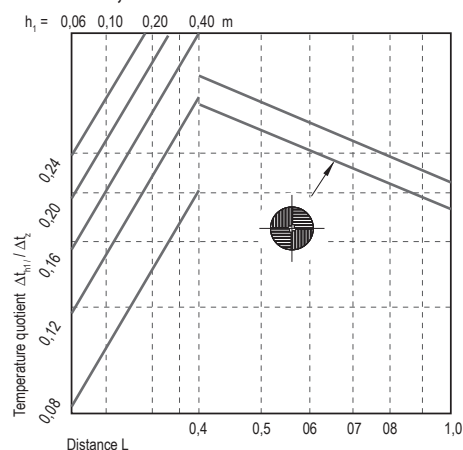
SOUND INTENSITY AND PRESSURE LOSS TYPE NP1



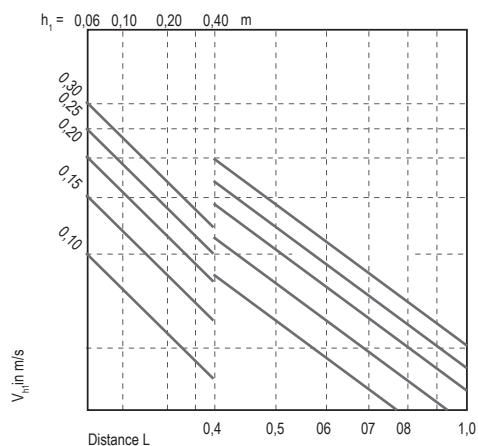
AIRFLOW RATE TYPE NP3, NP-0-3 PLATFORM-MOUNTED



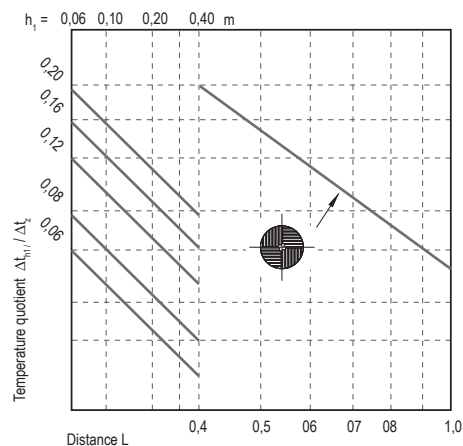
TEMPERATURE QUOTIENT TYPE NP3, NP-0-3. FLOOR-MOUNTED



AIRFLOW RATE TYPE NP3, NP-0-3. FLOOR-MOUNTED E



TEMPERATURE QUOTIENT TYPE NP3, NP-0-3. FLOOR-MOUNTED



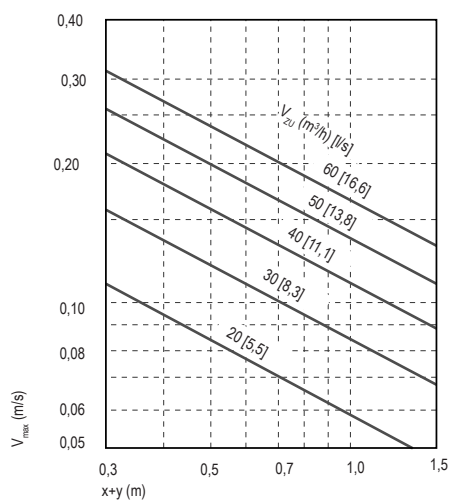
EXAMPLE

An assembly hall with 750 seats is to be equipped with swirl air vents. Required air supply = 12,000 l/s; the volume stream is equal to $V = 16$ l/s per one air vent. Swirl air vents for platforms and daises type NP-3, size 180, must be installed vertically.

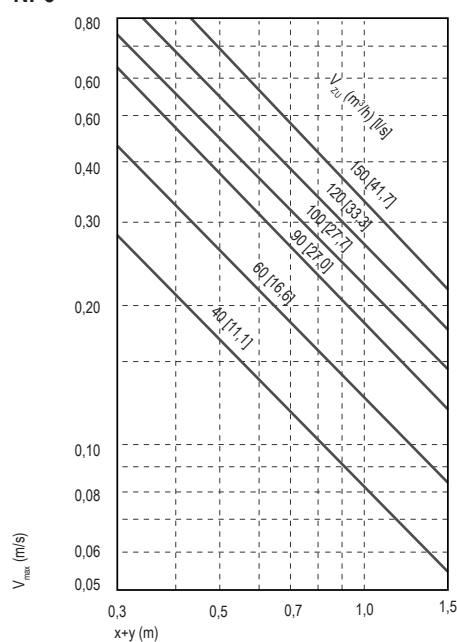
Installation height over floor	$h = 0.11$ m
Distance from the air vent	$X = 0.60$ m
Measurement point height over floor	$h_1 = 0.10$ m
Air supply temperature difference	$\Delta t_z = -5$ K

