

# KOOLAIR

## series

# KFD-KLD

## Linear slot diffusers

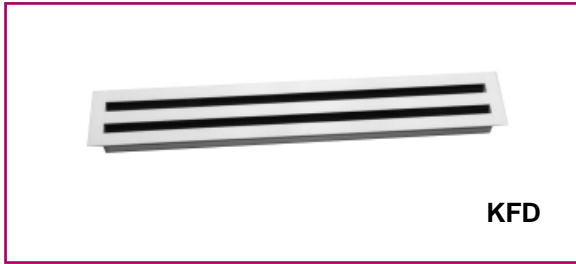


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# KFD linear slot diffusers



## Description

KFD model, linear slot diffuser for variable and constant volume designed especially to maintain the ceiling effect (Coanda effect) even with primary air flows reduced to 20% of the nominal flow. Complete with adjustable directional blades, with closing thermal fuses which close the air output when the air temperature exceeds 70° C.

## Finishes

Extruded aluminium profiles, pre-lacquered in RAL-9010 white. Directional blades in black. Special finishes available upon request.

## Description

The KFD-P model is a diffuser with a fixed plenum box manufactured in galvanised steel sheeting. Plenum boxes can be manufactured with thermo-acoustic insulation upon request.

## Utilisation

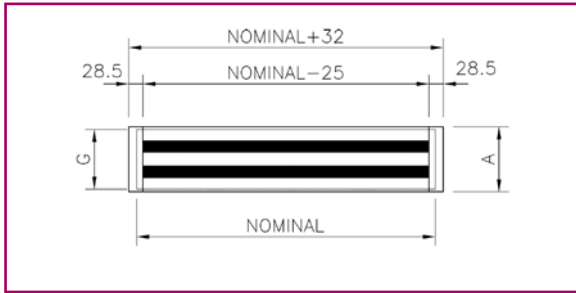
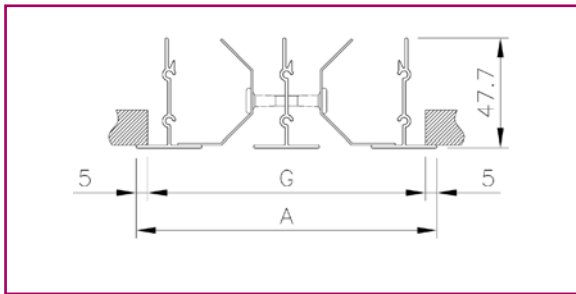
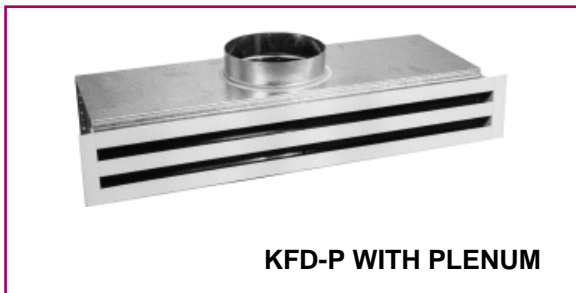
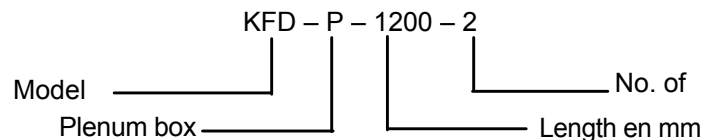
Ceiling installation. Especially suited to variable air flow, although its design also enables it to work perfectly with a constant flow. Adjustable and reversible blades with closing thermal fuses when air temperature exceeds 70 °C. Ideal accessory for KOOLAIR, KS model variable air volume terminal units (boxes).

## Dimensions

As regards length, the nominal size of the diffuser is the dimension of the opening. The diffuser dimensions are normally adapted to the needs of any ceilings or suspended ceilings. They can be manufactured to incorporate active and inactive sections. For general dimensions see page 8.

## Product code

Example:



<b>KFD</b>	Aluminium linear slot diffuser model
<b>1</b>	No. of slots..
<b>2</b>	
<b>3</b>	
<b>4</b>	
<b>5</b>	
<b>6</b>	
<b>P</b>	With Plenum.
<b>-</b>	Without Plenum.
<b>L</b>	Nominal or opening length. From 600 to 2000 in one single module

## Diffuser selection

### Selection

For a specific air flow, selection must take the noise level and the throw for the desired terminal velocity into consideration. The throws (X) which are shown in TABLE 1 correspond to a maximum velocity of 0.25 m/s in the occupied zone.

The selection table is for diffusers with ALL THE SLOTS SUPPLYING AIR IN THE SAME DIRECTION. When selection requires supply in TWO directions, the air flow has to be separated and selected using that which corresponds to each direction.

For a diffuser measuring 1200 mm in length and with 4 slots supplying a total air flow of 1000 m<sup>3</sup>/h in two directions, a diffuser of 1200 mm in length with 2 slots and 500 m<sup>3</sup>/h shall be selected from the table. In this way, diffusers with more than one slot and two directions can be selected. Please enquire about diffusers with more than 6 slots.

### Tests

These selection tables are based on real laboratory tests in conformity with UNE-EN 12238, UNE-EN ISO 3741 and UNE- EN ISO 5135 standards.

The diffuser has been aligned with the ceiling, next to the wall, in a room where L= length, A= width and l= diffuser length.

$$(A - l) / L = 0,5$$

-The air jet is adherent and the diffuser is mounted at ceiling level.

- Pressure P is measured in the duct before the plenum box.

- The room height is 3 ± 0.5 m.

- The Δt is equal to 0 °C (Isothermal conditions).

- The sound power level dB(A) have been obtained via tests carried out in a reverberating chamber built according to ISO 3741 standards.

- The maximum velocity in occupied zone (V<sub>z</sub>) is 0.25 m/s.

### Example:

Required specifications:

Air flow rate: \_\_\_\_\_ 600 m<sup>3</sup>/h

Throw: \_\_\_\_\_ 6 m

Required sound power level (maximum): \_\_\_\_\_ 40 dB(A)

Required pressure drop (lower than): \_\_\_\_\_ 20 Pa

No. of slots: \_\_\_\_\_ 4

### Solution

In table 1, and for an air flow rate of 600 m<sup>3</sup>/h, we can select a 4 slot diffuser measuring 1000 mm in length with which we will obtain:

Air flow rate: \_\_\_\_\_ 600 m<sup>3</sup>/h

Throw (X): \_\_\_\_\_ 5,3 m

Sound power level: \_\_\_\_\_ 38 dB(A)

