

02



Circular diffusers



Square diffusers

Circular diffusers, Square diffusers

Circular and square diffusers are designed for supply and extract air. Due to high induction (mixing of supply and room air) they are suitable for larger temperature differences between the supply and room air. Diffusers have high capacity and low sound power level.

VENTILATING GRILLES,
VENTILATING VALVES

CIRCULAR DIFFUSERS,
SQUARE DIFFUSERS

SWIRL DIFFUSERS,
VARIABLE SWIRL
DIFFUSERS

SLOT DIFFUSERS,
ROUND DUCT DIFFUSERS

AIR DISPLACEMENT
UNITS

SUPPLY AIR NOZZLES

EXTERNAL ELEMENTS

AIR FLOW
CONTROL UNITS

SOUND ATTENUATORS,
SOUND ATTENUATING
LOUVRES

Overview

■ Circular diffusers

Circular diffusers can be used for supply or extract air. Due to high induction (mixing of supply and room air) they are suitable for larger temperature differences between the supply and room air. Diffusers have high capacity and low sound power level.

Steel circular diffusers OD-1, OD-2

They consist of sheet steel, powder coated in RAL 9010. Upon customer's request, they can be coloured in any RAL colour.

Aluminium circular diffuser OD-3N

Diffuser rings are made of sheet aluminium and regulation mechanism consist of steel. Diffuser is powder coated in RAL 9010. Upon customer's request, they can be coloured in any RAL colour.

■ Square diffusers

Square diffusers are designed for supply and extract air. Due to high induction (mixing of supply and room air) they are suitable for larger temperature differentials between the supply and room air. Diffusers have high capacity and low sound power level.

Steel square diffusers KD-1, KD-2, KD-15, KD-16

They consist of sheet steel, powder coated in RAL 9010. Upon customer's request, they can be coloured in any RAL colour. Plenum box is made of galvanised sheet steel.

Steel circular diffusers OD-1, OD-2



OD-1

OD-2

Aluminium circular diffusers OD-3N



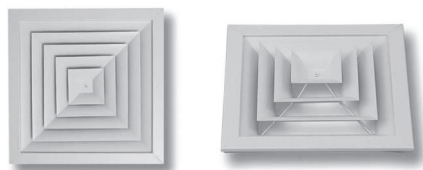
OD-3N

Circular diffuser OD-10



OD-10

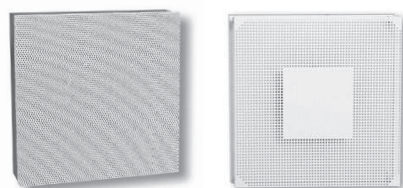
Square diffusers



KD-1

KD-2

Perforated square diffusers












KD-15

KD-16

Content

	Page
CIRCULAR DIFFUSERS	68
Circular diffusers OD-1, OD-2	68
Circular diffuser OD-3N	75
Registers	79
Circular diffuser OD-10	80
SQUARE DIFFUSERS	83
Square diffusers KD-1, KD-2	83
Square diffuser AKD-1N	85
Registers	88
Square diffuser KD-15	95
Square diffuser KD-16	97

Legend of symbols

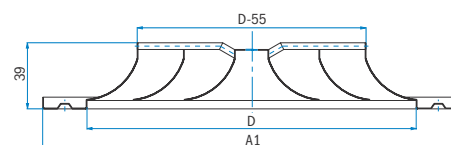
Al Element is made of aluminium profiles, aluminium sheet or aluminium casting.	 Element is intended to be built in the wall.	 Element is suitable for the supply of cool air (cooling).
St Element is made of steel sheet.	 Element is intended to be built in the ceiling or in the wall.	M Element allows regulation by electric motor (Belimo electric motors).
 Element is powder painted in standard RAL 9010 colour. Other desired colour is to be specified in the order.	 Element for air conditioning of rooms with floor to ceiling heights room up to 4 m.	F Element is intended for air filtration. The filter of class ... is built in.
 Shady symbol means possibility of optional material, surface protection, motor version, ...	 Element for air conditioning of rooms with floor to ceiling heights from 6 to 15 m.	CD The possibility of the automatic selection and calculation of the technical characteristics of grilles and difusers in regard to the given conditions with the assistance of the Klima ADE program.
 Element is intended to be built in the floor.	 Element is suitable for the supply of warm air (heating).	INOX The element is made of stainless sheet steel AISI 304.

Circular diffusers

■ Circular diffusers OD-1, OD-2

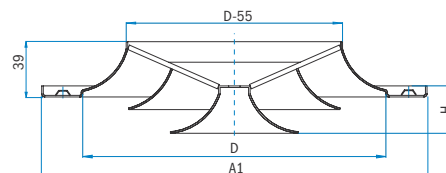
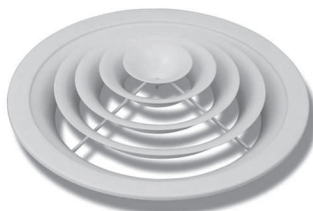
OD-1

- Fixed diffuser rings
- Central screw installation or fixing with three peripheral screws
- Peripheral foamy sealing strip
- Registers J2, L2



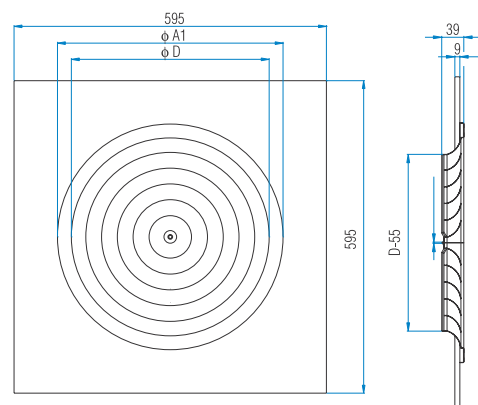
OD-2

- Fixed diffuser cone-form rings
- Central screw installation or fastening with three peripheral screws
- Peripheral foamy sealing strip
- Registers J2, L2



OD-1 in the plate

- OD-1 in the plate 595x595
- Sizes from 1 to 5 are available
- Only installation with cross-bar is possible
- Plenum boxes are equal to those for standard OD-1 corresponding nominal sizes



OD-1 and OD-2 dimensions

Size	D (mm)	A1 (mm)	H (mm)	OD-1 A _{ef} (m ²)	OD-2 A _{ef} (m ²)
1	192	244	30	0.0085	0.0090
2	248	300	45	0.0157	0.0167
3	304	356	60	0.0257	0.0282
4	360	412	75	0.0381	0.0422
5	416	468	90	0.0536	0.0618
6	472	542	98	0.0730	0.0812
7	528	598	112	0.0955	0.1037
8	584	654	126	0.1150	0.1235

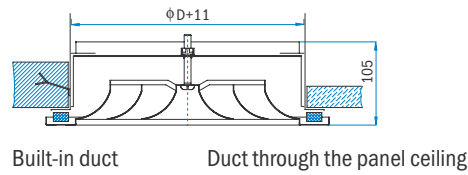
Dimensions of volume control dampers L2, J2 for OD-1 and OD-2

Size	ΦD-52 (mm)	ΦD+11 (mm)
1	140	203
2	196	259
3	252	315
4	308	371
5	364	427
6	420	483
7	476	539
8	532	595

