

# Slot diffusers

## ■ Slot diffusers LD-13, LD-14

### Application

LD-13 and LD-14 slot diffusers are designed for the supply of air in rooms with floor to ceiling heights of 2.5 to 4 m for supplying either cold or warm air, in particular in applications where air conditioning comfort demands are stringent. Due to their high induction rate and rapid decrease of temperature difference, these diffusers are also suitable for variable systems.

AI



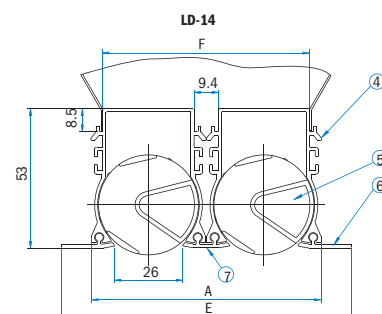
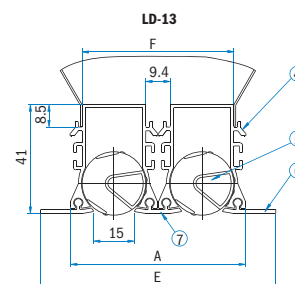
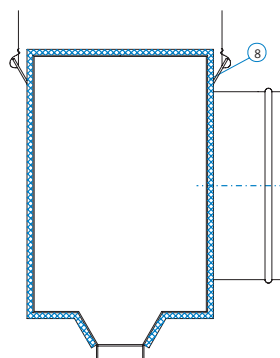
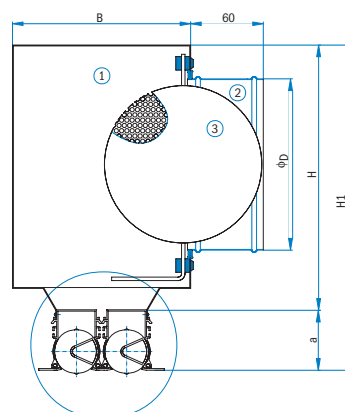
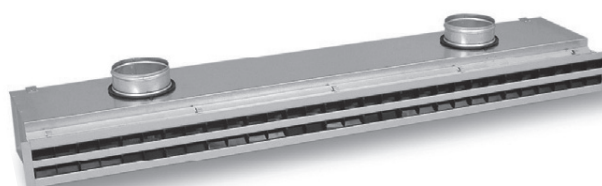
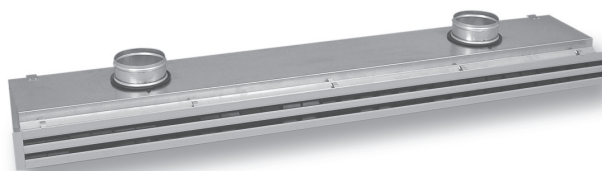
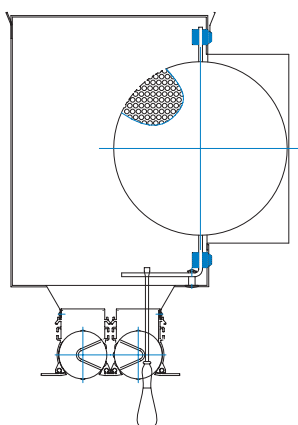
RAL 9010

CD

### Description

LD-13 and LD-14 slot diffusers are designed in 1, 2, 3 and 4-slot versions. Diffuser face plate consists of anodised aluminium sections with built-in cylindrical deflectors made of plastics. Deflectors allow continuous adjustment of discharged air direction within the 360° range as well as control of supply air flow rate. The cylindrical deflectors also allow full shutting of the diffuser. The slot diffuser plenum box is made of galvanised sheet steel and has a flow rate control damper built in its inlet spigot, to allow fine adjustment of the desired air flow rate.

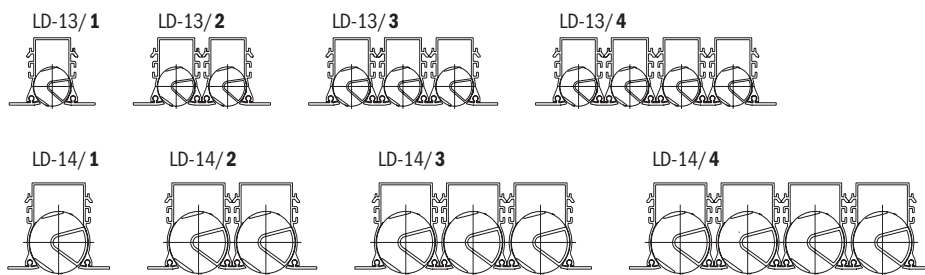
### Control schematic of the spigot volume control damper



1. Plenum box
2. Inlet spigot
3. Volume control damper
4. Main section
5. Cylindrical deflector
6. Side lateral section
7. Connecting section
8. Outside insulation

## Slot diffuser types

- Single-slot (designation LD-13,14/1)
- Two slots (designation LD-13,14/2)
- Three-slots (designation LD-13,14/3)
- Four-slots (designation LD-13,14/4)

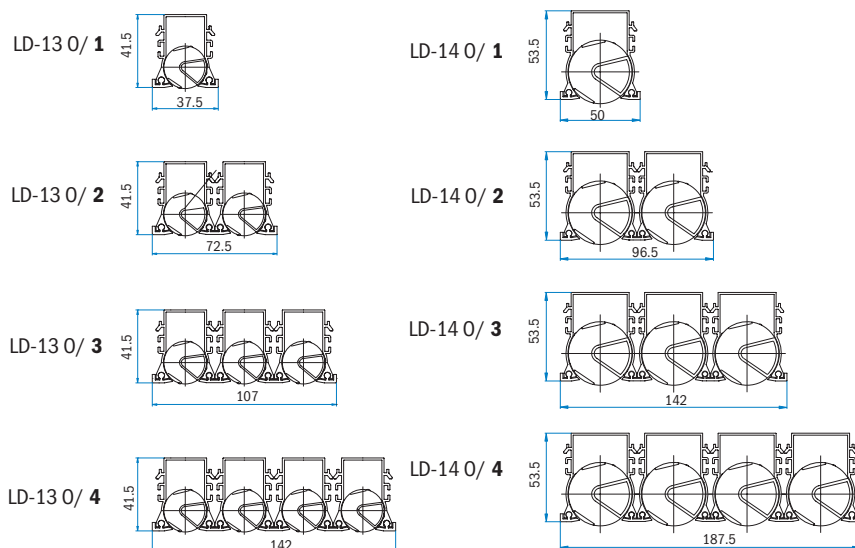


## Slot diffusers

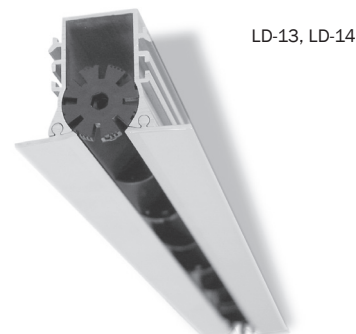
### LD-13 O, LD-14 O

#### Narrow version

The narrow slot diffuser differs from the conventional slot diffuser construction as regards its mounting to the ceiling or wall. The conventional slot diffuser has a L-cross-section mounting sleeve which remains visible and may, in certain applications, interfere with aesthetic requirements. The narrow design has eliminated this deficiency as well as introduced improved structural rigidity due to its reinforced sleeve. The product is thus suitable for installation in cooling suspended ceilings as well.



LD-13 O, LD-14 O



LD-13, LD-14

## Standard lengths L

LD-13 and LD-14 slot diffusers are available in standard lengths ranging from L=300 to L=2000 mm, with a 100 mm step. In cases where longer diffusers are required, they can be joint together by means of (rail-type) connecting plates. Plenum boxes are also available in standard lengths ranging from 300 mm to 2000 mm.

## Special orders

On customer's request slot diffusers can be made in other dimensions. End seals and longitudinal sections are painted in any RAL scale colour according to the customer's request. As standard, cylindrical deflectors are black or white, on the customer's request, they can be coloured in any RAL scale colour. Non-standard colours and extra components are to be ordered separately.