MAXIMUM AIR STREAM SPEED

NP4

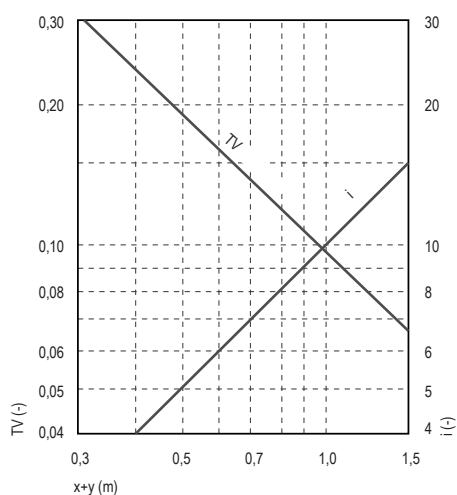


NP5

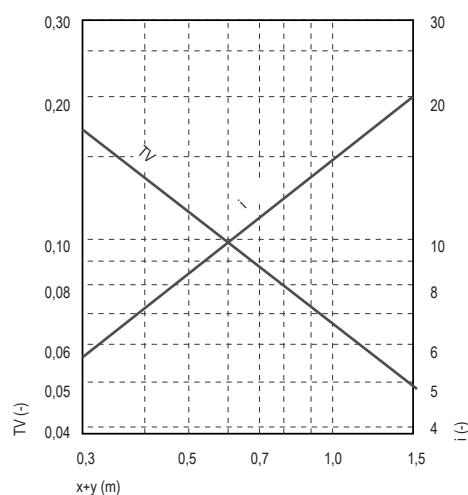


TEMPERATURE REDUCTION DIFFERENCE COEFFICIENT

NP5



NP4



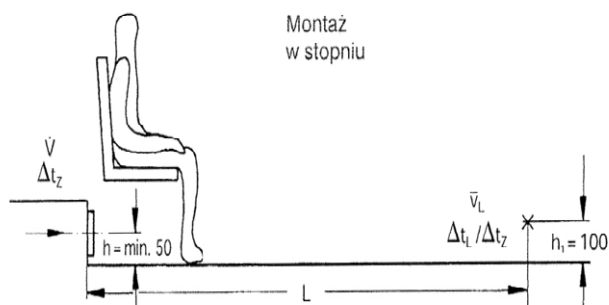
floor/stair air vents

STAIR DIFFUSER

V_{zu}	(m ³ /h)	= amount of supplied air
V_{zu}	[l/s]	= amount of supplied air
Δp_t	(Pa)	= pressure loss
δ	(kg/m ³)	= density
L_{WA}	[dB(A)]	= acoustic power level
V_{max}	(m/s)	= maximum final speed of air stream
$x+y$	(m)	= horizontal and vertical range
i	(-)	= induction coefficient
TV	(-)	= temperature reduction coefficient
NW		= size

TECHNICAL DATA:

DESIGNATION



$V_{element}$	w l/s: single element efficiency
V	w l/s: diffuser efficiency
V	w m ³ /s: diffuser efficiency
V_L	w stream speed at the altitude of 1000 m at a distance L
$\Delta t_L / \Delta t_z$	w K: Temperature quotient at a distance L
L	w m: Distance from diffuser
h	w m: Installation height min. 50 mm above the floor
h_1	w m: Height of measuring point above the floor
L_{wa}	w dB(A): sound intensity level in the A scale
Δp_t	w Pa: Total pressure loss
Δt_z	w K: Temperature difference between the supplied air and room air

EXAMPLE

Auditorium with 150 seats is to be fitted with a NP6 swirl diffusers. The total amount of supplied air = 1350 l / s, which gives the stream capacity $V = 9$ l / s per diffuser.

Diffusers are mounted vertically in steps.

Installation height above the floor $h = 0.10$ m

Distance from diffuser $L = 0.70$ m

The height of the measuring point above the floor $h_1 = 0.10$ m

Supplied air temperature $\Delta t_z = -4$ K and room air

GRAPH 1: SOUND POWER LEVEL AND PRESSURE LOSS

$L_{wa} = 30$ dB (A)

$\Delta p_t = 17$ Pa

GRAPH 2: FLOW RATE

$L = 0,70$ m

$V_L = 0,12 \times 1,73 = 0,20$ m/s

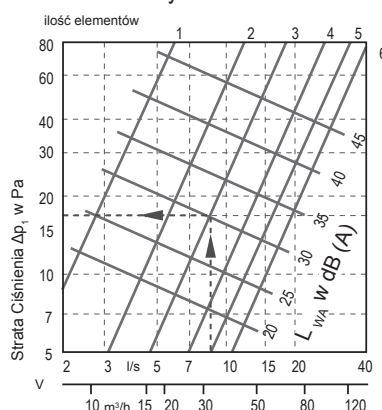
GRAPH 3: TEMPERATURE QUOTIENT

$L = 0,70$ m $\Delta t_L / \Delta t_z = 0,052 \times 1,73 = 0,09$

$\Delta t_L = 0,09 \times (-4) = -0,36$ K

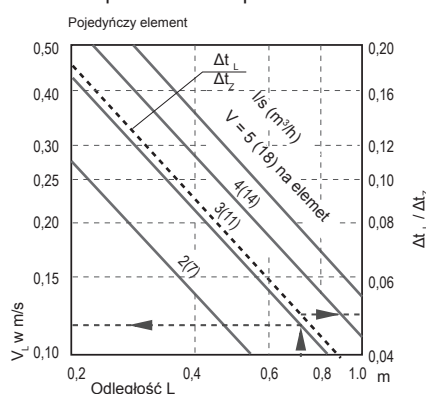
SOUND DATA

1 The intensity of sound



AERODYNAMIC DATA

2 The quotient of temperature / flow rate



GRAPH 2

Correction values for the elements 1 for 6

Nr elementu	1	2	3	4	5	6
$V_L \times$	1.0	1.41	1.73	2.0	2.24	2.45
$\Delta t_L \times$	1.0	1.41	1.73	2.0	2.24	2.45

EFFECTIVE OUTLET AREA

Nr elementu	1	2	3	4	5	6
A_{eff} w m ²	0.000626	0.001252	0.001878	0.002504	0.003130	0.003756

This image shows a single page of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