Installation of circular diffusers OD-1, OD-2

Installation 7

- Installation with crossbar.
Designation: **OD-1/7, OD-2/7**

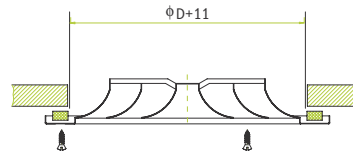


Installation 8

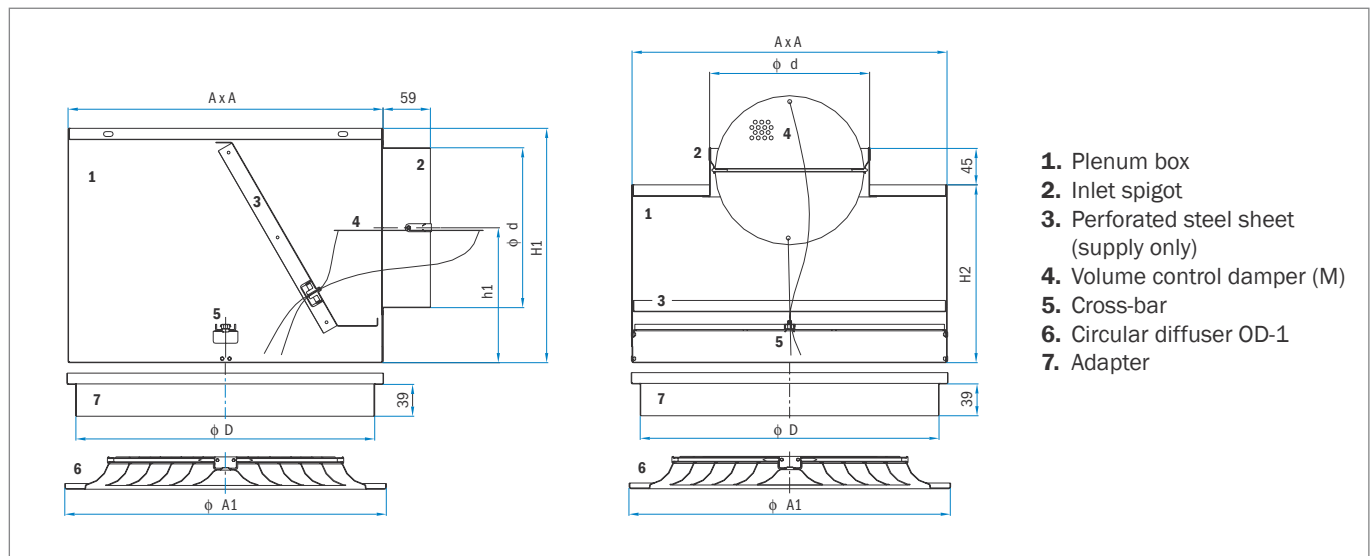
- Installation on register fastened in the duct.
Register has three girders.
Designation: **OD-1/8-(L2, J2), OD-2/8-(L2, J2)**

Installation X (without opening in the middle)

- Direct installation in the ceiling with three screws
Designation: **OD-1/X, OD-2/X**

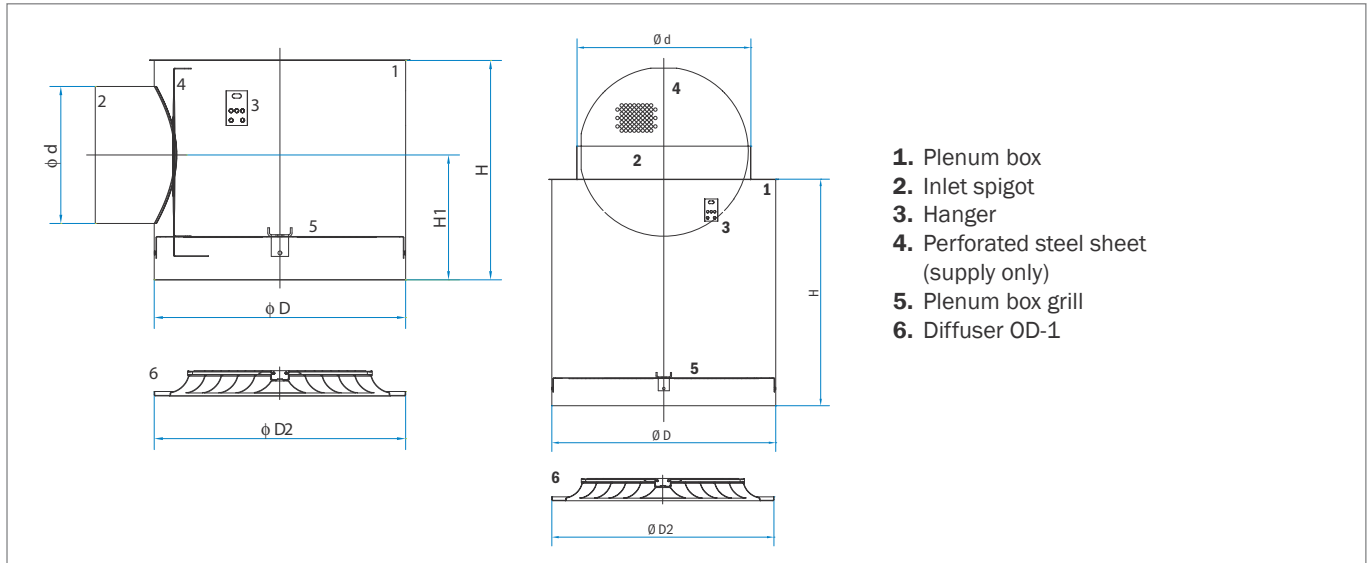


Installation of OD-1 and OD-2 with plenum box



Size	A	$\phi A1$	H1	h1	H2	ϕD	ϕd
1	280	244	210	125	200	204	123
2	325	300	240	137	200	260	158
3	390	356	290	167	240	319	198
4	390	412	290	167	240	370	198
5	590	468	325	177	240	430	248
6	590	542	325	177	240	488	248
7	590	598	325	177	240	540	248
8	815	654	450	250	300	596	313

Round diffuser OD-1 (side and vertical air supply)

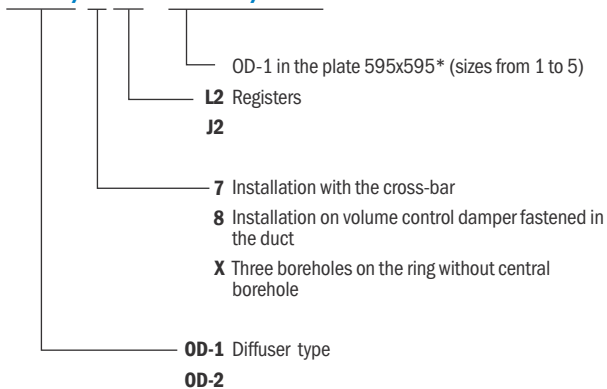


1. Plenum box
2. Inlet spigot
3. Hanger
4. Perforated steel sheet (supply only)
5. Plenum box grill
6. Diffuser OD-1

Size	ϕD	ϕd	H	H1	H2
1	204	123	210	125.5	210
2	260	158	245	143	245
3	319	198	285	163	280
4	370	198	285	163	280
5	430	248	335	188	330
6	488	248	335	188	330
7	540	248	335	188	330
8	596	313	400	220.5	395

Ordering key

OD-1/7-J2 Size 2 / 600

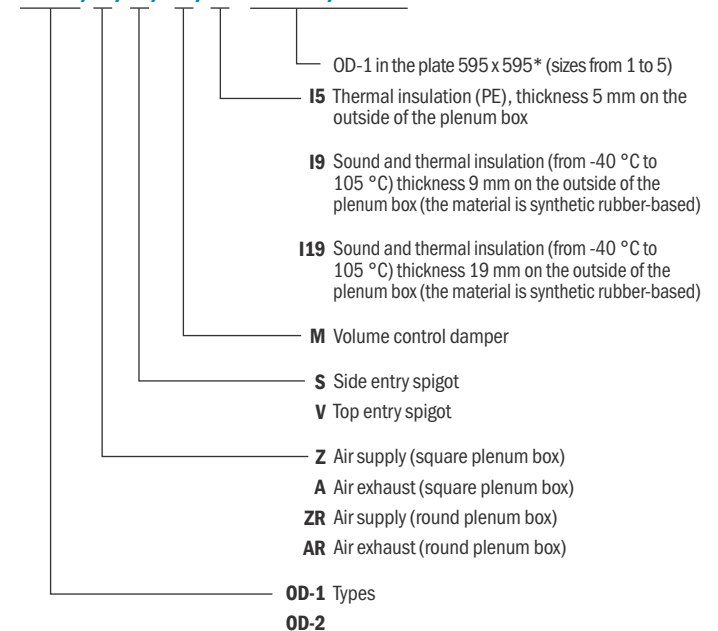


* Only installation number 7 is enabled if OD-1 version is installed into the plate.