Pressure drop: \_\_\_\_\_ 9 Pa

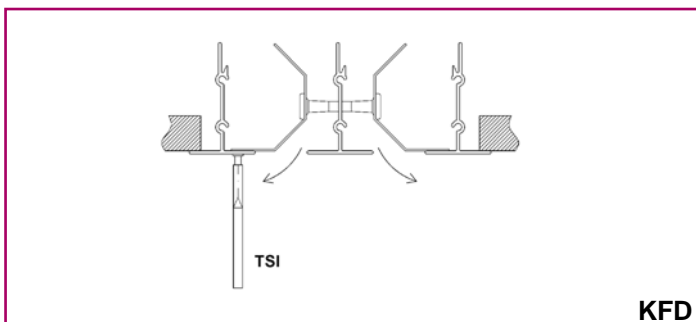
No. of slots: \_\_\_\_\_ 4

# KFD diffuser selection table

KFD		Lenght and nº of slots																	
Q		Dim. [m m]	600-1	900-1	1000-1	600-2	1500-1	600-3	1000-2	600-4	900-3	1000-3	900-4	1000-4	1500-3	1200-4	1500-4		
[m³/h]	[l/s]	A <sub>k</sub> [m²]	0,0057	0,0086	0,0096	0,0115	0,0144	0,0172	0,0191	0,0230	0,0258	0,0287	0,0345	0,0383	0,0431	0,0459	0,0574		
50	13,9	V <sub>k</sub> [m/s]	2,4																
		X [m]	1,4																
		P <sub>t</sub> [Pa]	3																
		dB(A)	<20																
70	19,4	V <sub>k</sub> [m/s]	3,4	2,3	2,0	1,7													
		X [m]	1,9	1,6	1,5	1,3													
		P <sub>t</sub> [Pa]	5	2	2	1													
		dB(A)	26	<20	<20	<20													
100	27,8	V <sub>k</sub> [m/s]	4,8	3,2	2,9	2,4	1,9	1,6											
		X [m]	2,7	2,2	2,1	1,9	1,7	1,6											
		P <sub>t</sub> [Pa]	11	5	4	3	2	1											
		dB(A)	33	26	25	22	<20	<20											
130	36,1	V <sub>k</sub> [m/s]	6,3	4,2	3,8	3,1	2,5	2,1	1,9	1,6									
		X [m]	3,5	2,9	2,7	2,5	2,2	2,0	1,9	1,8									
		P <sub>t</sub> [Pa]	19	8	7	5	3	2	2	1									
		dB(A)	38	32	30	27	23	21	<20	<20									
160	44,4	V <sub>k</sub> [m/s]	7,7	5,2	4,6	3,9	3,1	2,6	2,3	1,9	1,7	1,5							
		X [m]	4,3	3,5	3,4	3,1	2,7	2,5	2,4	2,2	2,0	1,9							
		P <sub>t</sub> [Pa]	28	13	10	7	5	3	3	2	1								
		dB(A)	42	36	34	31	27	25	23	20	<20	<20							
200	55,6	V <sub>k</sub> [m/s]	9,7	6,5	5,8	4,8	3,9	3,2	2,9	2,4	2,1	1,9	1,6	1,5					
		X [m]	5,4	4,4	4,2	3,8	3,4	3,1	3,0	2,7	2,6	2,4	2,2	2,1					
		P <sub>t</sub> [Pa]	44	20	16	11	7	5	4	3	2	2	1	1					
		dB(A)	46	40	38	35	32	29	27	24	23	21	<20	<20					
250	69,4	V <sub>k</sub> [m/s]		8,1	7,3	6,0	4,8	4,0	3,6	3,0	2,7	2,4	2,0	1,8	1,6	1,5			
		X [m]		5,5	5,3	4,8	4,3	3,9	3,7	3,4	3,2	3,0	2,8	2,6	2,5	2,4			
		P <sub>t</sub> [Pa]		31	25	17	11	8	6	4	3	3	2	2	1	1			
		dB(A)		44	43	40	36	33	32	29	27	25	22	21	<20	<20			
300	83,3	V <sub>k</sub> [m/s]		9,7	8,7	7,3	5,8	4,8	4,4	3,6	3,2	2,9	2,4	2,2	1,9	1,8	1,5		
		X [m]		6,6	6,3	5,8	5,1	4,7	4,5	4,1	3,8	3,6	3,3	3,2	3,0	2,9	2,6		
		P <sub>t</sub> [Pa]		44	36	25	16	11	9	6	5	4	3	2	2	2	1	1	
		dB(A)		48	46	43	40	37	35	32	30	29	26	24	22	21	<20	<20	
400	111,1	V <sub>k</sub> [m/s]				9,7	7,7	6,4	5,8	4,8	4,3	3,9	3,2	2,9	2,6	2,4	1,9		
		X [m]				7,7	6,9	6,3	5,9	5,4	5,1	4,9	4,4	4,2	4,0	3,8	3,4		
		P <sub>t</sub> [Pa]				44	28	20	16	11	9	7	5	4	3	3	2		
		dB(A)				49	45	43	41	38	36	34	32	30	28	27	23		
500	138,9	V <sub>k</sub> [m/s]						8,1	7,3	6,0	5,4	4,8	4,0	3,6	3,2	3,0	2,4		
		X [m]						7,8	7,4	6,8	6,4	6,1	5,5	5,3	5,0	4,8	4,3		
		P <sub>t</sub> [Pa]						31	25	17	14	11	8	6	5	4	3		
		dB(A)						47	45	42	41	39	36	34	32	31	28		
600	166,7	V <sub>k</sub> [m/s]								7,3	6,4	5,8	4,8	4,4	3,9	3,6	2,9		
		X [m]								8,1	7,7	7,3	6,6	6,3	5,9	5,8	5,1		
		P <sub>t</sub> [Pa]								25	20	16	11	9	7	6	4		
		dB(A)								46	44	42	40	38	36	35	31		
700	194,4	V <sub>k</sub> [m/s]									7,5	6,8	5,6	5,1	4,5	4,2	3,4		
		X [m]									9,0	8,5	7,8	7,4	6,9	6,7	6,0		
		P <sub>t</sub> [Pa]									27	22	15	12	10	8	5		
		dB(A)									47	45	43	41	39	38	34		
800	222,2	V <sub>k</sub> [m/s]										7,7	6,4	5,8	5,2	4,8	3,9		
		X [m]										9,7	8,9	8,4	7,9	7,7	6,9		
		P <sub>t</sub> [Pa]										28	20	16	13	11	7		
		dB(A)										48	45	44	42	41	37		
900	250,0	V <sub>k</sub> [m/s]											7,3	6,5	5,8	5,4	4,4		
		X [m]											10,0	9,5	8,9	8,6	7,7		
		P <sub>t</sub> [Pa]											25	20	16	14	9		
		dB(A)											48	46	44	43	39		
1000	277,8	V <sub>k</sub> [m/s]												7,3	6,4	6,0	4,8		
		X [m]												10,5	9,9	9,6	8,6		
		P <sub>t</sub> [Pa]													25	20	17	11	
		dB(A)													48	46	45	41	
1200	333,3	V <sub>k</sub> [m/s]															7,3	5,8	
		X [m]															11,5	10,3	
		P <sub>t</sub> [Pa]															25	16	
		dB(A)															49	45	
1400	388,9	V <sub>k</sub> [m/s]																6,8	
		X [m]																12,0	
		P <sub>t</sub> [Pa]																	22
		dB(A)																	48

**Symbols:**  
*V<sub>k</sub>* = Effective velocity in m/s  
*X* = Throw in m  
*P<sub>t</sub>* = Total pressure in Pa  
*dB(A)* = Sound power level  
*A<sub>k</sub>* = Effective area in m²

Table 1



### Air flow measurement

The air flow *q<sub>v</sub>*, shall be obtained by multiplying the effective area of the diffuser (*A<sub>k</sub>*) in m², by the effective velocity at outlet (*V<sub>k</sub>*), measured with a type hot-wire anemometer TSI- VELOCICALC located on the exterior side frame.

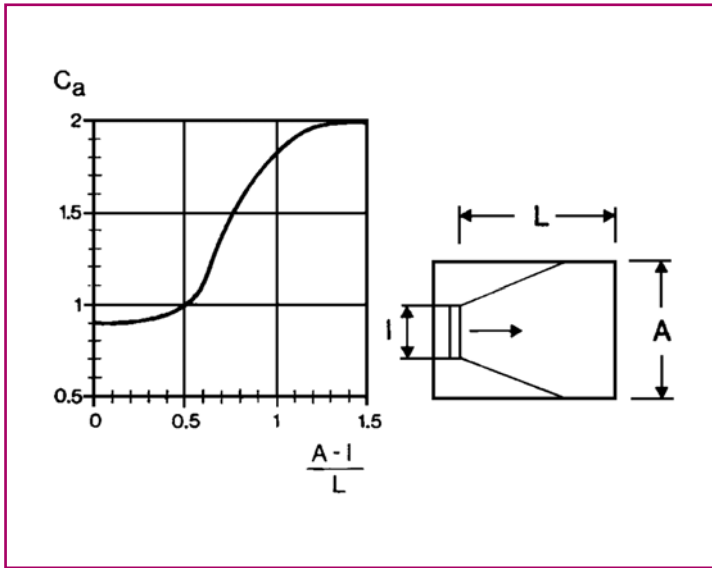
Different measurements must be taken along the perimeter of the diffuser to obtain an average value. The greater the number of measurements, the more accurate the measurement obtained will be.

# Correction factors

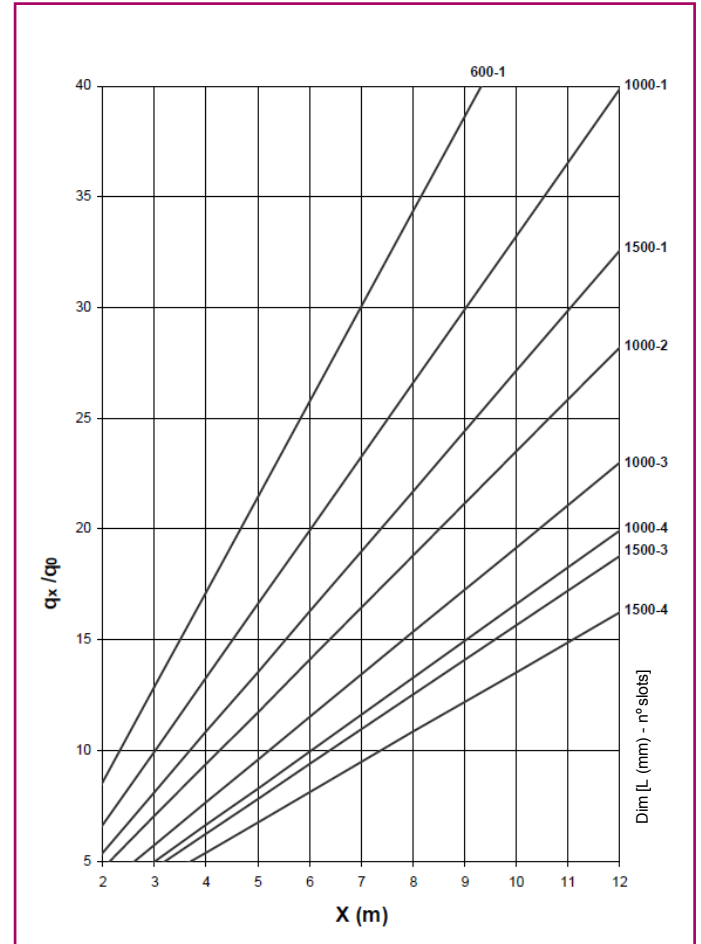
## 1) Throw correction factor for room width/length ratio

$C_a$

This factor is given by the division of the room width minus diffuser length and room length. It is applicable to diffusers with lateral discharge only. For diffusers with vertical discharge  $C_a$  equals 1, since they were tested in a square room ( $A/L = 1$ ).