### LD-13

No. of slots	H	H1	B	A	E	F
1	220	261	95	33	57.5	24.4
2	230	271	129	67	92	58.2
3	250	291	162	101	126.5	92.0
4	290	331	196	135	161.5	125.8

### LD-14

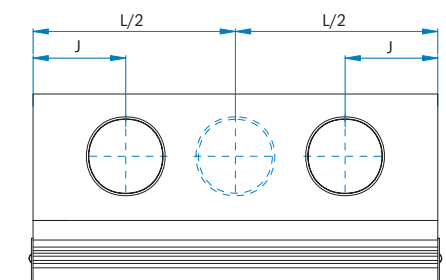
No. of slots	H	H1	B	A	E	F
1	233.5	287	106	44	69	35.3
2	253.5	307	150	89	115	80
3	293.5	347	195	133	161.5	124.7
4	318.5	372	240	178	206.5	169.4

### Number and diameter of inlet spigots

L	300 do 1000		1100 do 1500		1600 do 2000	
No. of slots	Number and diameter of inlet spigots					
	LD-13	LD-14	LD-13	LD-14	LD-13	LD-14
1	1 x 98	1 x 123	2 x 98	2 x 123	2 x 123	2 x 138
2	1 x 138	1 x 158	2 x 123	2 x 138	2 x 138	2 x 158
3	1 x 158	1 x 198	2 x 138	2 x 158	2 x 158	2 x 198
4	1 x 198	1 x 223	2 x 158	2 x 198	2 x 198	2 x 223

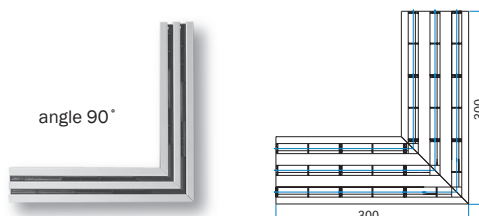
### Position of inlet spigots

Number of inlet spigots	Standard length	Position of spigots
1	300 - 1000	L/2
2	1100 - 1500	J = 300
2	1600 - 2000	J = 400



### Slot diffuser face plate designs

Slot diffuser face plates are made of linear or angular ended sections, which allow the diffusers to be joined at different angles. Angular ended sections are not fitted with air direction controls.



### Cylindrical deflectors

Cylindrical deflectors are an important components of a slot diffuser. They allow adjustment of both air flow rate and direction. Cylindrical deflectors are made of plastics. As standard, they are black or white.

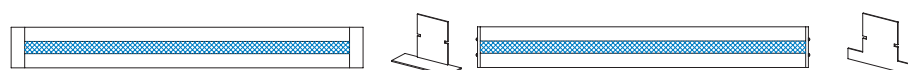


### End seals

End seals are components of the diffuser face plate. They are available in two designs:

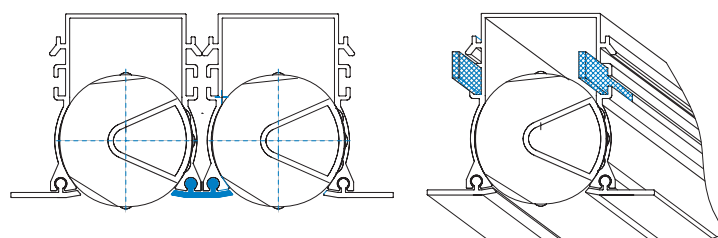
- as an angle piece (**E** – on both ends, **ET** – on one end only) or
- plates (**F** – on both ends, **FT** – on one end only).

The connecting strip-section has no end angle pieces or plates seals (design T).



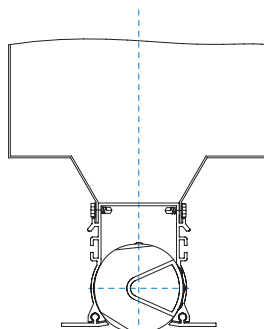
### Joining diffusers together in length and width

Joining in width (into diffusers with multiple slots) requires special strip sections, while joining in length requires connecting plates (the total length of combined diffusers is not limited).

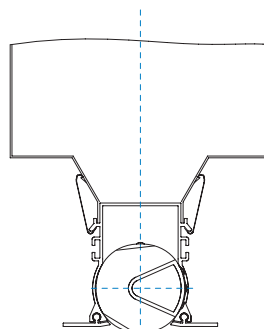


### Fixing of the plenum box onto LD-13, LD-14 diffusers

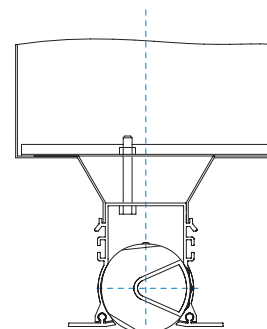
- With self-tapping screws (designation **U**)
- With spring clamps (designation **S**)
- With a cross-member (designation **Z**)



Fixing with self-tapping screws (U)



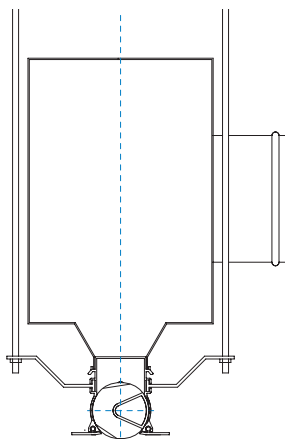
Fixing with spring clamps (S)



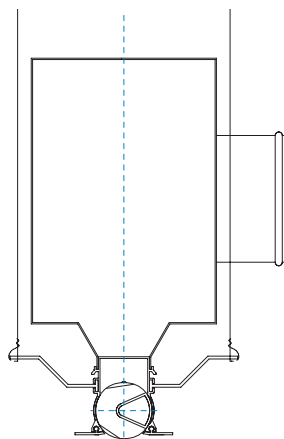
Fixing with a cross-member (Z)

### Installation methods

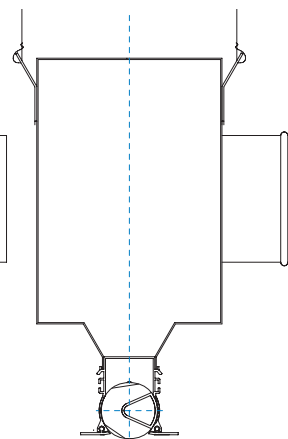
- With a threaded bar (designation **R**)
- With a wire (designation **R**)
- With suspension brackets on the plenum box (designation **P**)
- With special fixing elements (designation **R**)
- With springs (designation **N**)



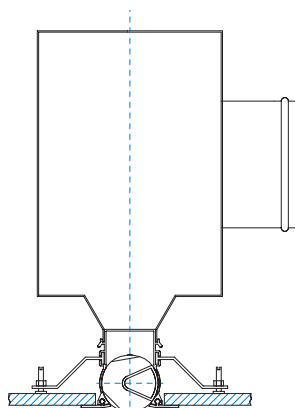
Installation with a threaded bar (R)



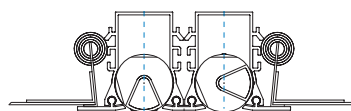
Installation with wire (R)



Installation with suspension bracket (P)