Ordering key

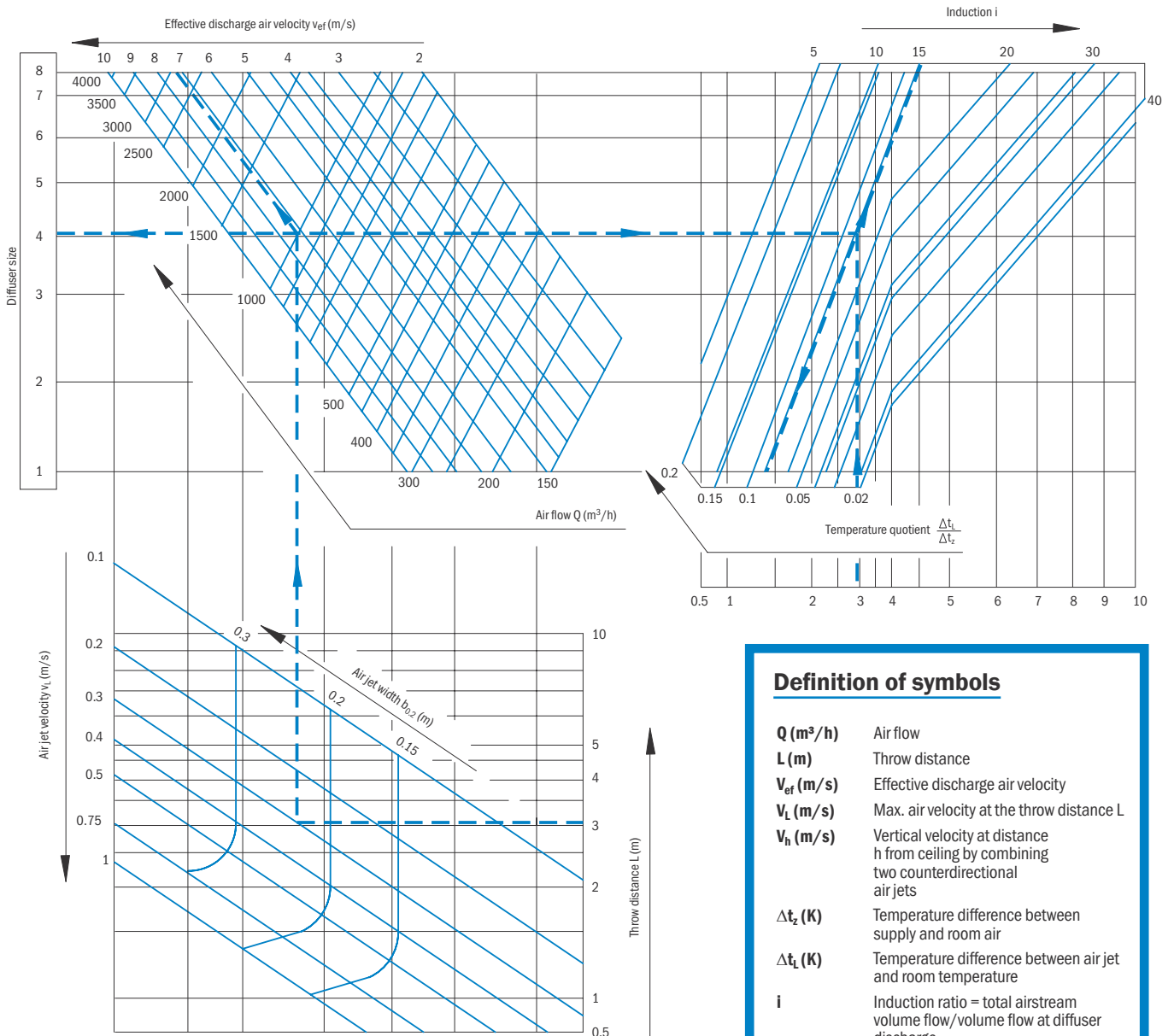
for OD-1, OD-2 with plenum box

OD-1/Z/S/M/I Size 2 / 600



*Only central installation can be used when installing on a plenum box.

Diagram for determining the size, induction and temperature of the air jet flow of the circular diffusers OD-1



Definition of symbols

- Q (m³/h)** Air flow
- L (m)** Throw distance
- v_{ef} (m/s)** Effective discharge air velocity
- v_L (m/s)** Max. air velocity at the throw distance L
- v_h (m/s)** Vertical velocity at distance h from ceiling by combining two counterdirectional air jets
- Δt_z (K)** Temperature difference between supply and room air
- Δt_L (K)** Temperature difference between air jet and room temperature
- i** Induction ratio = total airstream volume flow/volume flow at diffuser discharge
- $b_{0.2}$ (m)** Width of the air jet is measured at a distance from ceiling where air flow velocity is 0.2 m/s

VENTILATING GRILLES,
VENTILATING VALVES

CIRCULAR DIFFUSERS,
SQUARE DIFFUSERS

SWIRL DIFFUSERS,
VARIABLE SWIRL
DIFFUSERS

SLOT DIFFUSERS,
ROUND DUCT DIFFUSERS

AIR DISPLACEMENT
UNITS

SUPPLY AIR NOZZLES

EXTERNAL ELEMENTS

AIR FLOW
CONTROL UNITS

SOUND ATTENUATORS,
SOUND ATTENUATING
LOUVRES

Example

Given:
 Air flow: $Q = 1000 \text{ m}^3/\text{h}$, $L = 3 \text{ m}$
 Air jet velocity: $V_L = 0.3 \text{ m/s}$
 Temperature difference: $\Delta T_z = 5 \text{ }^\circ\text{C}$

Solution:
 From the diagram select the diffuser OD-1 size 4.

effective outlet velocity $v_{ef} = 7.2 \text{ m/s}$
 temperature quotient $\Delta t_1 / \Delta t_z = 0.08$
 temperature difference $\Delta t_1 = 0.08 \times 5 = 0.4 \text{ }^\circ\text{C}$
 induction $i = 16$
 width of the air jet $b_{0.2} = 0.22 \text{ m}$

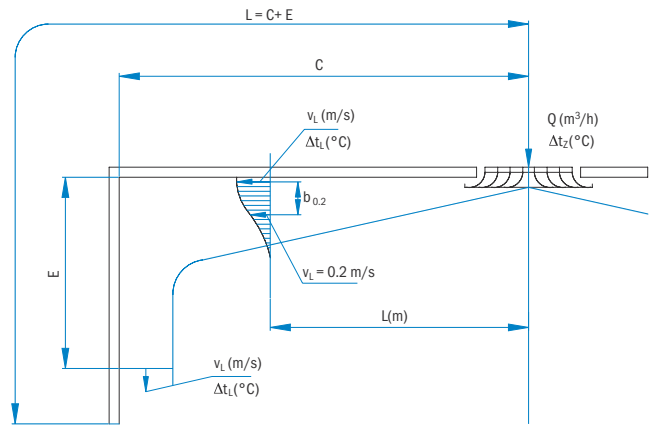
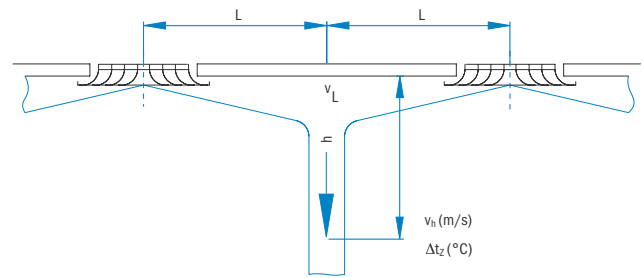
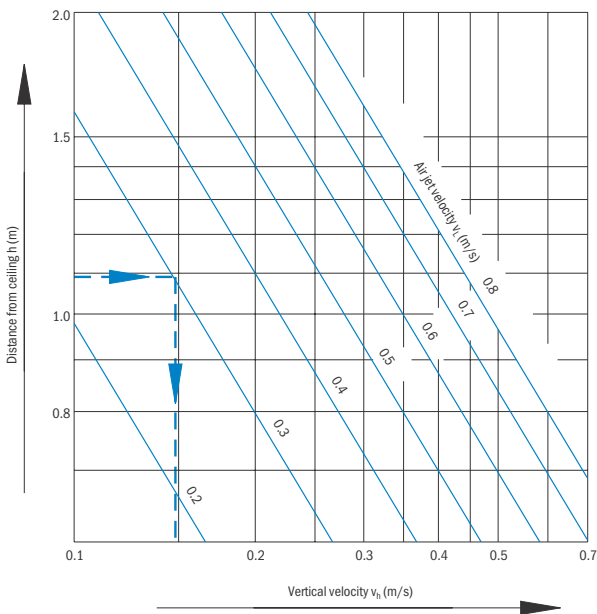


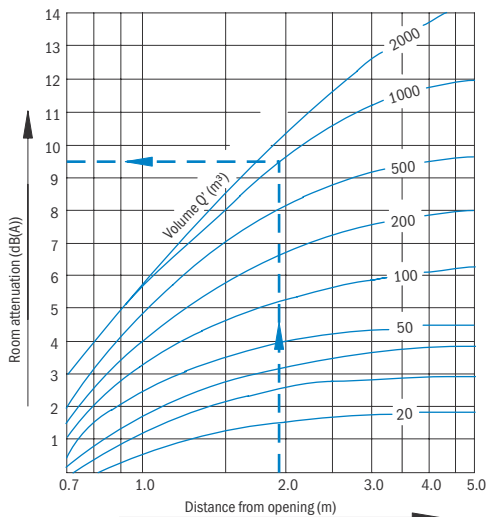
Diagram for determination of vertical velocity