## Induction rate



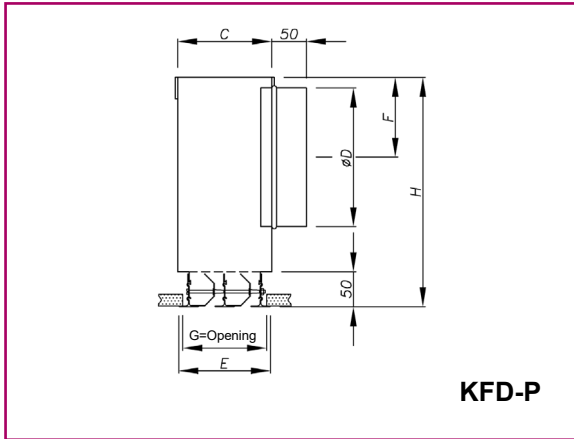
Once the throw is known,  $X$  or  $X_c$ , it is possible to determine the induction coefficient on the graph. For the example on page 5, and as there are no correction factors  $C_a$  and  $C_h$ , the induction coefficient ( $q_x/q_o$ ) when the diffuser supplies the whole of the air flow in the same direction, would be equal to 10.5 and the induced air flow would therefore be:

$$600 \times 10,5 = 6300 \text{ m}^3/\text{h}$$

If the diffuser should supply the air flow in two directions, a correction factor of 1.4 must also be applied. This results in a total induced air flow of:

$$6300 \times 1,4 = 8820 \text{ m}^3/\text{h}$$

# KFD dimensions



KFD-P

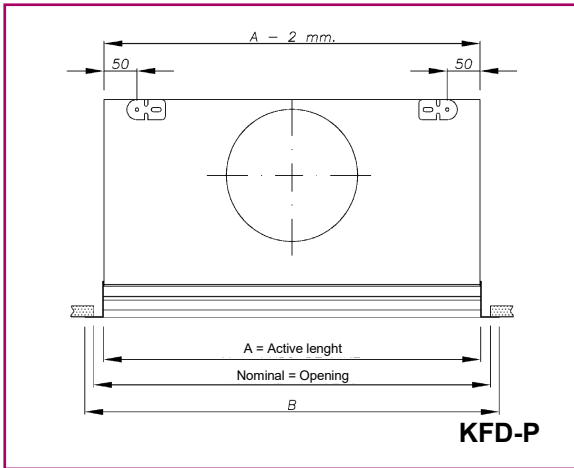
### KFD diffuser with fixed plenum box

Extruded aluminium linear diffuser with galvanized steel plenum box. When supplied, the plenum box (fixed or removable) is screwed to the diffuser.

The top of the plenum box has lugs so it can be fixed to the ceiling. Said lugs are not folded to make transportation easier and must be shaped during on-site assembly.

### Duct inlets

The plenum inlet spigots are standardized according to ISO standards and enable connection of both flexible and rigid ducts. A damper to manually regulate the air flow, which is useful in constant air volumens, can be installed on request.



KFD-P

### Nº of slots

Standard diffusers have 1, 2, 3 or 4 slots. The maximum number of slots that can be built is 6. On manufacture, the direction of the diffuser slots is standard. Discharge from the slots can be directed as required during on-site mounting.

### Dimensions

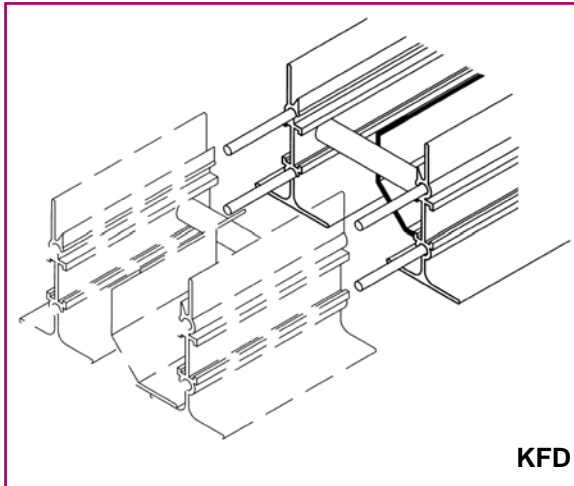
The table below shows standard dimensions of diffusers with plenum boxes.

Under request, plenum boxes may be modified, within certain limits, in order to adapt them to non-standard sizes.

## GENERAL DIMENSIONS KFD-P

SLOTS	1						2						3						4										
MODEL	300	600	900	1000	1200	1500	2000	300	600	900	1000	1200	1500	2000	300	600	900	1000	1200	1500	2000	300	600	900	1000	1200	1500	2000	
L	275	575	875	975	1175	1475	1975	275	575	875	975	1175	1475	1975	275	575	875	975	1175	1475	1975	275	575	875	975	1175	1475	1975	
B	END CUP 8,7 mm	292	592	892	992	1192	1492	1992	292	592	892	992	1192	1492	1992	292	592	892	992	1192	1492	1992	292	592	892	992	1192	1492	1992
	END CUP 28,5 mm	332	632	932	1032	1232	1532	2032	332	632	932	1032	1232	1532	2032	332	632	932	1032	1232	1532	2032	332	632	932	1032	1232	1532	2032
C	83						134						185						236										
E	80						131						181						232										
G	70						121						171						222										
ØD	160						200						250						250										
Nº OF SPIGOTS	1			2			1			2			1			2			1			2							
H	275						330						330						330										
F	95						115						140						140										

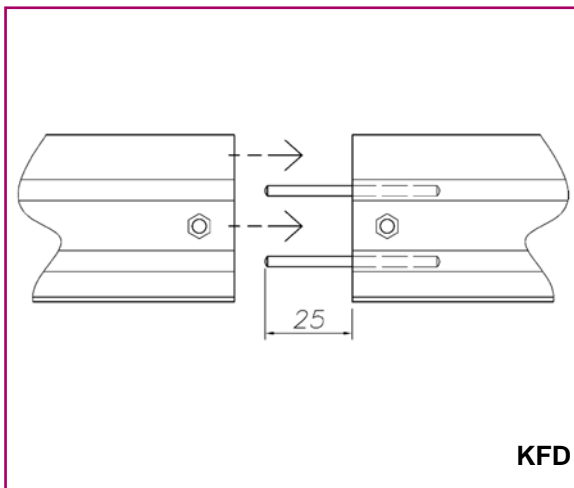
## Connection system and blade unblocking



### Connection system

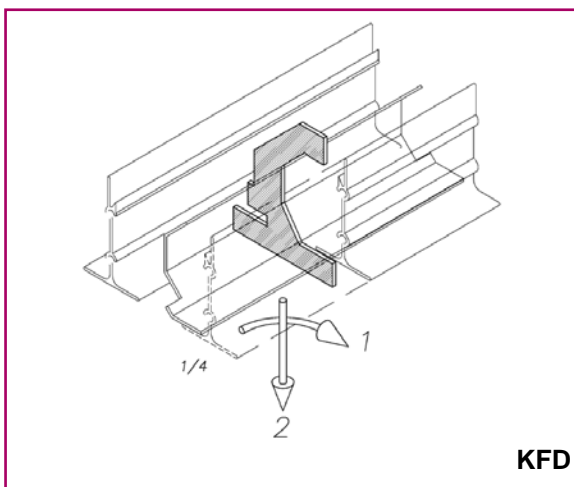
When the diffusers are longer than 2000 mm, they come in separate sections.

The sections are connected lengthwise by using pins located on the exterior profiles, as its show in fig. attached. The pins are fixed under pressure.



### Alignment

Perfect alignment, both vertically and in a straight-line, is achieved by combining the regulation of the plenum box suspension system and joining the different sections of the diffuser using the pins which must be inserted as far as they will go.