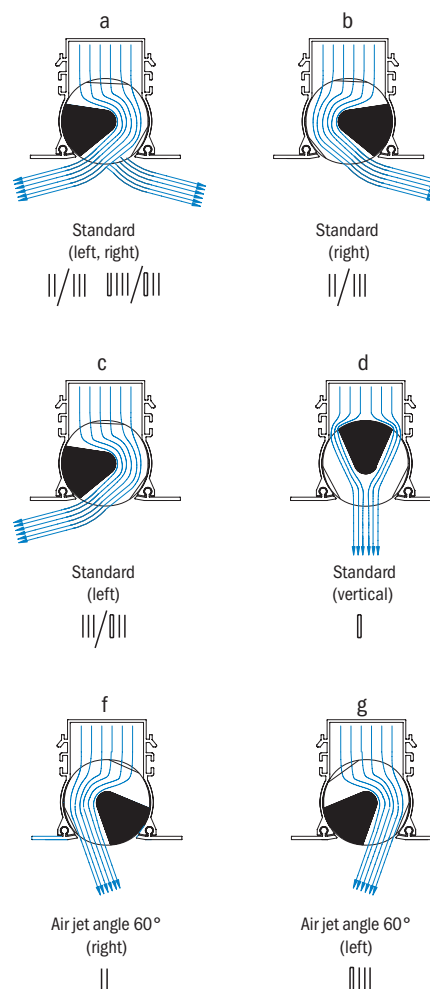
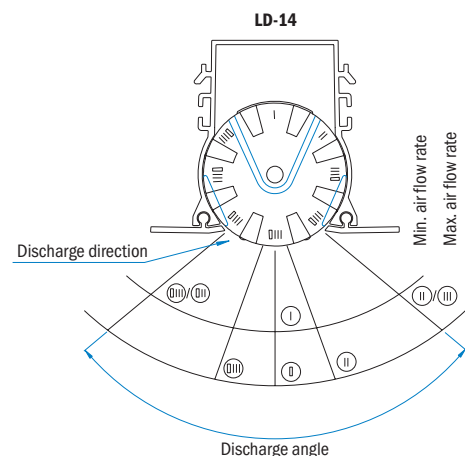
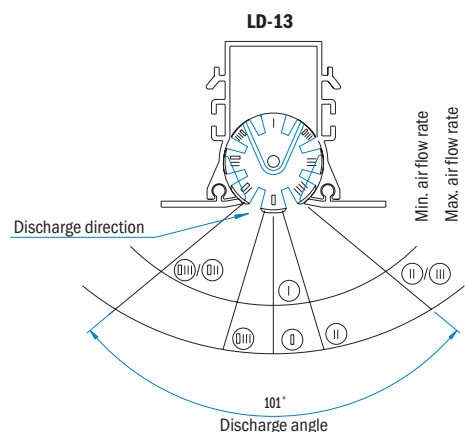


Installation with special fastening elements (R)



Installation with springs into ducts (N)

### Types of air discharge



### Slot diffuser with actuator controlled discharge direction

Slot diffusers with actuator controlled discharge direction are suitable for summer-winter air supply applications. The desired direction of air jet is achieved by means of an electric actuator which moves a slider. Manual adjustment is therefore not necessary. Compared with standard slot diffusers, air flow rate is reduced by 50 %. There are two options for the Belimo electric motors:

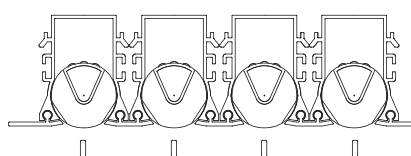
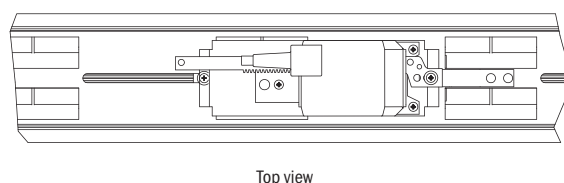
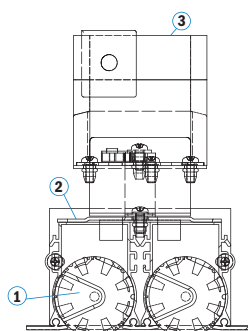
LH 24A-SR100 and LH-24A-MP100. The first operates at 24V AC/DC, the second within the range of 0-10V or 0-32V. Their travel distance is 100 mm, for which 150 s is required.

### Component parts

1. Slot diffuser
2. Deflector
3. Electric actuator

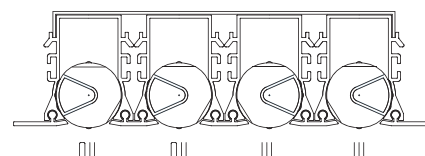
In case the discharge angle is to be adjustable by means of an electric actuator (winter-summer application), this requirement shall be specified in the ordering form.

\* Motor version on customer's request.



### Every second row

1. Adjustment of deflectors for warm air supply

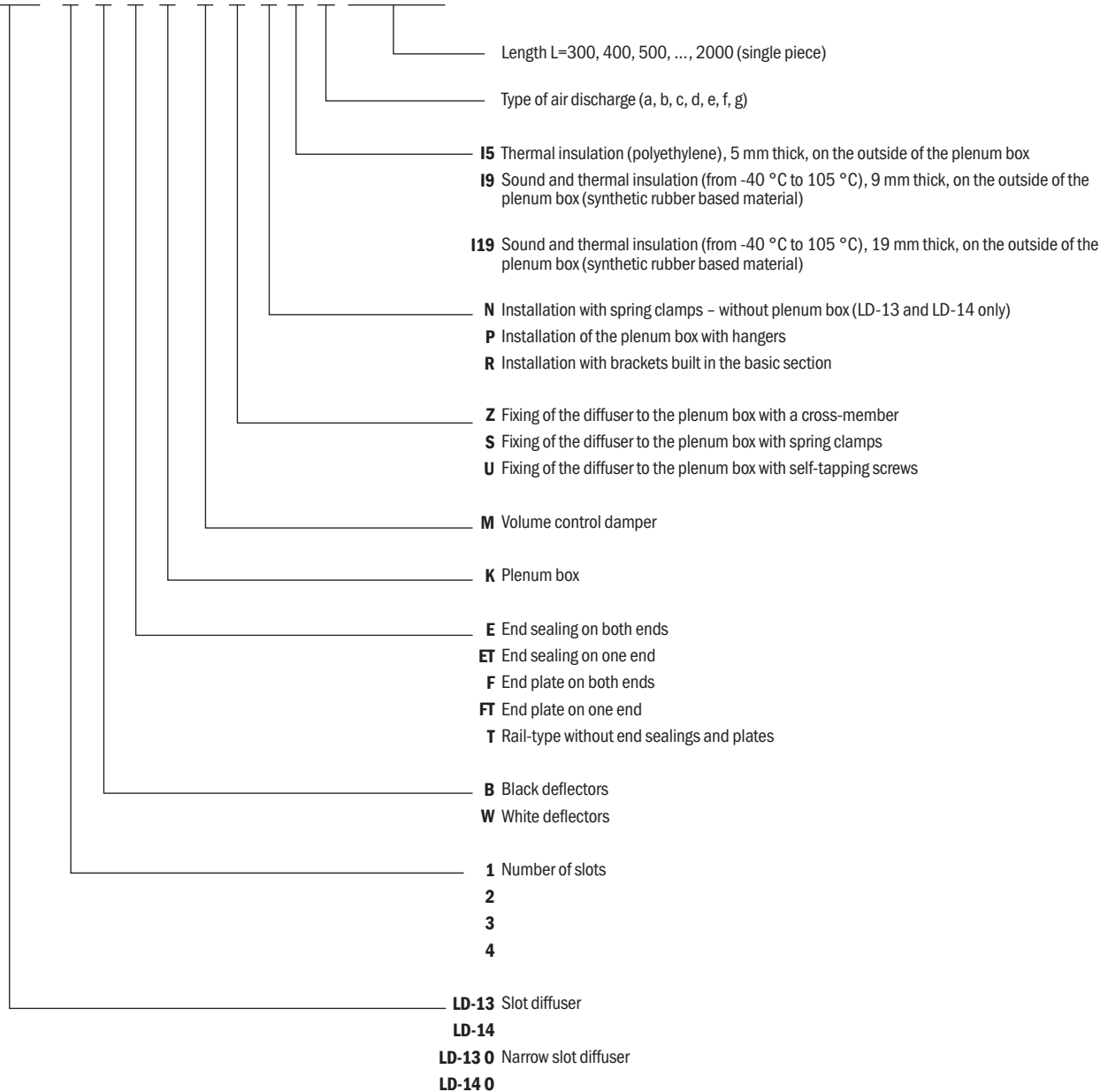


### Every second row

2. Adjustment of deflectors for cold air supply

### Ordering key

**LD-13/1/B/E/K/M/S/P/I/g L=1700**



#### Note:

- Please specify the deflector colour in your order.
- Standard eloxal colour of the aluminium section is the original aluminium colour. Other colours shall be specified in the order.
- For the LD-13 0 and LD-14 0 type, the following end seals are available: F, FT and T.
- When installing in cooling ceilings, consult the manufacturer.
- In the case the slot diffuser is ordered complete with plenum box, the air jet configuration is set as shown on the drawing on page 184.
- Versions with insulation on the inside of the plenum box are also available.