Max temperature quotient $\Delta t_1 / \Delta t_z$ determined using the diagram 1 for temperature quotient:

$L_{\text{diagram}} = L + h$

Room attenuation diagram



Q' (m³) calculated volume, depending on room reflectance
 Q (m³) actual room volume

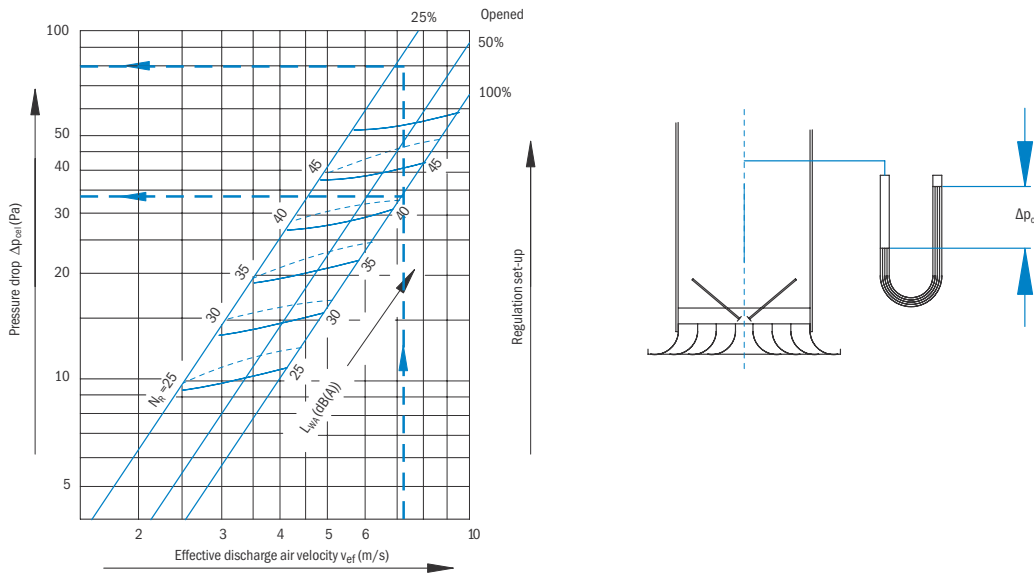
The following data are necessary to calculate the volume Q' .

- 1. Normal rooms $Q' = Q$
- 2. Rooms with highly reflective walls $Q' = 0.5Q$
- 3. Rooms with absorption walls $Q' = 2Q$

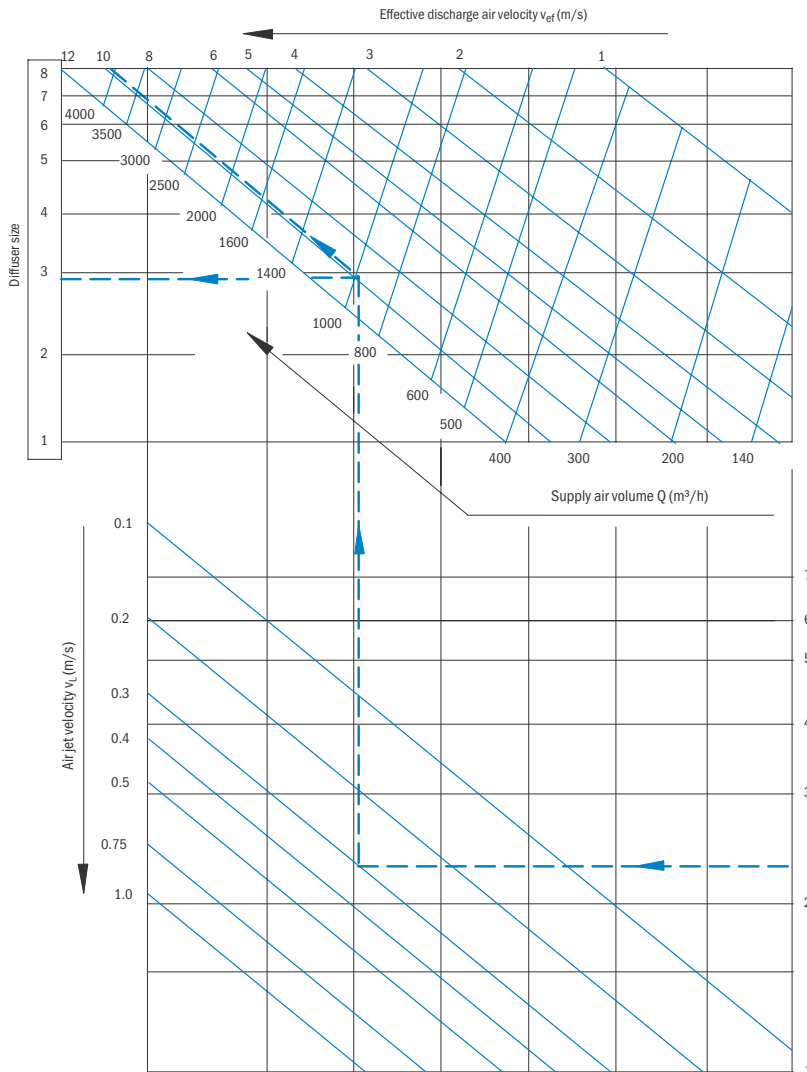
Definition of symbols

Δp_{cel} (Pa) Pressure drop
 L_{WA} (dB(A)) Sound power level
 N_R Max. value according to ISO

Pressure drop diagram (Valid for volume control damper J2)



Sizing diagram for circular diffusers OD-2



Definition of symbols

Q (m³/h)	Air flow
L (m)	Throw distance
v_{ef} (m/s)	Effective discharge air velocity
v_L (m/s)	Max. air velocity at the throw distance L
v_h (m/s)	Vertical velocity at distance h from ceiling by combining two counterdirectional air jets
Δt_z (K)	Temperature difference between supply and room air
Δt_L (K)	Temperature difference between air jet and room temperature
i	Induction ratio = total air stream volume flow/volume flow at diffuser discharge
$b_{0.2}$ (m)	Width of the air jet is measured at a distance from ceiling where air flow velocity is 0.2 m/s
Δp_{cel} (Pa)	Pressure drop
L_{WA} (dB(A))	Sound power level
N_R	Border value according to ISO

Example

Given:

Air flow volume: $Q = 1000 \text{ m}^3/\text{h}$, $L = 2.4 \text{ m}$
 Air jet velocity: $V_L = 0.3 \text{ m/s}$
 Temperature difference: $\Delta t_z = 5 \text{ }^\circ\text{C}$

Solution:

From the diagram select the diffuser OD-2 size 3.

Effective discharge velocity $v_{ef} = 9.8 \text{ m/s}$

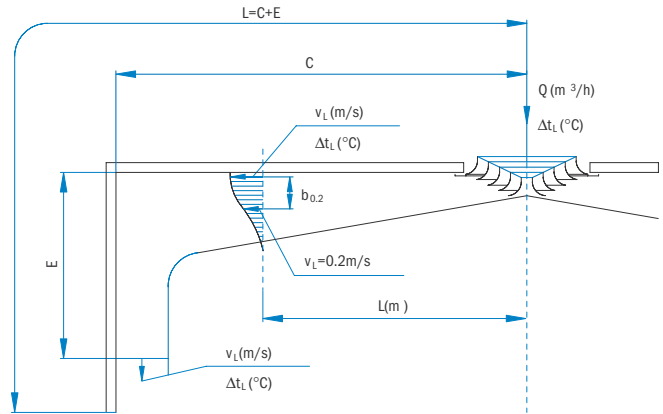
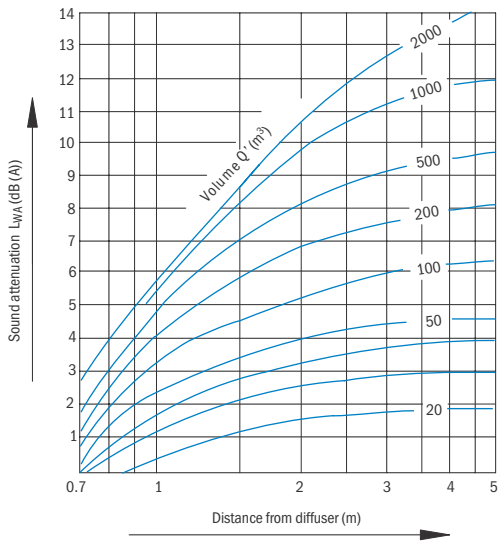