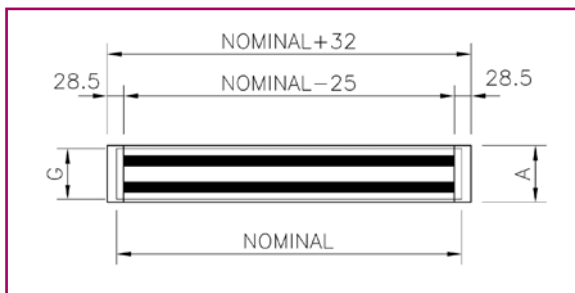
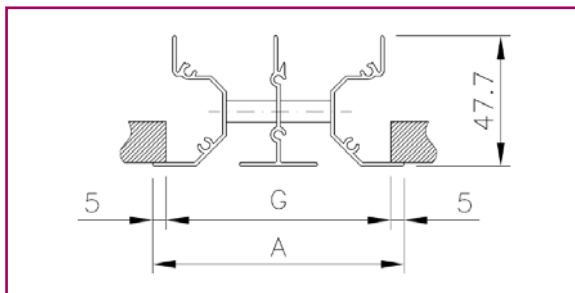
### Blade unblocking

In order to immobilize the adjustable blades during transportation, they are held tight with grey pieces of cardboard. When the diffuser has been installed, rotate the cardboard one quarter turn and pull it downwards.

Check whether the discharge is facing the right direction. If not, remove the blade by pulling it downwards and replace it in the proper direction.



# KLD linear slot diffusers for primary and secondary air flow



<b>KLD</b>	Aluminium linear diffuser slot model.
<b>1</b>	No. of slots.
<b>2</b>	
<b>3</b>	
<b>4</b>	
<b>5</b>	
<b>6</b>	
<b>P</b>	With Plenum.
<b>-</b>	Without Plenum.
<b>L</b>	Nominal or opening length. From 600 to 2000 in one single module

Discharges **See page 13**

## Description

KLD model, linear slot diffuser for variable and constant air flow designed especially to maintain the ceiling effect (Coanda effect) even with primary air flows reduced to 20% of the nominal flow. Fixed directional blades.

## Finishes

Extruded aluminium profiles pre-lacquered in white. RAL-9010. Special finishes upon request.

## Description

The KLD-P model is a diffuser with a fix plenum box manufactured in galvanised steel. Plenum boxes can be manufactured with thermo-acoustic insulation upon request.

## Utilisation

Ceiling installation. Especially suited to variable air flow, although its design enables it to work perfectly with a constant air flow. Fixed directional blades with lateral air flow in one or two directions. This is the ideal accessory for KOOLAIR, KS model variable air flow terminal units (boxes).

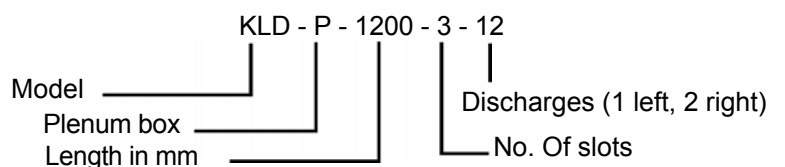
## Dimensions

As regards length, the nominal dimension of the diffuser is the size of the opening. Diffuser dimensions are normally adapted to the needs of any ceilings or suspended ceilings. They can be built to incorporate active and inactive sections. For general dimensions see page 14.

## Product code

The diffusers are supplied with fixed blades, for that reason it is necessary to previously determine the discharge direction of the slots using the number of the discharge code on page 14. This discharge direction **CANNOT BE CHANGED** on site. 28.5 mm end caps are supplied at both ends. 8.7 mm upon request.

Example:



## Diffuser selection

### Selection

For a specific air flow, selection must take the noise level and the throw for the desired terminal velocity into consideration. The throws which appear in TABLE 2 correspond to a maximum velocity of 0.25 m/s in the occupied zone.

The selection table is for diffusers with ALL THE SLOTS SUPPLYING AIR IN THE SAME DIRECTION. When selection requires supply in TWO directions, the air flow has to be separated and selected using that which corresponds to each direction.

For a diffuser measuring 1200 mm in length with 4 slots supplying a total air flow of 1000 m<sup>3</sup>/h in two directions, a 1200 mm long diffuser with 2 slots and 500 m<sup>3</sup>/h shall be selected from the table. In this way, diffusers with more than one slot and two directions can be selected. Please enquire about diffusers with more than 6 slots.

### Tests

These selection tables are based on real laboratory tests in conformity with UNE-EN 12238, UNE- EN ISO 3741 and UNE- EN ISO 5135 standards.

The diffuser has been aligned with the ceiling, next to the wall, in a room where L= length, A= width and l= diffuser length.

$$(A - l) / L = 0,5$$

- The air jet is adherent and the diffuser is mounted at ceiling level.
- Pressure P is measured in the duct before the plenum box.
- The room height is 3 ± 0.5 m.
- The Δt is equal to 0°C (Isothermal conditions).
- The sound power level dB(A) have been obtained via tests carried out in a reverberating chamber built according to ISO 3741 standards.
- The maximum velocity in occupied zone (V<sub>z</sub>) is 0.25 m/s.

### Example:

Required specifications:

Air flow rate: \_\_\_\_\_ 400 m<sup>3</sup>/h  
 Throw: \_\_\_\_\_ 4,5 to 5,5 m  
 Required sound power level (maximum): \_\_\_\_\_ 40 dB(A)  
 Required pressure drop (lower than): \_\_\_\_\_ 20 Pa  
 No. of slots: \_\_\_\_\_ 2

### Solution

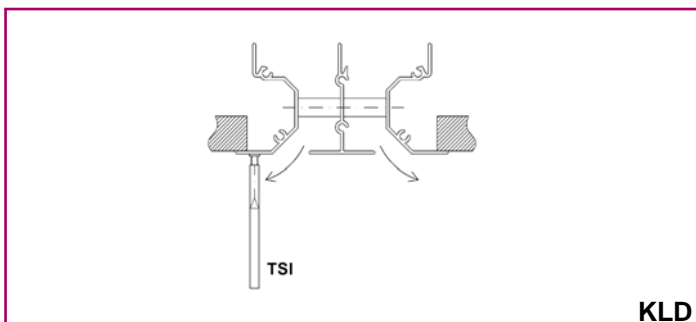
In table 2, and for the air flow requested, we can select a 2 slot diffuser measuring 1200 mm in length with which we will obtain:

Air flow rate: \_\_\_\_\_ 400 m<sup>3</sup>/h  
 Throw (X): \_\_\_\_\_ 5,2 m  
 Sound power level: \_\_\_\_\_ 36 dB(A)  
 Pressure drop: \_\_\_\_\_ 15 Pa  
 No. of slots: \_\_\_\_\_ 2