## Wall mounted slot diffusers

### LD-13S and LD-14S

#### Application

Designed for installation in plasterboard walls with a thickness of 100 mm or more. These are used for the supply of air in rooms with ceiling heights of 2.5 to 4 m. Suitable for cooling as well as for heating, especially in rooms with elevated comfort requirements. They may also be used to discharge the air from the room, and enable a high level of induction.

#### Description

Inlet or outlet connection may be in the plenum box above the ventilated room or on the other side of the wall. On the diffuser side, the plenum box is sound-insulated, lowering the level of noise emissions in the ventilated room.

#### Component parts

1. front chamber connection (KF)
- 1'. rear chamber connection (KB)
2. slot diffuser LD-13S or LD-14S
3. sound insulation
4. plenum box

#### Plenum box

Despite its low height, it assures sufficient air distribution in the direction from the plenum box connection to LD-13 or D-14 across the entire length of the diffuser. It can be installed in plasterboard walls with a minimum thickness of 100 mm. Design allows installation and placement on metal profile brackets of internal plasterboard walls.

#### Front plenum box connection

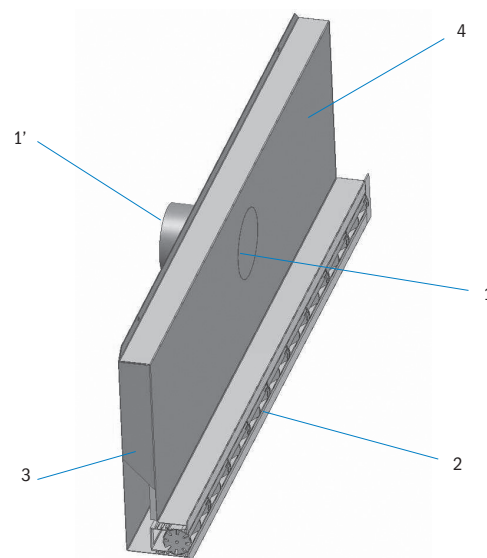
Front plenum box connection allows air inlet and outlet above the suspended ceiling of the ventilated room. This assures a certain competitive advantage, as there is no need to adjust the duct network to the diffuser placement.

#### Rear plenum box connection

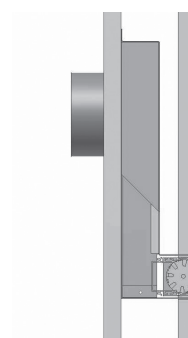
Rear side connection allows air inlet and outlet through the neighboring room. Due to the height of the connector according to LD-13 or LD-14, the duct network can be placed above the suspended ceiling.

#### Sound insulation

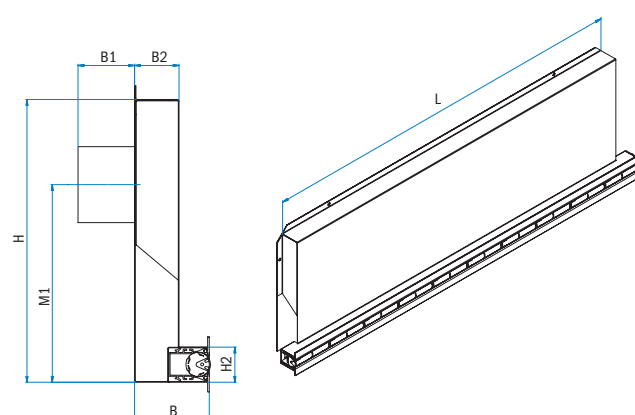
Sound insulation has enhanced absorption properties and prevents the spreading of emissions from the duct network into the ventilated room. The insulation placement effectively reduces internal noise generation in the entire plenum box, particularly on the location of the inlet jet through the connection.



#### Installation in the plasterboard



#### Dimensions

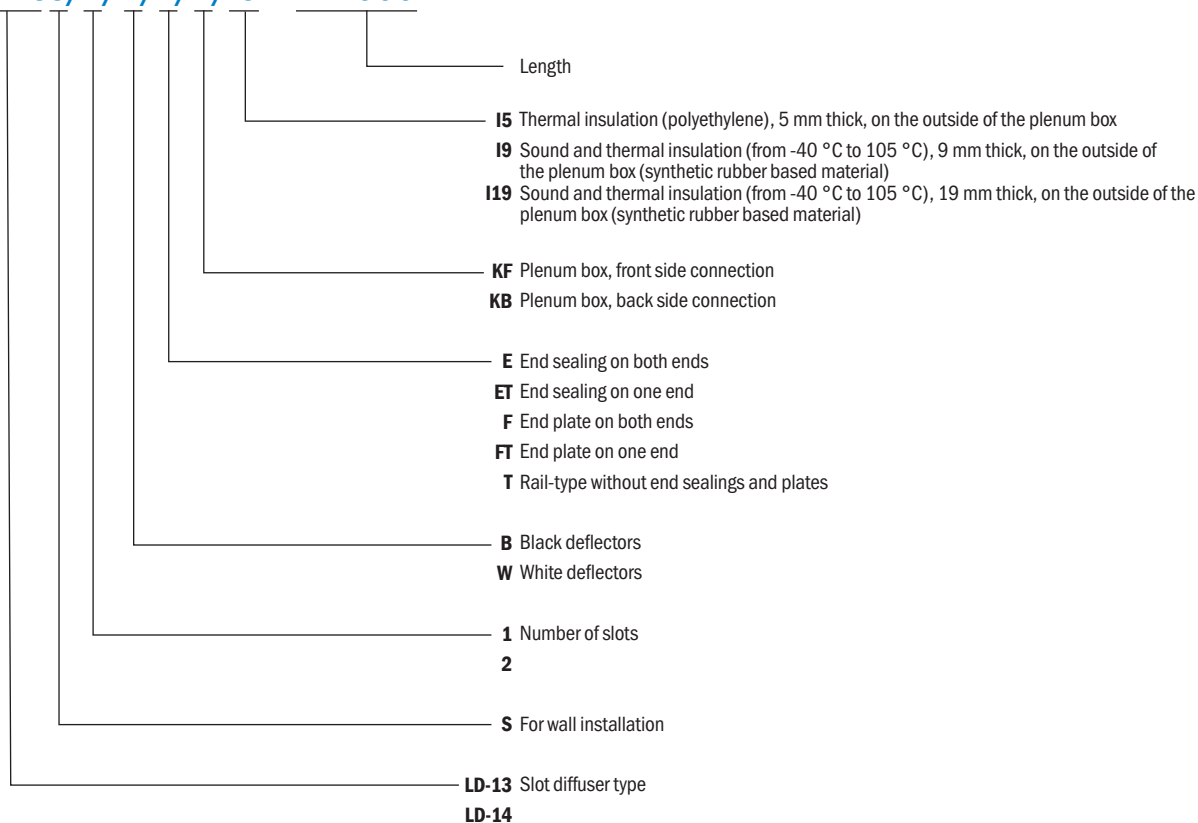


	H (mm)	H1 (mm)	H2 (mm)	B (mm)	B1 (mm)	B2 (mm)	L (mm)	ΦD (mm)
LD-13S/1	289	203	40	75	58	45	1000	98
LD-14S/1	289	203	74	75	58	45	1000	123
LD-13S/2	289	203	51	75	58	45	1000	138
LD-14S/2	289	203	96	75	58	45	1000	158



### Ordering key

**LD-13S/1/B/E/K/I5 L =1000**



#### Note:

- Please specify the deflector colour in your order.
- Standard eloxal colour of the aluminium section is the original aluminium colour. Other colours shall be specified in the order.
- Versions with insulation on the inside of the plenum box are also available.