Diagram for approximate determination of room attenuation

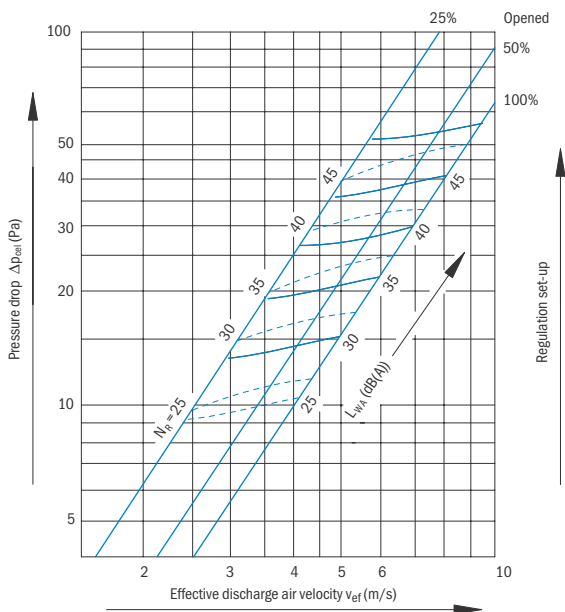
Q' (m³) Calculated volume, depending on room reflectance
 Q (m³) Actual room volume

The following data are necessary to calculate the volume Q' .

1. Normal rooms $Q' = Q$
2. Rooms with highly reflective walls $Q' = 0.5Q$
3. Rooms with absorption walls $Q' = 2Q$

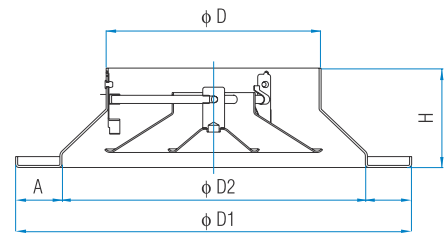


Pressure drop diagram (Valid for register J2)



■ Circular diffusers OD-3N

- Dismountable and height adjustable diffuser core (two positions).
- Installation with a mounting base collar.
- Two designs:
 - aluminium sheet, painted in white RAL 9010,
 - aluminium sheet, eloxal treated in natural aluminium colour.



Application

The diffuser core has two setting positions. In the upper position, the jet is directed downwards, for warm air heating application; in the lower position, the jet is directed horizontally, for cooling applications.

For duct cleaning, only the diffuser core is to be dismantled.

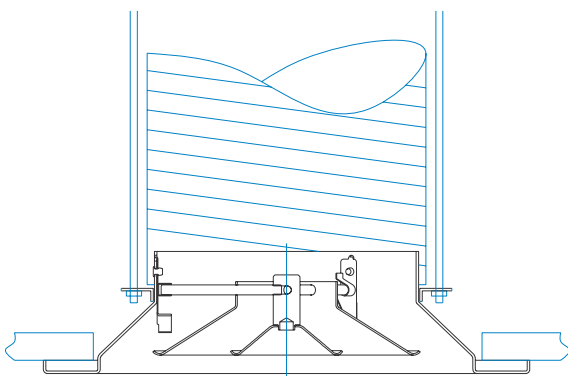
OD-3N has a capacity to supply large volumes of air.

Table of dimensions:

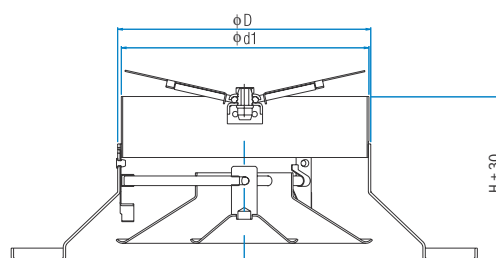
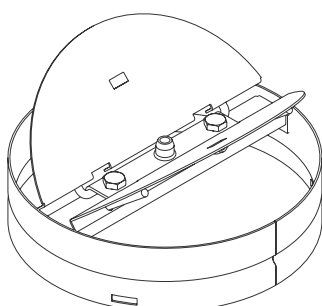
Size	ϕD	$\phi D1$	$\phi D2$	A	H
100	98	225	165	30	67
160	158	291	223	34	73
200	198	378	302	38	77
250	248	454	368	43	86
315	313	537	441	48	94
355	353	624	518	53	98
400	398	704	588	58	125
450	448	788	662	63	133
500	498	872	736	68	145
630	628	1063	927	68	162
710	708	1180	1044	68	172
800	798	1323	1177	73	198
900	898	1470	1324	73	211

Mounting

- Direct mounting on a circular duct or hose without additional adjustment fittings.

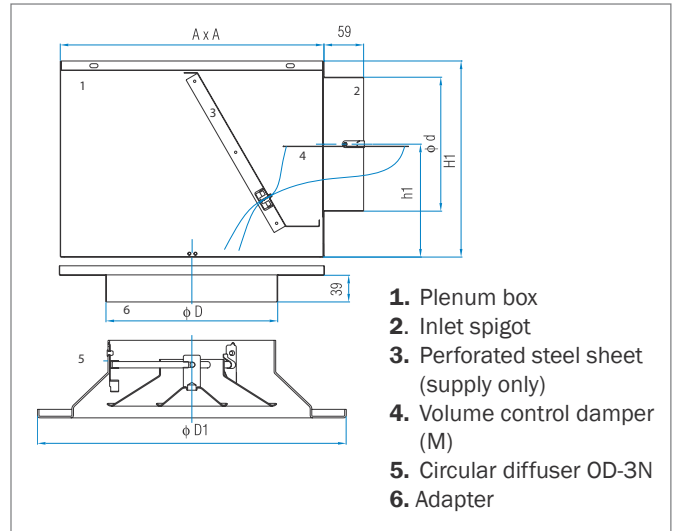


- Mounting on a circular duct – adjustment with a J2 adjustment fitting (for sizes 160 to 500).



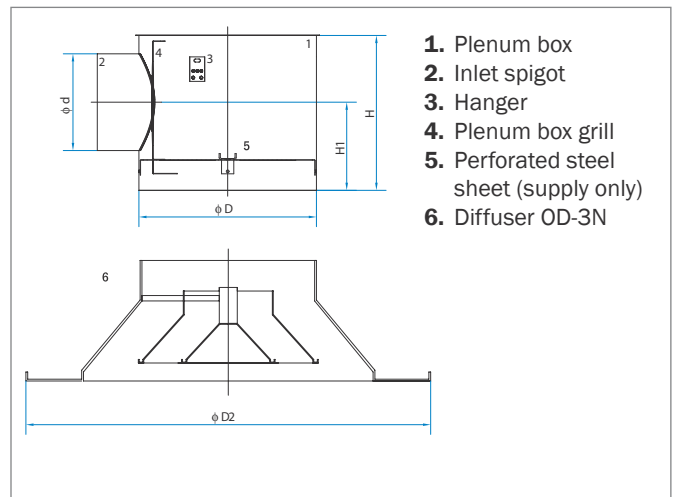
Mounting with a connection plenum box (for sizes up to 500):

Size	A	H1	h1	Φd	ΦD	ΦD1	Φd1	H+30
100	230	185	112	98	103	225	–	97
160 200	280	210	125	123	163	291	154	103
					204	378	194	107
250	390	290	167	198	254	454	244	116
315 355	590	325	177	248	319	537	309	124
					358	624	349	128
400	590	390	210	313	404	704	394	155
450					454	788	444	163
500					504	872	494	175



Swirl diffusers OD-3N (air inlet on the side):

Size	Φ D	Φ D2	Φ d	H	H1
100	103	225	98	185	113
160	163	291	123	210	125.5
200	204	378	123	210	125.5
250	254	454	198	285	163
315	319	537	248	335	188
355	358	624	248	335	188
400	404	704	313	400	220.5
450	454	788	313	400	220.5
500	504	872	313	400	220.5