# KLD diffuser selection table

KLD		Lenght and nº of slots															
		Dim. [m m]	600-1	900-1	1000-1	600-2 1200-1	1500-1	600-3 900-2	1000-2	600-4 1200-2	900-3	1000-3 1500-2	900-4 1200-3	1000-4	1500-3	1200-4	1500-4
Q		A <sub>k</sub> [m <sup>2</sup> ]	0,0054	0,0081	0,0090	0,0109	0,0136	0,0163	0,0181	0,0217	0,0244	0,0272	0,0326	0,0362	0,0407	0,0434	0,0543
[m <sup>3</sup> /h]	[l/s]	V <sub>k</sub> [m/s] X [m] P <sub>t</sub> [Pa] dB(A)															
60	16,7	V <sub>k</sub> [m/s] X [m] P <sub>t</sub> [Pa] dB(A)	3,1 1,6 5 <20														
80	22,2	V <sub>k</sub> [m/s] X [m] P <sub>t</sub> [Pa] dB(A)	4,1 2,1 10 <20	2,7 1,7 4 <20													
100	27,8	V <sub>k</sub> [m/s] X [m] P <sub>t</sub> [Pa] dB(A)	5,1 2,6 15 24	3,4 2,1 7 <20	3,1 2,0 5 <20												
130	36,1	V <sub>k</sub> [m/s] X [m] P <sub>t</sub> [Pa] dB(A)	6,7 3,4 25 32	4,4 2,8 11 24	4,0 2,6 9 22	3,3 2,4 6 <20	2,7 2,1 4 <20										
160	44,4	V <sub>k</sub> [m/s] X [m] P <sub>t</sub> [Pa] dB(A)	8,2 4,2 38 37	5,5 3,4 17 30	4,9 3,2 14 28	4,1 3,0 10 24	3,3 2,6 6 <20	2,7 2,4 4 <20	2,5 2,3 3 <20	2,0 2,1 2 <20							
200	55,6	V <sub>k</sub> [m/s] X [m] P <sub>t</sub> [Pa] dB(A)	10,2 5,2 60 44	6,8 4,3 27 36	6,1 4,0 21 34	5,1 3,7 15 30	4,1 3,3 10 26	3,4 3,0 7 22	3,1 2,9 5 20	2,6 2,6 4 <20	2,3 2,5 3 <20						
250	69,4	V <sub>k</sub> [m/s] X [m] P <sub>t</sub> [Pa] dB(A)		8,5 5,3 41 42	7,7 5,1 34 40	6,4 4,6 23 36	5,1 4,1 15 32	4,3 3,8 10 29	3,8 3,6 8 27	3,2 3,3 6 23	2,8 3,1 5 21	2,6 2,9 4 <20	2,1 2,7 3 <20				
300	83,3	V <sub>k</sub> [m/s] X [m] P <sub>t</sub> [Pa] dB(A)		10,2 6,4 60 47	9,2 6,1 48 45	7,7 5,5 34 41	6,1 5,0 21 37	5,1 4,5 15 34	4,6 4,3 12 32	3,8 3,9 8 28	3,4 3,7 7 26	3,1 3,5 5 24	2,6 3,2 4 20	2,3 3,0 3 <20	2,0 2,9 2 <20	1,9 2,8 2 <20	
400	111,1	V <sub>k</sub> [m/s] X [m] P <sub>t</sub> [Pa] dB(A)				10,2 7,4 60 49	8,2 6,6 38 45	6,8 6,0 27 42	6,1 5,7 21 40	5,1 5,2 15 36	4,5 4,9 12 34	4,1 4,7 10 32	3,4 4,3 7 28	3,1 4,0 5 26	2,7 3,8 4 24	2,6 3,7 4 23	2,0 3,3 4 20
500	138,9	V <sub>k</sub> [m/s] X [m] P <sub>t</sub> [Pa] dB(A)						8,5 7,5 41 48	7,7 7,2 34 46	6,4 6,5 23 42	5,7 6,2 18 40	5,1 5,8 15 38	4,3 5,3 10 34	3,8 5,1 8 32	3,4 4,8 7 30	3,2 4,6 6 29	2,6 4,1 5 25
600	166,7	V <sub>k</sub> [m/s] X [m] P <sub>t</sub> [Pa] dB(A)								7,7 7,8 34 47	6,8 7,4 27 45	6,1 7,0 21 43	5,1 6,4 15 40	4,6 6,1 12 38	4,1 5,7 10 35	3,8 5,5 8 34	3,1 5,0 5 30
700	194,4	V <sub>k</sub> [m/s] X [m] P <sub>t</sub> [Pa] dB(A)										7,2 8,2 29 47	6,0 7,5 20 44	5,4 7,1 16 42	4,8 6,7 13 40	4,5 6,5 11 38	3,6 5,8 7 34
800	222,2	V <sub>k</sub> [m/s] X [m] P <sub>t</sub> [Pa] dB(A)											6,8 8,5 27 48	6,1 8,1 21 45	5,5 7,6 17 43	5,1 7,4 15 42	4,1 6,6 10 38
900	250,0	V <sub>k</sub> [m/s] X [m] P <sub>t</sub> [Pa] dB(A)													6,1 8,6 21 46	5,8 8,3 19 45	4,6 7,4 12 41
1000	277,8	V <sub>k</sub> [m/s] X [m] P <sub>t</sub> [Pa] dB(A)														6,4 9,2 23 48	5,1 8,3 15 44
1200	333,3	V <sub>k</sub> [m/s] X [m] P <sub>t</sub> [Pa] dB(A)															6,1 9,9 21 49

Table 2



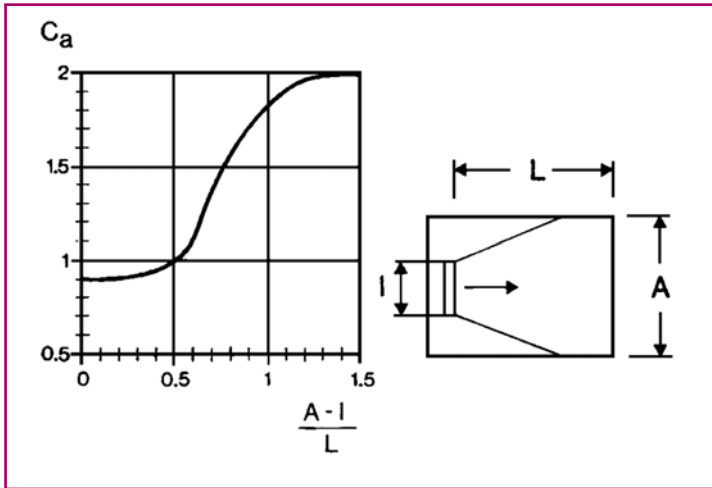
### Air flow measurement

The air flow  $q_v$  shall be obtained by multiplying the effective area of the diffuser ( $A_k$ ) in  $m^2$ , by the velocity at outlet ( $V_k$ ), measured with a TSI- VELOCICALC hot-wire anemometer located on the exterior side frame. Different measurements must be taken along the diffuser (at least 5) and an average taken to determine the velocity as accurately as possible.

# Correction factors

## 1) Throw correction factor for room width/length ratio (C<sub>a</sub>).

This factor is given by the division of the room width minus diffuser length and room length. It is applicable to diffusers with lateral discharge only. For diffusers with vertical discharge C<sub>a</sub> equals 1, since they were tested in a square room (A/L = 1).



## 2) Throw correction factor for distance of diffuser to ceiling (C<sub>h</sub>).

For adherent jets, i.e. diffuser aligned with ceiling:  $C_h = 1$ .  
 For free jets:  $C_h = 1,4$

The corrected throw  $X_c$  is obtained by:

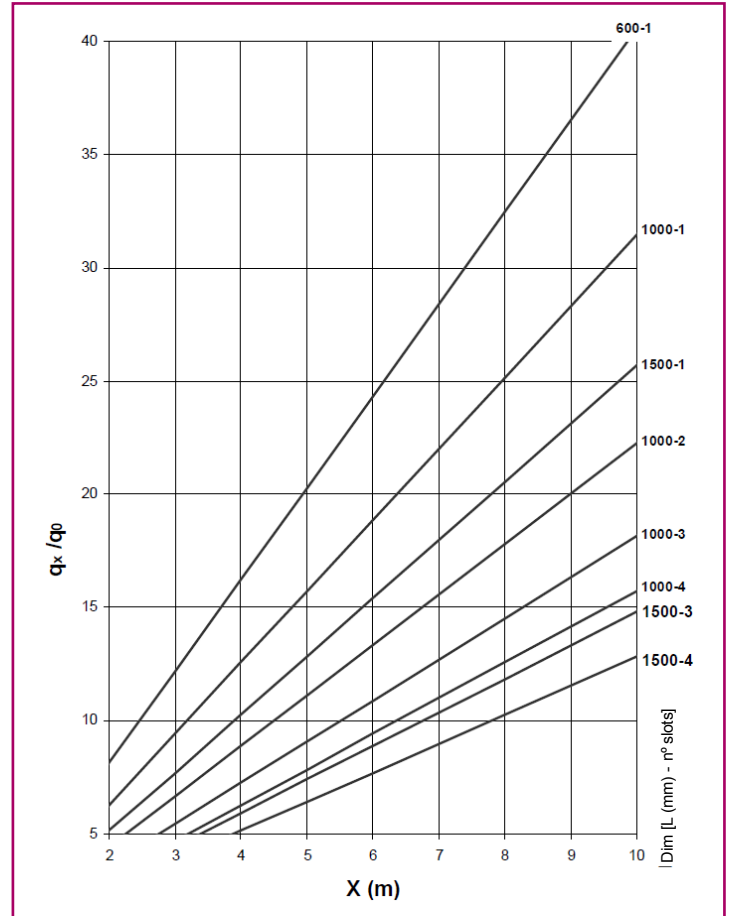
$$X_c = X \cdot C_a \cdot C_h$$

## 3) Maximum distance of diffuser to ceiling.

To obtain an adhering jet with cold air for the linear diffusers with lateral discharge, it is advisable not to exceed the distance of the diffuser with respect to the ceiling ( $h$  max.) and the temperature difference  $\Delta t$  (difference between room and supply air temperature) according to the following table.

$\Delta T(^{\circ}C)$	0	6	9	12
$h \text{ máx (m)}$	0,38	0,21	0,14	0,11

## Induction rate



Once the throw is known,  $X$  or  $X_c$ , it is possible to determine the induction coefficient on the graph.