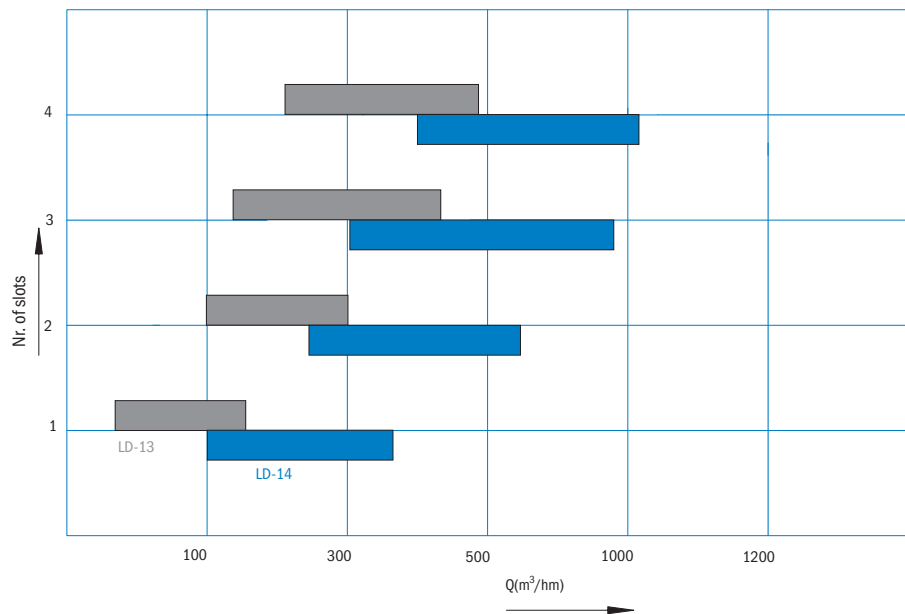


### Fast selection diagram:

$L_{WA} < 35 \text{ dB(A)}$

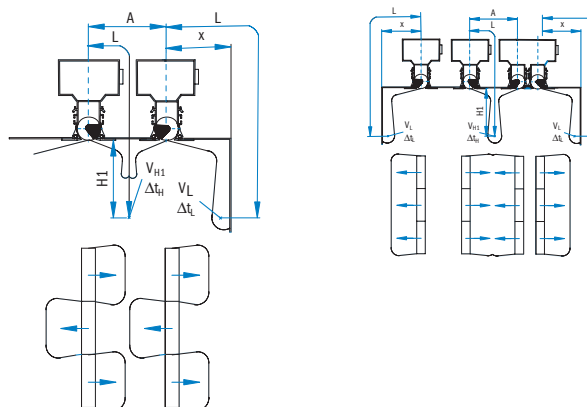
Technical specifications for one-slot diffuser, per meter of length, at horizontal discharge

	A(m <sup>2</sup> )	Q(m <sup>3</sup> /h)	L <sub>WA</sub> (dB)
<b>LD-13</b>	0.0092	135	34
<b>LD-14</b>	0.0136	210	28



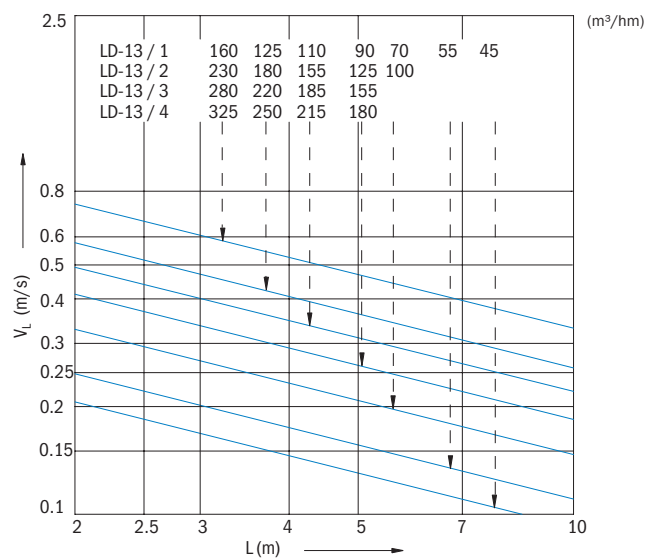
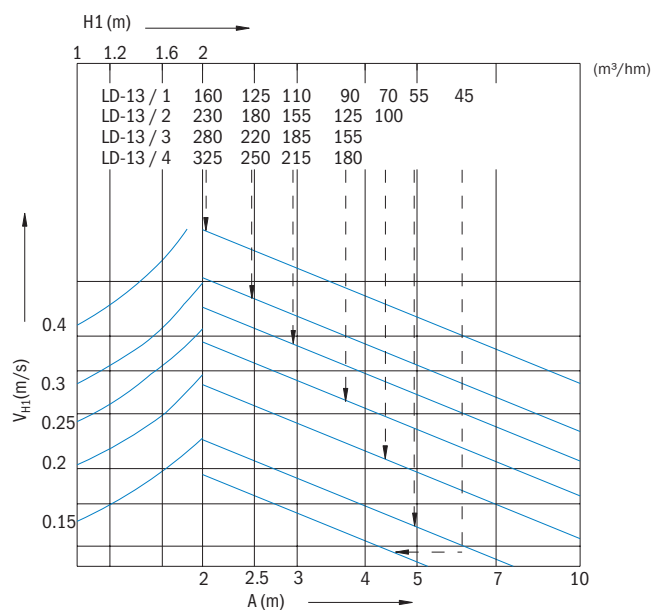
### Definition of symbols

<b>Q (m<sup>3</sup>/hm)</b>	Air flow rate to length
<b>x (m)</b>	Horizontal distance to the wall
<b>H (m)</b>	Room height
<b>L (m)</b>	Throw distance (L=H1+x)
<b>VL (m/s)</b>	Air velocity at the throw distance L
<b>Δt<sub>s</sub> (K)</b>	Temperature difference between the supply and room air
<b>Δt<sub>c</sub> (K)</b>	Difference between the core and room air temperature
<b>Δp (Pa)</b>	Pressure drop
<b>L<sub>WA</sub> (dB(A))</b>	Sound power level
<b>v<sub>H1</sub> (m/s)</b>	Air velocity at the distance H1
<b>A, B (m)</b>	Distance between diffusers, in length and in width
<b>H1 (m)</b>	Throw distance

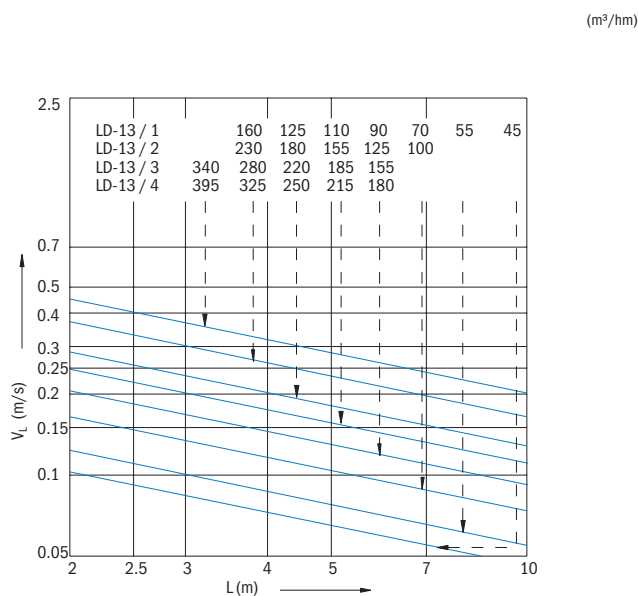
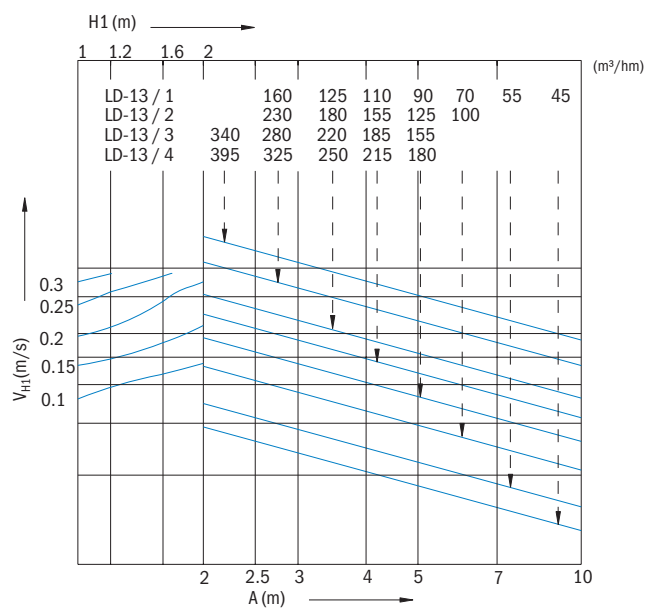