Ordering key

OD-3N/J2/K/M/I Size 160

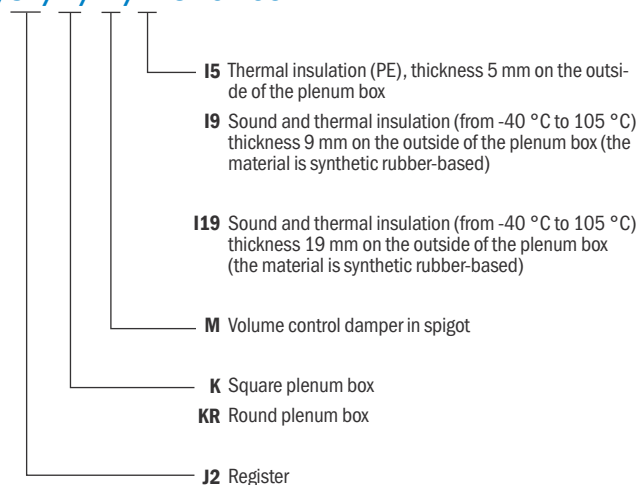
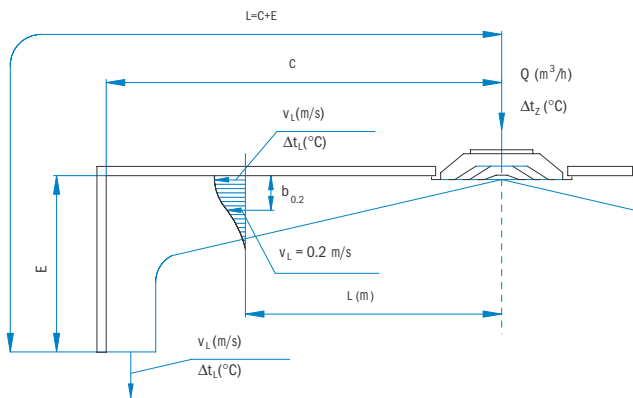
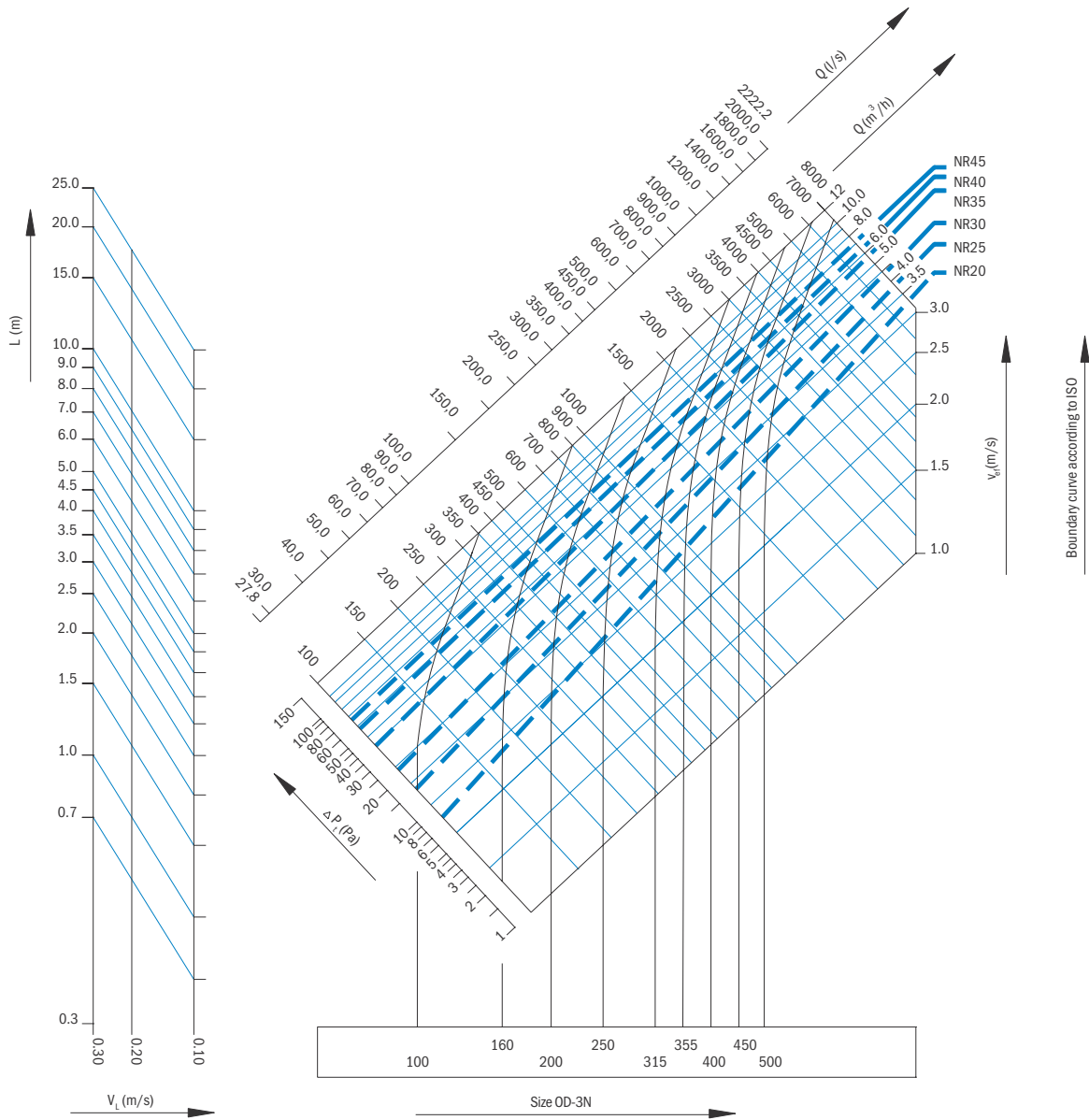


Diagram for the determination of technical characteristics at horizontal jets (sizes 100 to 500)



Definition of symbols

- Q (l/s)** Volume flow rate
- Q (m³/h)** Volume flow rate
- L (m)** Distance L
- V_{eff} (m/s)** Effective velocity
- V_L (m/s)** Air jet maximum velocity at throw distance L
- Δp_t (Pa)** Pressure drop
- N_R** Boundary curve according to ISO