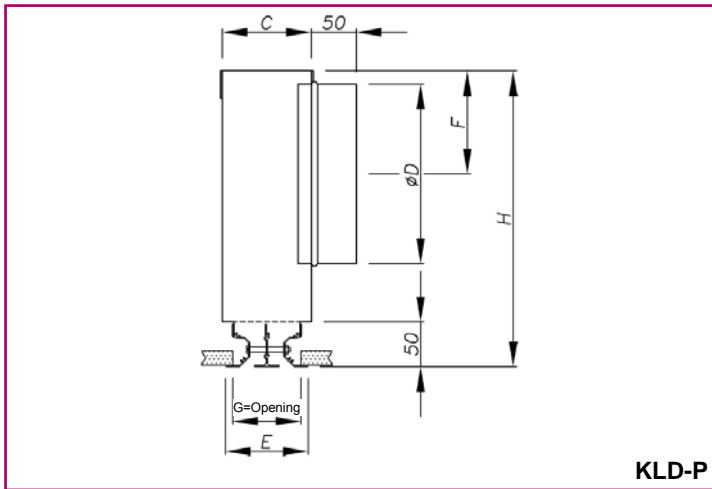
For example, on page 11, as there are no correction factors  $C_a$  and  $C_h$ , the induction coefficient ( $q_x/q_o$ ) when the diffuser supplies the whole of the air flow in the same direction, would be equal to 10.5 and the induced air flow would therefore be:

$$400 \times 10,5 = 4200 \text{ m}^3/\text{h}$$

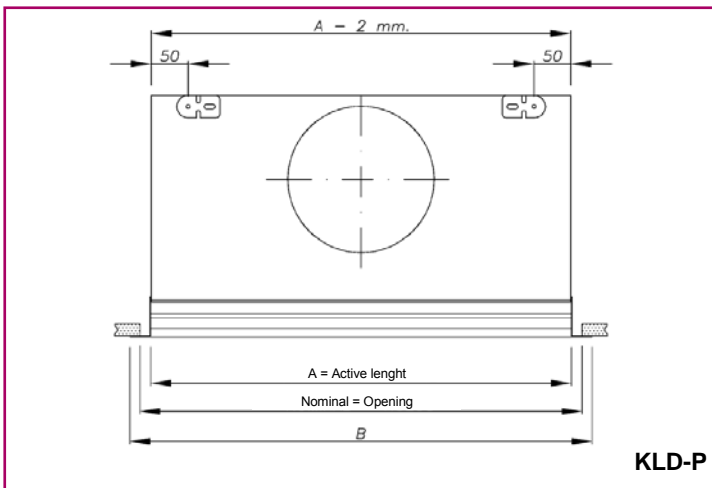
If the diffuser should supply the air flow in two directions, a correction factor of 1.4 must be also applied. This results in a total induced air flow of:

$$4200 \times 1,4 = 5880 \text{ m}^3/\text{h}$$

## Dimensions KLD



KLD-P



KLD-P

### KLD diffuser with fixed plenum box

Extruded aluminium linear diffuser with galvanized steel plenum box. When supplied, the plenum box (fixed or removable) is screwed to the diffuser.

The top of the plenum box has lugs so it can be fixed to the ceiling. Said lugs are not folded to make transportation easier and must be shaped during on-site assembly.

### Duct inlets

The plenum inlet spigots are standardized according to ISO standards and enable connection of both flexible and rigid ducts. A damper to manually regulate the air flow, which is useful in constant air volumens, can be installed on request.

### Nº of slots

Standard diffusers have 1, 2, 3 and 4 slots. The maximum number of slots than can be built is 6.

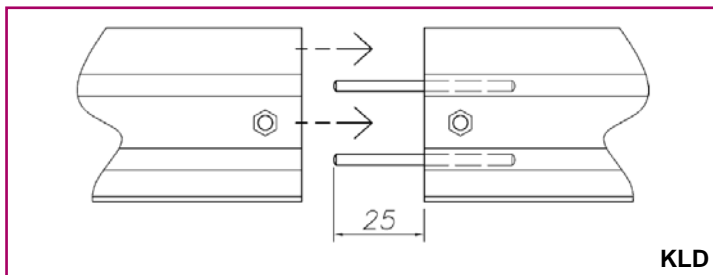
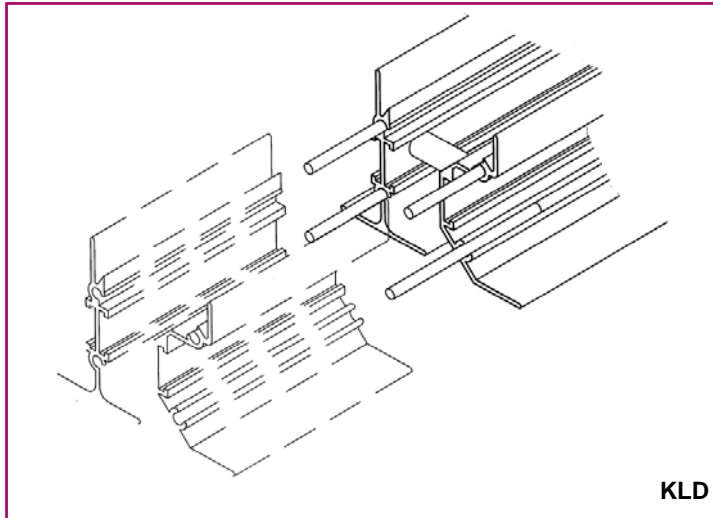
### Dimensions

The table below shows standard dimensions of diffusers with plenum boxes.

Under request, plenum boxes may be modified, within certain limits, in order to adapt them to non-standard sizes.

TYPE OF DISCHARGE	MODEL	A	B		C	E	G	No. OF SPIGOTS	ØD	H	F
			END CUP 8,7 mm	END CUP 28,5 mm							
0:1 1:0	300	275	292,4	332	79	60	50	1	160	275	95
	600	575	592,4	632							
	900	875	892,4	932							
	1000	975	992,4	1032				2			
	1200	1175	1192,4	1232							
	1500	1475	1492,4	1532							
2000	1975	1992,4	2032								
0:2 2:0	300	275	292,4	332	99	92	82	1	200	330	115
	600	575	592,4	632							
	900	875	892,4	932							
	1000	975	992,4	1032				2			
	1200	1175	1192,4	1232							
	1500	1475	1492,4	1532							
2000	1975	1992,4	2032								
0:3 3:0	300	275	292,4	332	131	123	113	1	250	330	140
	600	575	592,4	632							
	900	875	892,4	932							
	1000	975	992,4	1032				2			
	1200	1175	1192,4	1232							
	1500	1475	1492,4	1532							
2000	1975	1992,4	2032								
1:1	300	275	292,4	332	105	92	82	1	200	330	115
	600	575	592,4	632							
	900	875	892,4	932							
	1000	975	992,4	1032				2			
	1200	1175	1192,4	1232							
	1500	1475	1492,4	1532							
2000	1975	1992,4	2032								
1:2 2:1	300	275	292,4	332	137	123	113	1	250	330	140
	600	575	592,4	632							
	900	875	892,4	932							
	1000	975	992,4	1032				2			
	1200	1175	1192,4	1232							
	1500	1475	1492,4	1532							
2000	1975	1992,4	2032								
1:3 3:1 2:2	300	275	292,4	332	169	155	145	1	250	330	140
	600	575	592,4	632							
	900	875	892,4	932							
	1000	975	992,4	1032				2			
	1200	1175	1192,4	1232							
	1500	1475	1492,4	1532							
2000	1975	1992,4	2032								
0:4 4:0	300	275	292,4	332	163	155	145	1	250	330	140
	600	575	592,4	632							
	900	875	892,4	932							
	1000	975	992,4	1032				2			
	1200	1175	1192,4	1232							
	1500	1475	1492,4	1532							
2000	1975	1992,4	2032								

# Connection system



### Connection System

When the diffusers are longer than 2000 mm, they come in separate sections.

The sections are connected lengthwise by using pins located on the exterior profiles, as its shown in fig. attached. The pins are fixed under pressure. Perfect alignment is achieved by combining regulation of the plenum box suspension system and, in this way, bringing together the different diffuser sections.

### Types of discharges

The enclosed table shows all the possible combinations for 1,2,3 and 4 slot KLD diffusers.

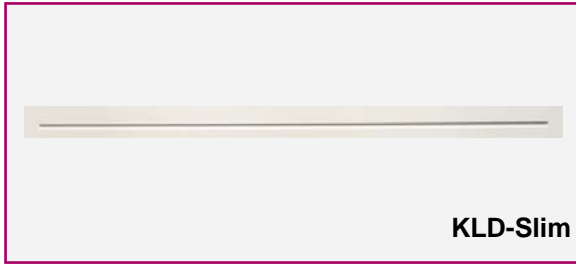
The location of the duct inlet which allows air to enter the plenum box must be taken into consideration when defining the position of the discharges.

KLD

TYPES OF DISCHARGES

LEFT	RIGHT	
	↓	
		← AIRE
		01
		02
		03
		04
		10
		20
		30
		40
		11
		12
		13
		21
		31
		22

# KLD-Slim slot diffuser



## Description

The KLD-Slim-P slot diffuser offers high induction capacity with excellent performance in terms of both aesthetics and technical features. The unit has non-adjustable blades and corresponds to the diffuser with a supply plenum box constructed of galvanized sheet. By special order, the plenum boxes can be constructed with thermal-acoustic insulation.

## Finishes

Extruded aluminium sections with prelacquer finish in RAL-9010 white. Special finishes upon request.

## Application

The KLD-Slim slot diffusers are recommended for both ceiling and wall installation and particularly appropriate for variable air volume, although the design allows excellent operation with constant air volume as well.

The diffusers are fitted with non-adjustable blades and lateral air outlet in one or two directions and can be used for air return. High-quality aesthetics and performance are further enhanced by alternating the return diffusers with supply diffusers in the same continuous line.