## Air velocity diagrams for LD-13, at different throw distances

### One or two sided horizontal discharge

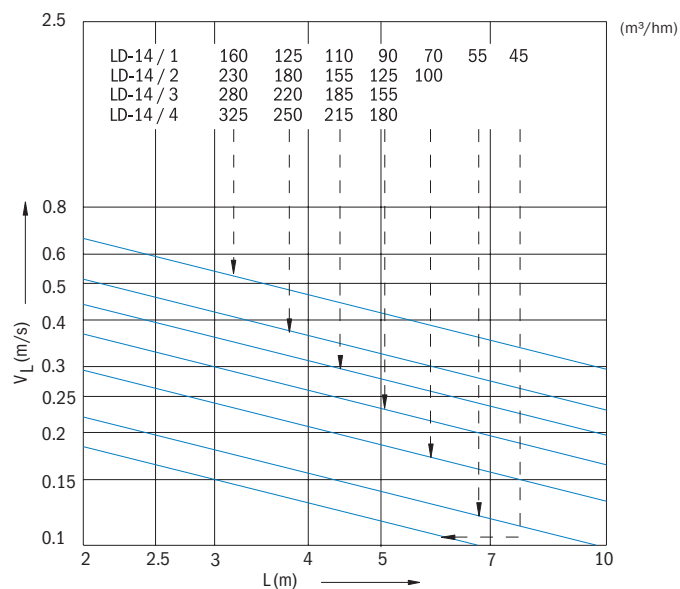
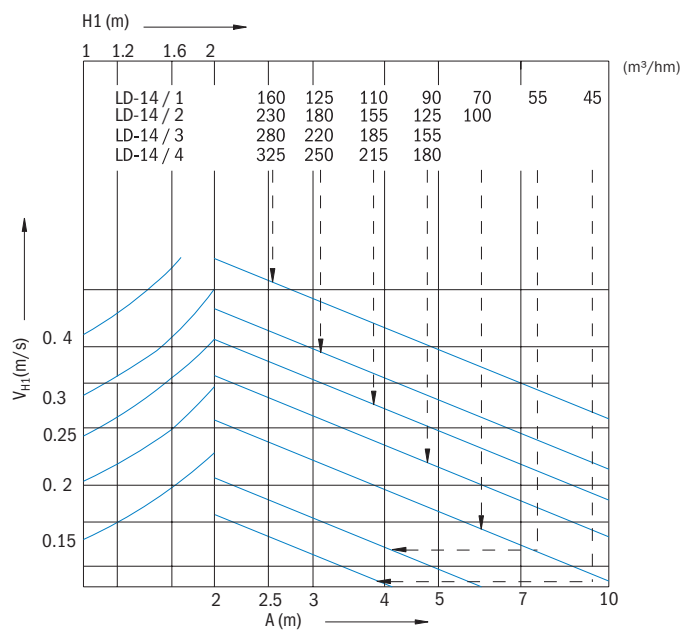


### Alternate sided horizontal discharge

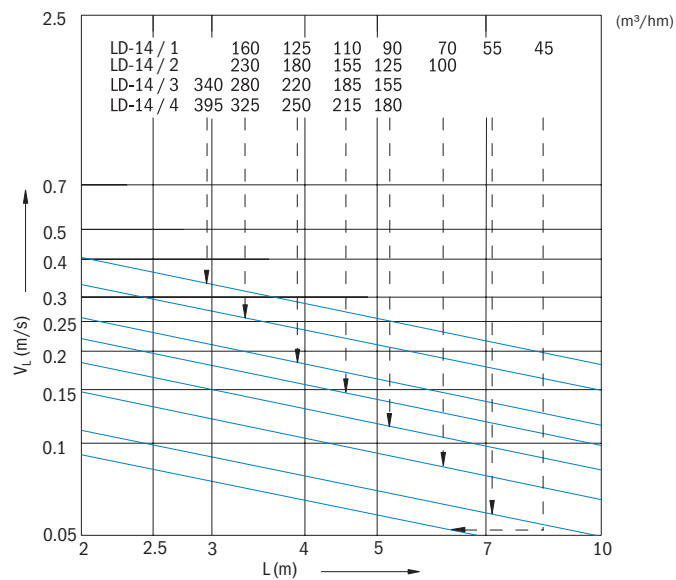
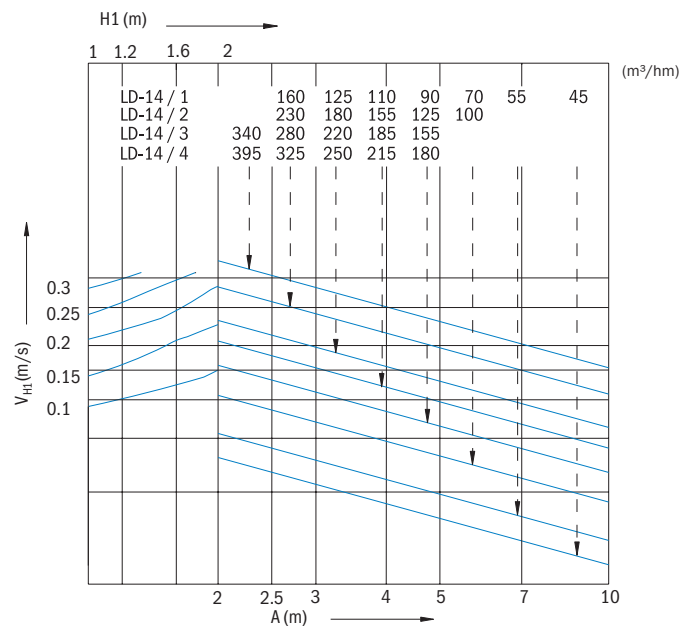


## Air velocity diagrams for LD-14, at different throw distances

## One or two sided horizontal discharge

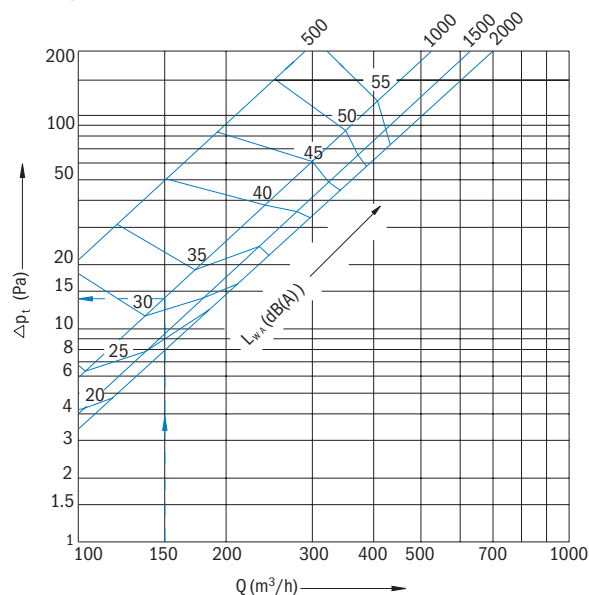


## Alternate sided horizontal discharge

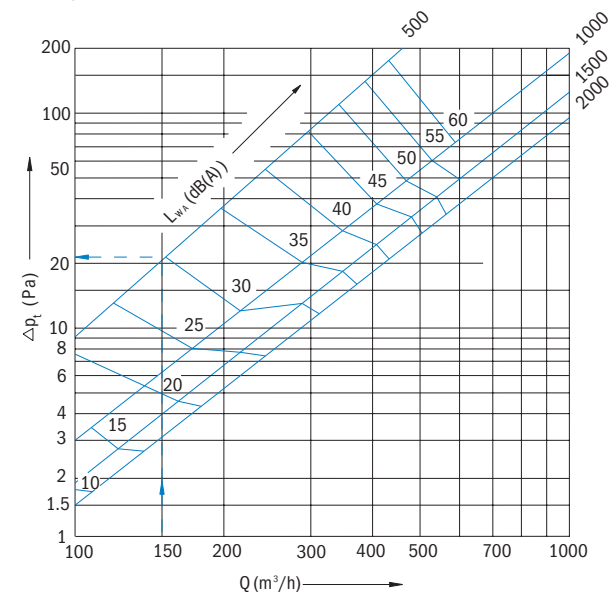


## Sound power level and pressure drop

LD 13/1



LD 13/2



Correction factors applicable to LD-13/1

Type of discharge	Vertical		Horizontal	
	Open	Closed	Open	Closed
Flow rate control damper				
<b>L=500</b>	x 1	x 1.44	x 0.87	x 1.34
<b>L=1000</b>	x 1	x 3.30	x 0.85	x 3.02
<b>L=1500</b>	x 1	x 5.26	x 0.84	x 4.47
<b>L=2000</b>	x 1	x 7.37	x 0.81	x 5.68