VENTILATING GRILLES,
VENTILATING VALVES

CIRCULAR DIFFUSERS,
SQUARE DIFFUSERS

SWIRL DIFFUSERS,
VARIABLE SWIRL
DIFFUSERS

SLOT DIFFUSERS,
ROUND DUCT DIFFUSERS

AIR DISPLACEMENT
UNITS

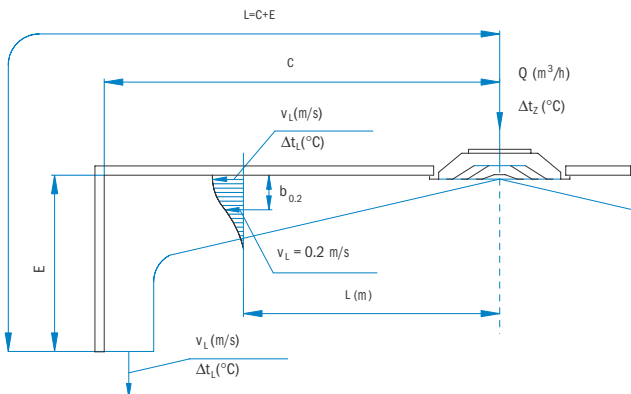
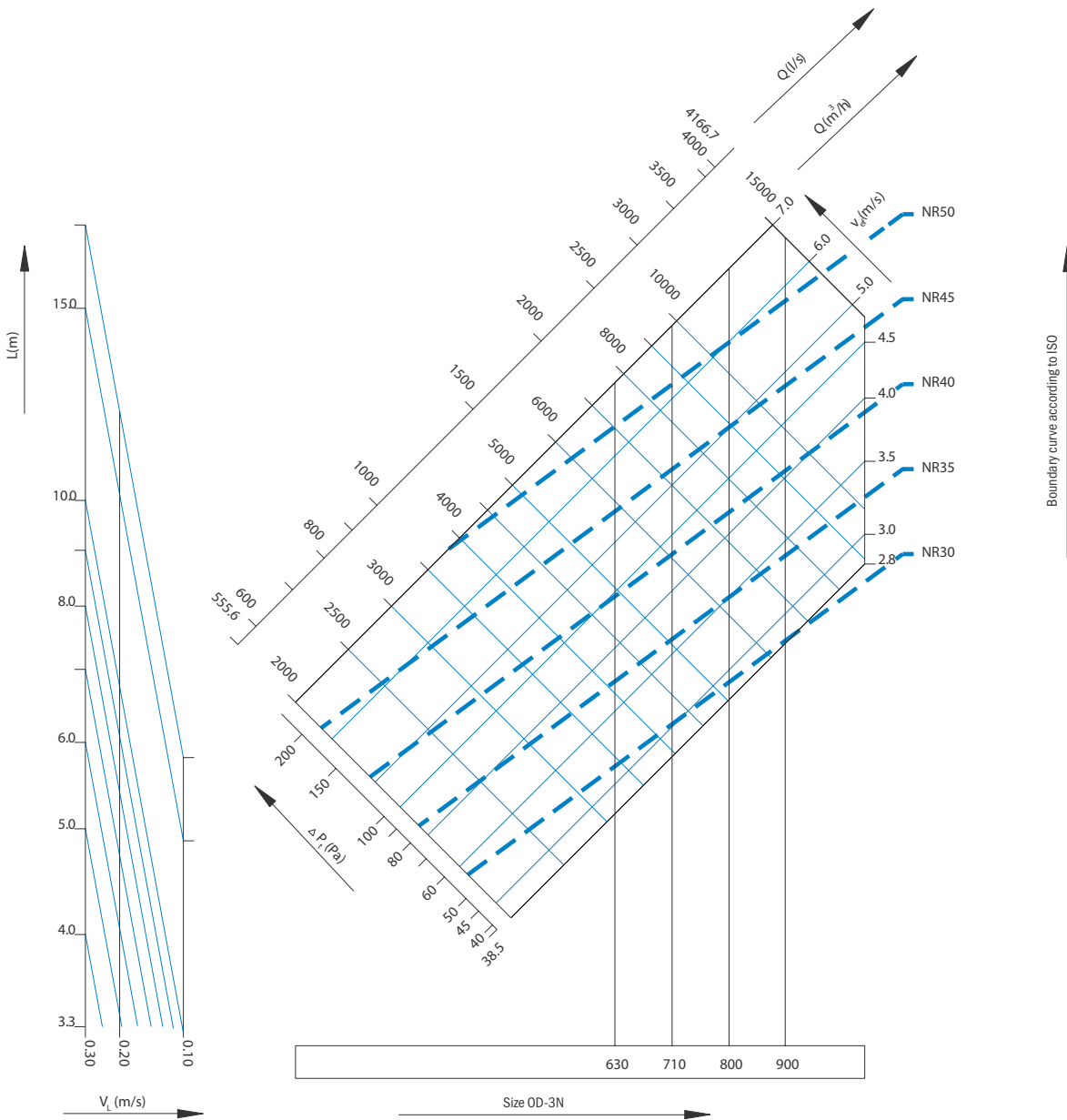
SUPPLY AIR NOZZLES

EXTERNAL ELEMENTS

AIR FLOW
CONTROL UNITS

SOUND ATTENUATORS,
SOUND ATTENUATING
LOUVERES

Diagram for the determination of technical characteristics at horizontal jets (sizes 630 to 900)



Definition of symbols	
Q (l/s)	Volume flow rate
Q (m³/h)	Volume flow rate
L (m)	Distance L
V_{ef} (m/s)	Effective velocity
V_L (m/s)	Air jet maximum velocity at throw distance L
Δp_t (Pa)	Pressure drop
N_R	Boundary curve according to ISO

Registers

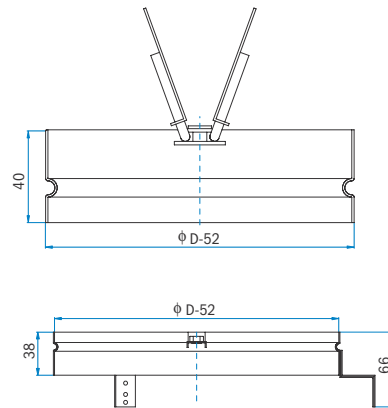
When adjusting the system, desired operating conditions are obtained by the means of ventilation elements control. Registers are installed for additional air volume control, thus influencing air velocity and throw distance as well. Registers are made of galvanised sheet steel.

J2

Register J2 has two separately adjustable deflector flaps. It is used to deflect and control air flow from the duct. Central installation of circular diffuser on built-in crossbar is also possible.

L2

Element without regulation facilities is designed for the central installation of circular diffuser. Crossbar is a component part of L2. Picture shows L2/8 – angle irons for duct installation.

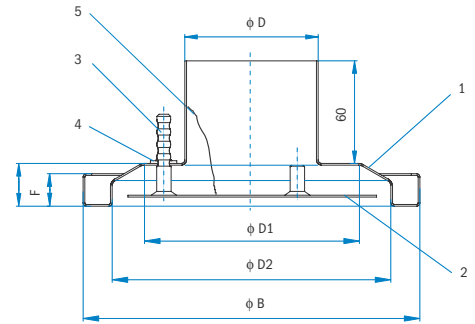


Circular diffuser OD-10

Application

Circular diffusers OD-10 are designed for ceiling installation in rooms with heights from 2.6 to 4 m and temperature difference between supply and room air of 10K.

By rotating the central disc, the discharge angle can be adjusted horizontally or vertically.



Description

Diffuser housing is made of sheet aluminium, valve disc of pickled sheet steel. Diffuser is powder coated in RAL 9010 or upon customer's wish.

Component parts

1. Housing with connection valve
2. Disc control element
3. Spring
4. Holder
5. Safety rope

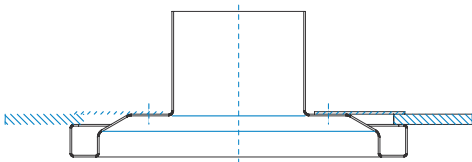
Size	φB	φD	φD1	φD2	C	F	A _{ef} s = -5	A _{ef} s = +5
80	197	78	128	163	25	20	0.00435	0.00498
100	215	98	146	181	25	20	0.00486	0.00556
125	249	123	180	215	25	20	0.00582	0.00666
160	308	158	204.5	264	35	25	0.01173	0.01236
200	364	198	260.5	320	35	25	0.01437	0.01514
250	444	248	306	390	45	30	0.02434	0.02507
315	535	313	397	481	45	30	0.03034	0.03119

A_{ef} Effective area (m²)