## Identification

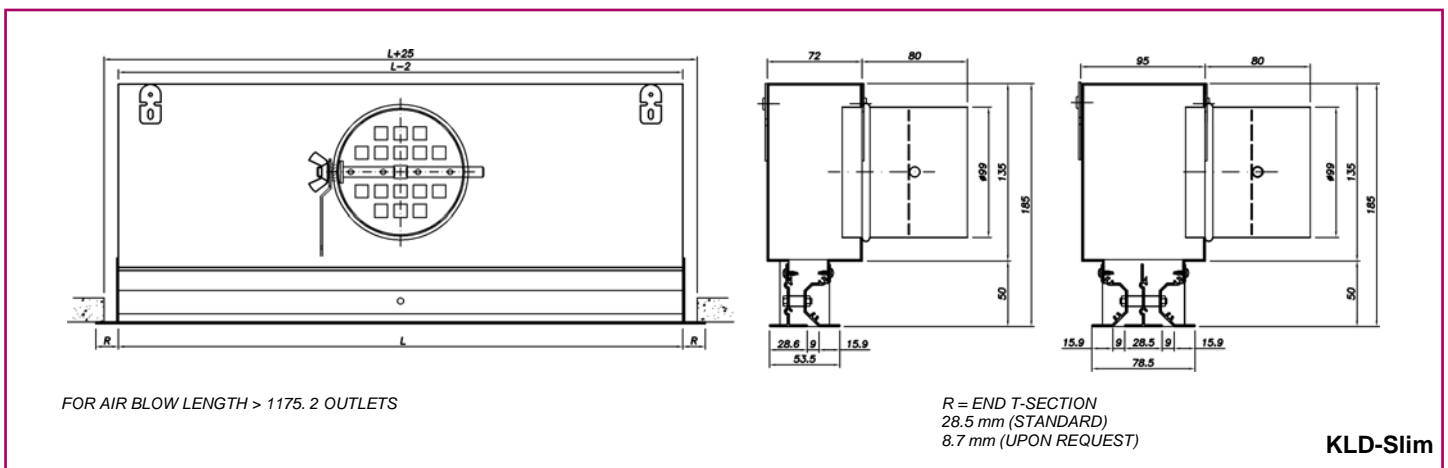
The diffusers are supplied with non-adjustable blades and, therefore, it is first necessary to determine the air blow direction of the slots. The air blow direction **CANNOT BE MODIFIED** on site. Standard diffusers have 1 and 2 slots. The unit can be manufactured with 3 or 4 slots upon request.

The supply includes end T-section of 28.5 mm. End T-sections of 8.7 mm are available upon request.



<b>KLD-Slim</b>	Linear slot diffuser model of aluminium construction.
<b>1</b>	Number of slots.
<b>2</b>	
<b>P</b>	With Plenum Box.
<b>-</b>	Without Plenum Box.
<b>L</b>	Nominal or opening length. From 600 to 2000 in a single module.

# Dimensions







# KLD-Q square diffusers for variable and constant air flow



## Description

KLD-Q model, square diffuser for variable and constant air flow especially designed to maintain the ceiling effect (Coanda effect) even when primary air flows are reduced to 20% of the nominal flow. Fixed blades with air outflow in four directions.

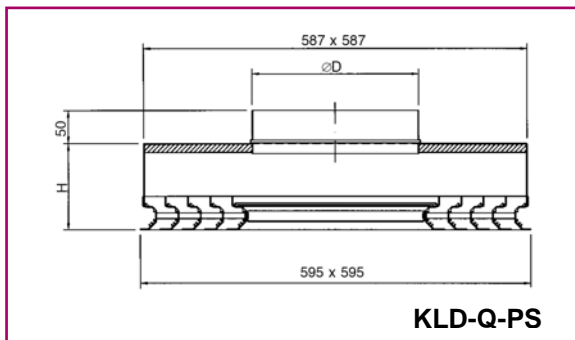
## Finishes

Extruded aluminium profiles, pre-lacquered in RAL-9010 white. Available filter-holder version.



## Utilisation

Ceiling installation. Especially suited to variable air flow although its design also enables it to work perfectly with a constant air flow. Ideal accessory for KOOLAIR, KS model variable flow terminal units (boxes).



## Dimensions and plenum box

As regards length, the nominal dimension of the diffuser is the size of the opening. The KLD-Q version corresponds to a diffuser with a plenum box in two versions, with side or top duct inlet (see identification). Standard models with 1, 2, 3 and 4 slots are for ceilings with 600x600 mm modulation.

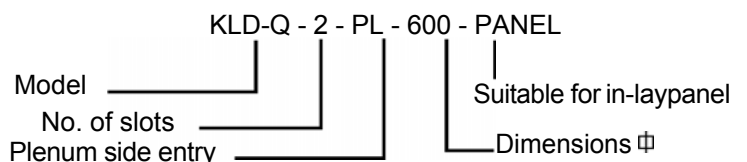
Upon request, they can be manufactured in any other size, or adapted to any other ceiling type, as for example, continuous plaster ceilings. See general dimensions on page 18.

<b>KLD-Q</b>	Aluminium linear diffuser.
<b>1</b>	No. of slots.
<b>2</b>	
<b>3</b>	
<b>4</b>	
<b>PL</b>	With plenum, side entry.
<b>PS</b>	With plenum, top entry.
<b>-</b>	Without plenum box.
<b>PANEL</b>	Prepared for in-laypanel
<b>L x L</b>	Nominal or opening measurement in mm.

## Product code

It is necessary to determine the model, no. of slots, the plenum box and, when necessary, preparation for in-lay panel.

Example:



## KLD-Q diffuser selection table

KLD-Q 600x600						
Q		Nb. slots A <sub>k</sub> [m <sup>2</sup> ]	1	2	3	4
[m <sup>3</sup> /h]	[l/s]		0,0208	0,0397	0,0550	0,0655
150	41,7	V <sub>k</sub> [m/s]	2,0			
		X [m]	0,9			
		P <sub>t</sub> [Pa]	4			
		dB(A)	<20			
200	55,6	V <sub>k</sub> [m/s]	2,7	1,4		
		X [m]	1,3	0,9		
		P <sub>t</sub> [Pa]	6	2		
		dB(A)	27	<20		
250	69,4	V <sub>k</sub> [m/s]	3,3	1,7	1,3	
		X [m]	1,6	1,1	1,0	
		P <sub>t</sub> [Pa]	10	3	1	
		dB(A)	32	21	<20	
300	83,3	V <sub>k</sub> [m/s]	4,0	2,1	1,5	1,3
		X [m]	1,9	1,4	1,2	1,1
		P <sub>t</sub> [Pa]	14	4	2	1
		dB(A)	36	26	20	<20
350	97,2	V <sub>k</sub> [m/s]	4,7	2,4	1,8	1,5
		X [m]	2,2	1,6	1,3	1,2
		P <sub>t</sub> [Pa]	19	5	3	2
		dB(A)	40	29	24	21
400	111,1	V <sub>k</sub> [m/s]	5,3	2,8	2,0	1,7
		X [m]	2,5	1,8	1,5	1,4
		P <sub>t</sub> [Pa]	25	7	4	3
		dB(A)	43	32	27	24
500	138,9	V <sub>k</sub> [m/s]	6,7	3,5	2,5	2,1
		X [m]	3,1	2,3	1,9	1,8
		P <sub>t</sub> [Pa]	40	11	6	4
		dB(A)	48	38	32	29
600	166,7	V <sub>k</sub> [m/s]		4,2	3,0	2,5
		X [m]		2,7	2,3	2,1
		P <sub>t</sub> [Pa]		16	8	6
		dB(A)		42	37	34
700	194,4	V <sub>k</sub> [m/s]		4,9	3,5	3,0
		X [m]		3,2	2,7	2,5
		P <sub>t</sub> [Pa]		21	11	8
		dB(A)		46	40	37
800	222,2	V <sub>k</sub> [m/s]		5,6	4,0	3,4
		X [m]		3,6	3,1	2,8
		P <sub>t</sub> [Pa]		28	15	10
		dB(A)		49	43	41
900	250,0	V <sub>k</sub> [m/s]			4,5	3,8
		X [m]			3,5	3,2
		P <sub>t</sub> [Pa]			18	13
		dB(A)			46	43
1000	277,8	V [m/s]			5,0	4,2
		X [m]			3,8	3,5
		P <sub>t</sub> [Pa]			23	16
		dB(A)			49	46
1200	333,3	V <sub>k</sub> [m/s]				5,1
		X [m]				4,2
		P <sub>t</sub> [Pa]				23
		dB(A)				50

Table 4

### Selection

For a specific air flow, selection must take the noise level and the throw for the desired terminal velocity into consideration. The throws which are shown in the table correspond to a maximum velocity of 0.25 m/s in the occupied zone.