Correction factors applicable to LD-13/2

Type of discharge	Vertical		Horizontal	
	Open	Closed	Open	Closed
Flow rate control damper				
<b>L=500</b>	x 1	x 1.91	x 0.86	x 1.79
<b>L=1000</b>	x 1	x 5.91	x 0.70	x 5.31
<b>L=1500</b>	x 1	x 9.88	x 0.58	x 8.67
<b>L=2000</b>	x 1	x 14.10	x 0.47	x 11.99

### Example

$Q = 150 \text{ m}^3/\text{h}$

$L = 1000 \text{ mm}$

$\Delta p_t = 14 \text{ Pa}$  (vertical; damper opened)

$\Delta p_t = 14 \times 3.30 = 46.2 \text{ Pa}$  (vertical; damper closed)

$\Delta p_t = 14 \times 0.85 = 11.9 \text{ Pa}$  (horizontal; damper opened)

$\Delta p_t = 14 \times 3.02 = 42.3 \text{ Pa}$  (horizontal; damper closed)

$L_{WA} = 32 \text{ dB(A)}$

### Example

$Q = 150 \text{ m}^3/\text{h}$

$L = 500 \text{ mm}$

$\Delta p_t = 22 \text{ Pa}$  (vertical; damper opened)

$\Delta p_t = 22 \times 1.91 = 42.0 \text{ Pa}$  (vertical; damper closed)

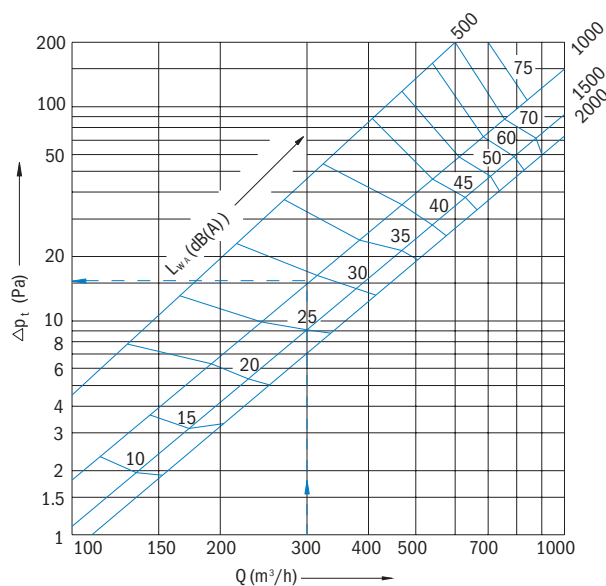
$\Delta p_t = 22 \times 0.86 = 18.9 \text{ Pa}$  (horizontal; damper opened)

$\Delta p_t = 22 \times 1.79 = 39.4 \text{ Pa}$  (horizontal; damper closed)

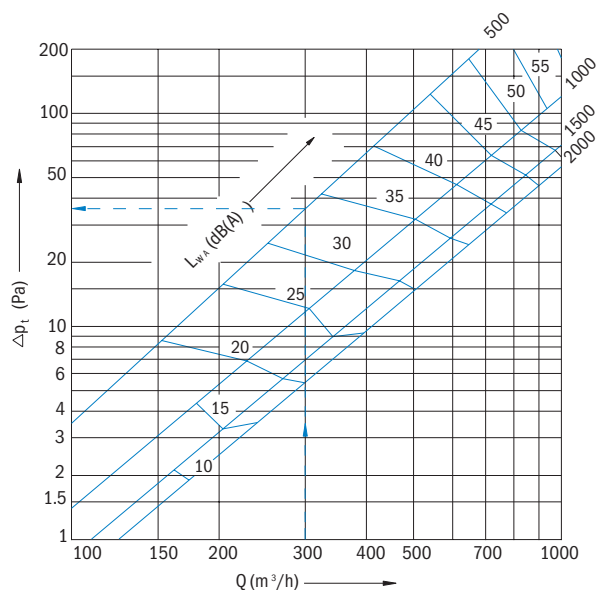
$L_{WA} = 30 \text{ dB(A)}$

## Sound power level and pressure drop

LD 13/3



LD 13/4



Correction factors applicable to LD-13/3

Type of discharge	Vertical		Horizontal	
	Open	Closed	Open	Closed
Flow rate control damper				
<b>L=500</b>	x 1	x 2.37	x 0.84	x 2.24
<b>L=1000</b>	x 1	x 8.52	x 0.56	x 7.59
<b>L=1500</b>	x 1	x 14.50	x 0.32	x 12.86
<b>L=2000</b>	x 1	x 20.82	x 0.18	x 18.29

Correction factors applicable to LD-13/4

Type of discharge	Vertical		Horizontal	
	Open	Closed	Open	Closed
Flow rate control damper				
<b>L=500</b>	x 1	x 3.08	x 0.70	x 2.91
<b>L=1000</b>	x 1	x 11.07	x 0.47	x 9.87
<b>L=1500</b>	x 1	x 18.85	x 0.27	x 16.72
<b>L=2000</b>	x 1	x 27.07	x 0.15	x 23.78

**Example**

Q = 300 m³/h

L = 1000 mm

 $\Delta p_t = 15$  Pa (vertical; damper opened) $\Delta p_t = 15 \times 8.52 = 127.8$  Pa (vertical; damper closed) $\Delta p_t = 15 \times 0.56 = 8.4$  Pa (horizontal; damper opened) $\Delta p_t = 15 \times 7.59 = 113.8$  Pa (horizontal; damper closed) $L_{WA} = 29$  dB(A)**Example**