Installation

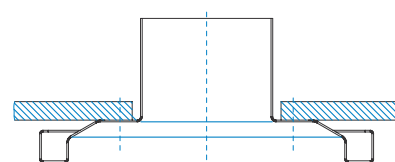
OD-10/1

- Installation with fastening section



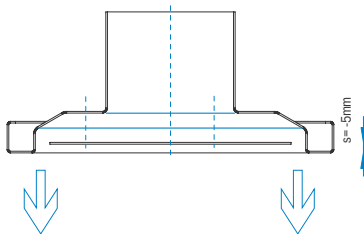
OD-10/2

- Direct installation in the ceiling with screws

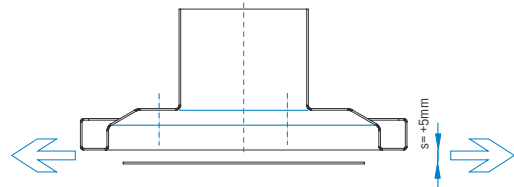


Set-up of the next valve disc

- Air jet direction by heating



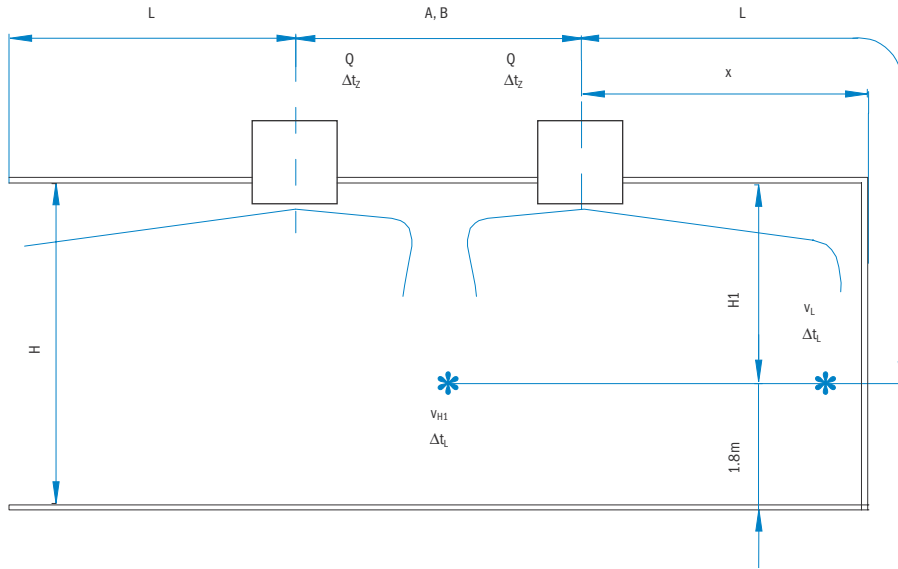
- Air jet direction by cooling



Ordering key

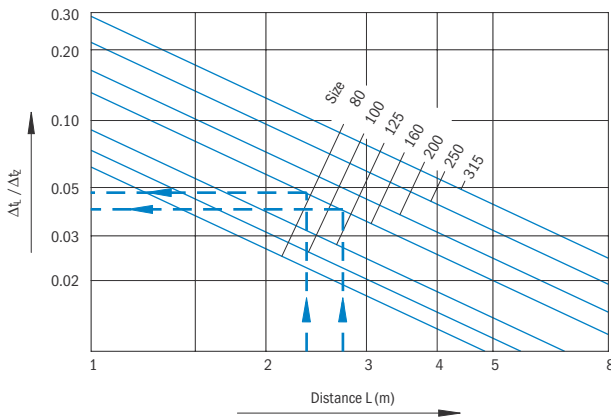
OD-10/1 Size 160

- 1 Installation with attaching section
- 2 Direct ceiling installation



Definition of symbols

Q (m³/h)	Air flow
x (m)	Horizontal distance to the wall
H (m)	Room height
H1 (m)	Distance between the ceiling and occupied zone
L (m)	Throw distance (L = H1 + x)
v_L (m)	Air velocity at the throw distance L
Δt_z (K)	Temperature difference between supply and room air
Δt_l (K)	Temperature difference between room air and air jet temperature
Δp (Pa)	Pressure drop
L_{WA} (dB(A))	Sound power level
v_{H1} (m/s)	Air velocity at the H1 distance
A, B (m)	Distance between two diffusers (by width and length)



Dim. S	Sizes 80, 100, 125	Sizes 160, 200	Sizes 250, 315	Correction factor
5	1.05	1.04	1.03	k1
10	0.95	0.97	0.98	k1
5	-6.0	-5.5	-5.0	k2
10	2.0	1.5	1.5	k2
5	1.17	1.11	1.08	k3
10	0.90	0.92	0.94	k3

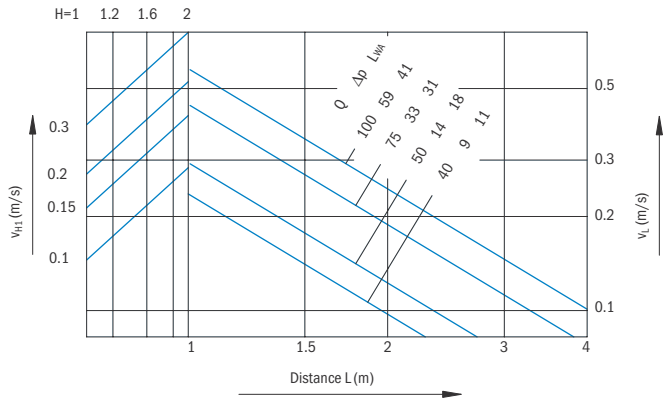
k1 Velocity corrections v_{H1} in v_L :
 $v_{H1} = (v_{H1} \text{ from diagram}) \times k1$
 $v_L = (v_L \text{ from diagram}) \times k1$

k2 Sound power corrections:
 $L_{WA} = (L_{WA} \text{ from diagram}) - k2$

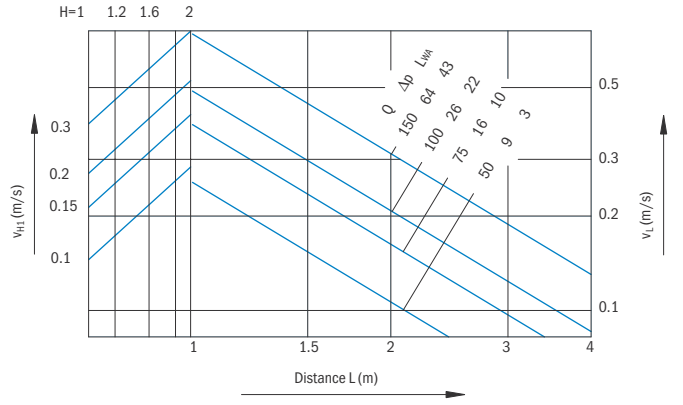
k3 Pressure drop corrections:
 $\Delta p = (\Delta p \text{ from diagram}) \times k3$

Technical data for horizontal discharge (central disc adjustment $s = 10 \text{ mm}$)

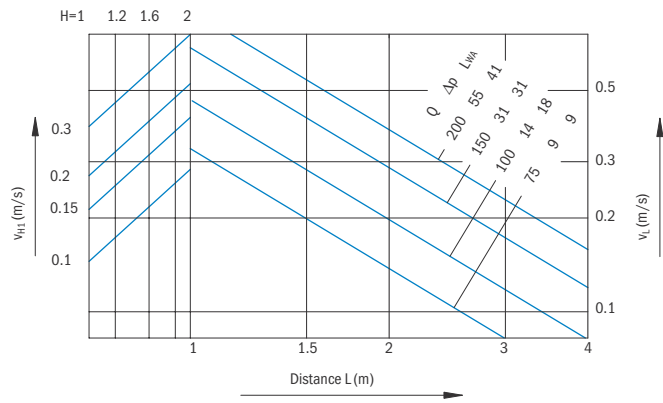
Size 80



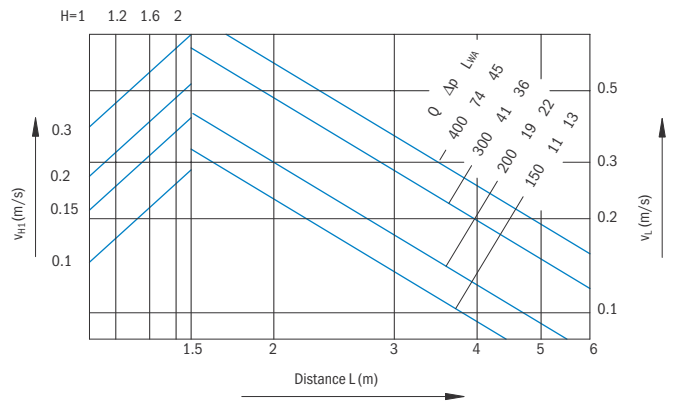
Size 100



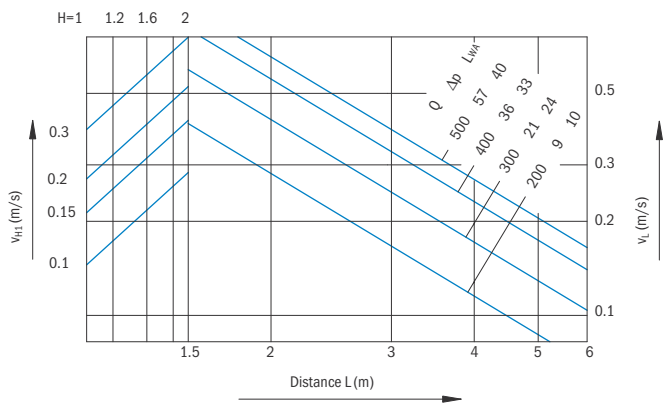
Size 125



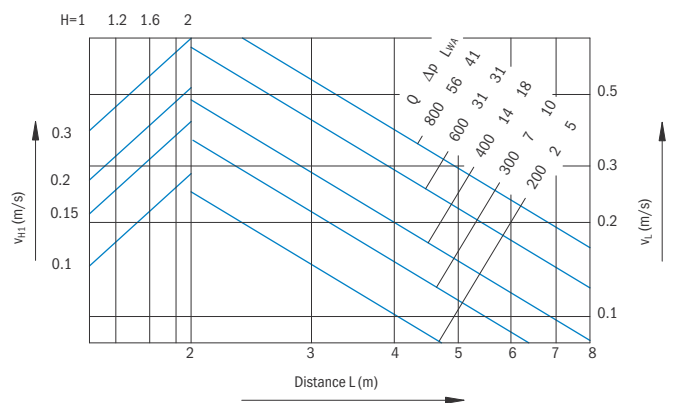
Size 160



Size 200



Size 250



Size 315