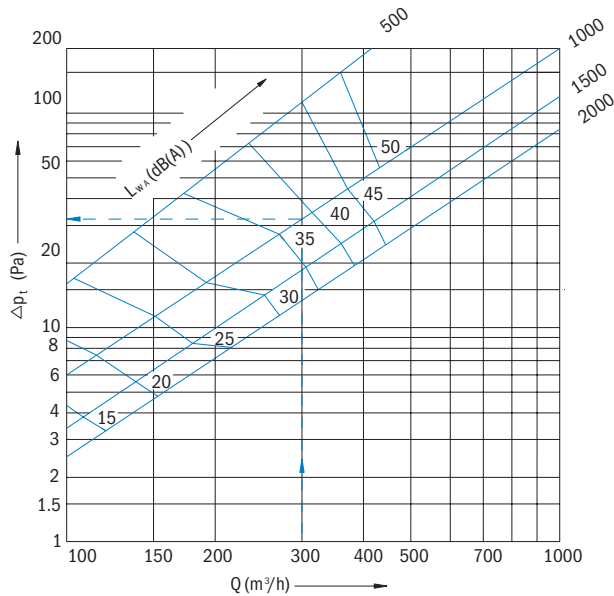
Q = 300 m³/h

L = 500 mm

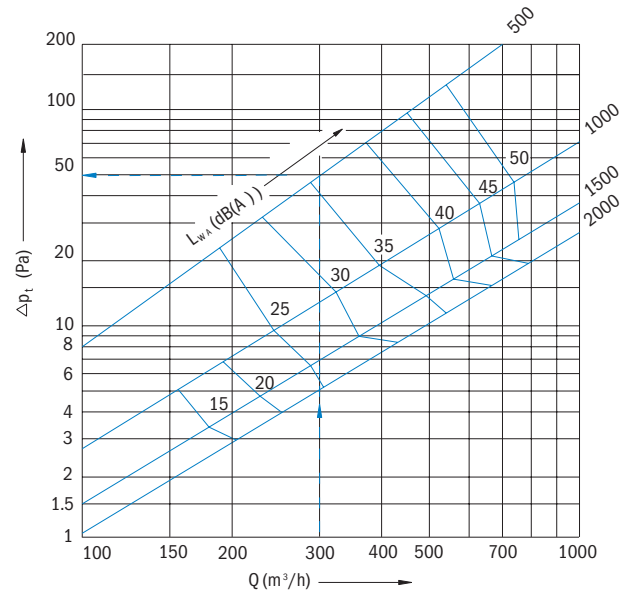
 $\Delta p_t = 35$  Pa (vertical; damper opened) $\Delta p_t = 35 \times 3.08 = 107.8$  Pa (vertical; damper closed) $\Delta p_t = 35 \times 0.70 = 24.5$  Pa (horizontal; damper opened) $\Delta p_t = 35 \times 2.91 = 101.8$  Pa (horizontal; damper closed) $L_{WA} = 33$  dB(A)

## Sound power level and pressure drop

### LD 14/1



### LD 14/2



### Correction factors applicable to LD-14/1

Type of discharge	Vertical		Horizontal	
	Open	Closed	Open	Closed
Flow rate control damper				
<b>L=500</b>	x 1	x 1.81	x 0.76	x 1.31
<b>L=1000</b>	x 1	x 3.83	x 0.42	x 3.23
<b>L=1500</b>	x 1	x 5.80	x 0.28	x 5.11
<b>L=2000</b>	x 1	x 7.87	x 0.19	x 7.07

### Correction factors applicable to LD-14/2

Type of discharge	Vertical		Horizontal	
	Open	Closed	Open	Closed
Flow rate control damper				
<b>L=500</b>	x 1	x 2.11	x 0.53	x 1.59
<b>L=1000</b>	x 1	x 8.84	x 0.29	x 7.96
<b>L=1500</b>	x 1	x 15.36	x 0.20	x 14.14
<b>L=2000</b>	x 1	x 22.32	x 0.14	x 20.70

#### Example

$Q = 300 \text{ m}^3/\text{h}$

$L = 1000 \text{ mm}$

$\Delta p_t = 33 \text{ Pa}$  (vertical; damper opened)

$\Delta p_t = 33 \times 3.83 = 126.4 \text{ Pa}$  (vertical; damper closed)

$\Delta p_t = 33 \times 0.42 = 14.0 \text{ Pa}$  (horizontal; damper opened)

$\Delta p_t = 33 \times 3.23 = 107.0 \text{ Pa}$  (horizontal; damper closed)

$L_{WA} = 38 \text{ dB(A)}$

#### Example

$Q = 300 \text{ m}^3/\text{h}$

$L = 500 \text{ mm}$

$\Delta p_t = 47 \text{ Pa}$  (vertical; damper opened)

$\Delta p_t = 47 \times 2.11 = 99.2 \text{ Pa}$  (vertical; damper closed)

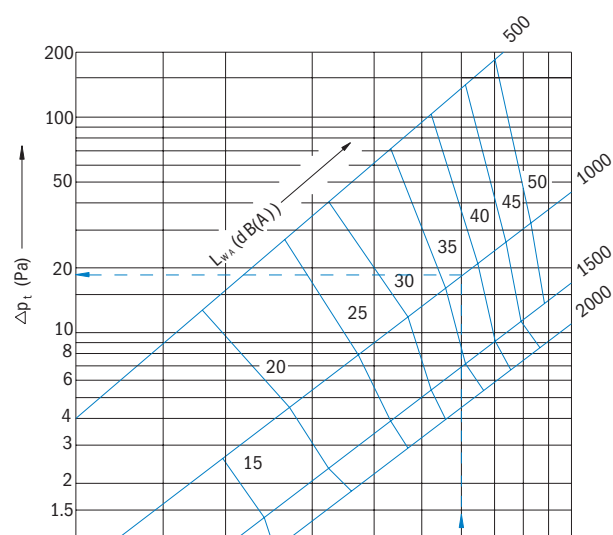
$\Delta p_t = 47 \times 0.53 = 24.9 \text{ Pa}$  (horizontal; damper opened)

$\Delta p_t = 47 \times 1.59 = 74.7 \text{ Pa}$  (horizontal; damper closed)

$L_{WA} = 36 \text{ dB(A)}$

## Sound power level and pressure drop

## LD 14/3



## Correction factors applicable to LD-14/3

Type of discharge	Vertical		Horizontal	
	Open	Closed	Open	Closed
Flow rate control damper				
<b>L=500</b>	x 1	x 2.41	x 0.33	x 1.87
<b>L=1000</b>	x 1	x 13.86	x 0.19	x 12.69
<b>L=1500</b>	x 1	x 24.92	x 0.16	x 23.17
<b>L=2000</b>	x 1	x 36.76	x 0.13	x 31.33

**Example**

$Q = 600 \text{ m}^3/\text{h}$

$L = 1000 \text{ mm}$

$\Delta p_t = 18 \text{ Pa}$  (vertical; damper opened)

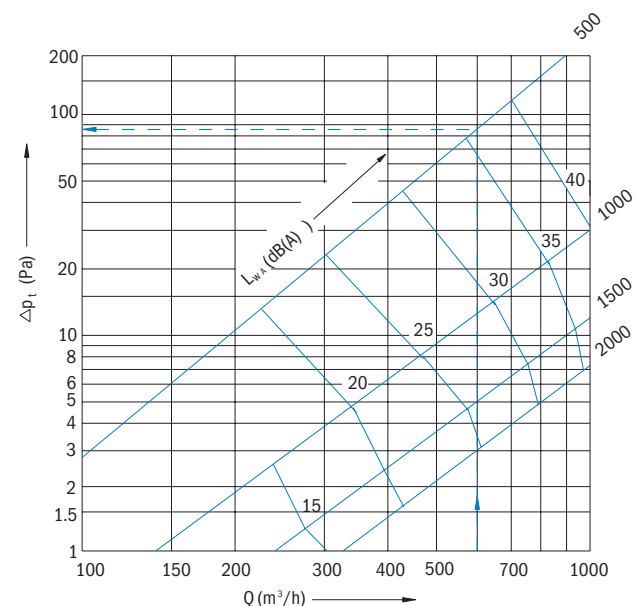
$\Delta p_t = 18 \times 13.86 = 249.5 \text{ Pa}$  (vertical; damper closed)

$\Delta p_t = 18 \times 0.19 = 3.4 \text{ Pa}$  (horizontal; damper opened)

$\Delta p_t = 18 \times 12.69 = 228.4 \text{ Pa}$  (horizontal; damper closed)

$L_{WA} = 38 \text{ dB(A)}$

## LD 14/4



## Correction factors applicable to LD-14/4

Type of discharge	Vertical		Horizontal	
	Open	Closed	Open	Closed
Flow rate control damper				
<b>L=500</b>	x 1	x 3.14	x 0.28	x 2.43
<b>L=1000</b>	x 1	x 18.02	x 0.15	x 16.50
<b>L=1500</b>	x 1	x 32.34	x 0.13	x 28.12
<b>L=2000</b>	x 1	x 47.79	x 0.10	x 39.63

**Example**

$Q = 600 \text{ m}^3/\text{h}$

$L = 500 \text{ mm}$

$\Delta p_t = 70 \text{ Pa}$  (vertical; damper opened)

$\Delta p_t = 70 \times 3.14 = 219.8 \text{ Pa}$  (vertical; damper closed)

$\Delta p_t = 70 \times 0.28 = 19.6 \text{ Pa}$  (horizontal; damper opened)

$\Delta p_t = 70 \times 2.43 = 170.1 \text{ Pa}$  (horizontal; damper closed)

$L_{WA} = 36 \text{ dB(A)}$