### Example:

#### Required specifications:

Air flow rate: \_\_\_\_\_ 600 m<sup>3</sup>/h

Required throw: \_\_\_\_\_ 3 m

Required sound power level (maximum): \_\_\_\_\_ 40 dB(A)

Required pressure drop (lower than): \_\_\_\_\_ 20 Pa

### Solution

In table 4, and for the air flow requested, we can select diffuser model KLD-Q-600x600-3, which has the following specifications:

Air flow: \_\_\_\_\_ 600 m<sup>3</sup>/h

Throw (X): \_\_\_\_\_ 2,3 m

Sound power level: \_\_\_\_\_ 37 dB(A)

Pressure drop: \_\_\_\_\_ 8 Pa

No. of slots: \_\_\_\_\_ 3

### Tests

This selection table is based on real laboratory tests in conformity with UNE-EN 12238, UNE-EN ISO 3741 and UNE- EN ISO 5135 standards. The sound power level dB(A) have been obtained in a reverberating chamber in accordance with ISO 3741 standards.

The Δt is equal to 0 °C (Isothermal conditions).

The maximum velocity in the occupied zone is 0.25 m/s.

The height of the room is 3 ± 0.5 m.

As the diffuser has been tested in the centre of a square room and aligned with the ceiling there are no correction factors for throw (X).

### Air flow measurement

See page 19.

### Symbols:

V<sub>k</sub> = Effective velocity in m/s

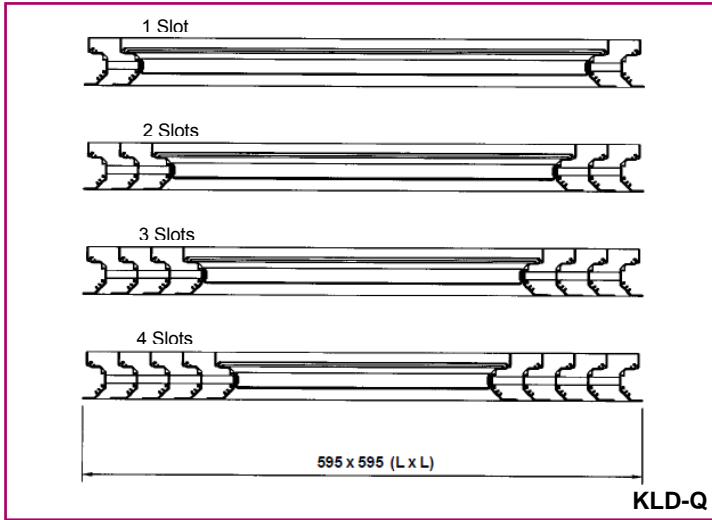
X = Throw in m

P<sub>t</sub> = Total pressure in Pa

dB(A) = Sound power level

A<sub>k</sub> = Effective area in m<sup>2</sup>

# Dimensions



### KLD-Q dimensions and n°. of slots

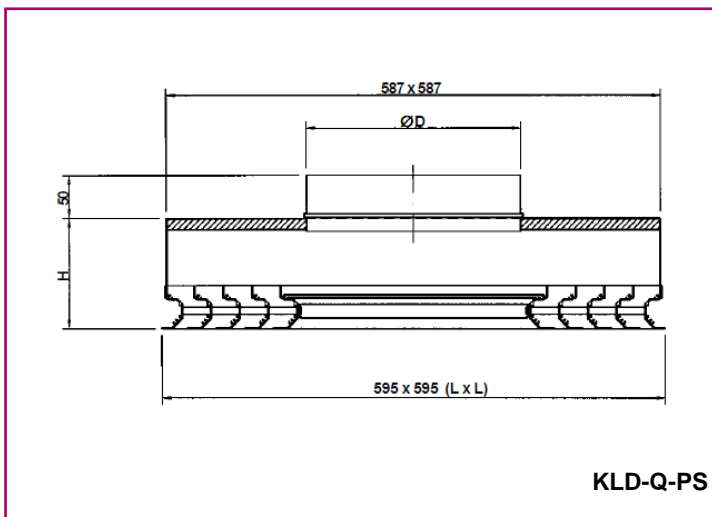
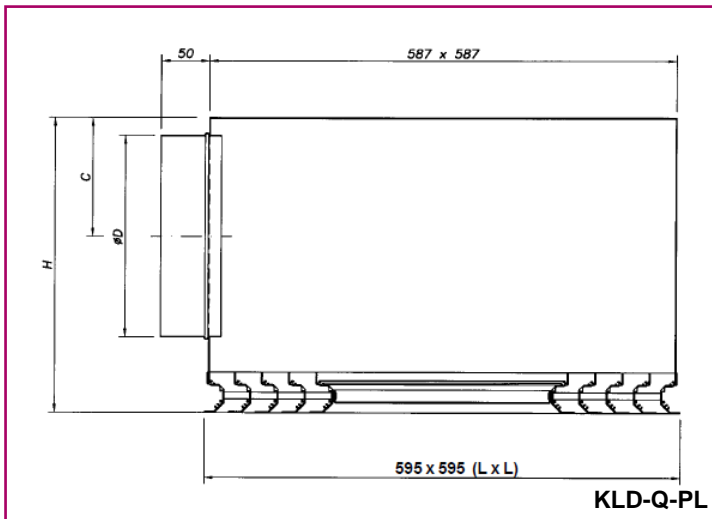
Standard 1, 2, 3 and 4 slot diffusers are adapted to a nominal measurement of 600 x 600 mm, which can be perfectly adapted to false ceilings. They can be adapted to other sizes or ceiling modulations upon request.

### Plenum boxes and duct inlets

Diffusers can be supplied with the plenum screwed on. The diameters of the duct inlets are standard size in accordance with ISO standards, and can be located on the side of the plenum box (PL) or on the top (PS). A manually regulaty can be fixed to the duct inlet upon request so that the diffuser can be used with a constant air flow.

### General KLD-Q dimensions

MODEL	L x L	No. OF SLOTS	C	ØD	H
KLD - Q - PL	600 x 600	1	122	199	270
		2	147	249	320
		3			
		4			
KLD - Q - PS	600 x 600	1		199	130
		2		249	
		3			
		4			



## KLD-Q-PANEL diffuser

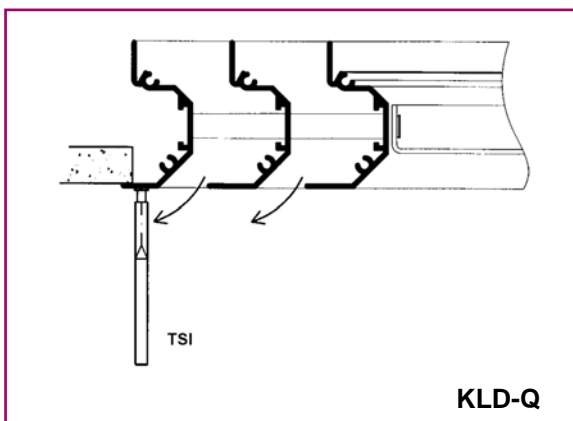


### Description

A panel of the same decorating material as that used in the ceiling or the suspended ceiling can be placed in the central core of the KLD-Q-PANEL diffuser regardless of whether the ceiling is plaster or fibre.

In this way, the diffuser becomes integrated into the décor and is less noticeable in those cases in which the aim of the ceiling is to be more uniform in appearance without the elements installed on them standing out.

The only thing that has to be done is to cut out a panel of the same size as the central core opening and place it on the support that the diffuser has for this purpose. It is advisable to fix it with adhesive and place a piece of insulating material of the same size over it which should also be fixed with adhesive.



### Air flow measurement

The air flow  $q_v$ , shall be obtained by multiplying the effective area of the diffuser ( $A_k$ ) in  $m^2$  by the effective velocity ( $V_k$ ), measured with a hot-wire anemometer TSI- VELOCICALC located on the exterior profile.

Different measurements must be taken along the perimeter of the diffuser to obtain an average value. The greater the number of measurements, the more accurate the measurement obtained will be.

## KLD-Q-PANEL diffuser selection table

KLD-Q-Panel - 600x600					
Q		Nº vías A (m <sup>2</sup> )	1	2	3
(m <sup>3</sup> /h)	(l/s)		0,0277	0,0476	0,0675
160	44,4	V <sub>k</sub> (m/s) X (m) P <sub>t</sub> (Pa) dB(A)	1,6 0,9 3 <20		
200	55,6	V <sub>k</sub> (m/s) X (m) P <sub>t</sub> (Pa) dB(A)	2,0 1,1 5 <20		
250	69,4	V <sub>k</sub> (m/s) X (m) P <sub>t</sub> (Pa) dB(A)	2,5 1,4 8 22	1,5 1,1 3 <20	
300	83,3	V <sub>k</sub> (m/s) X (m) P <sub>t</sub> (Pa) dB(A)	3,0 1,7 11 26	1,8 1,3 4 21	1,2 1,1 2 <20
400	111,1	V <sub>k</sub> (m/s) X (m) P <sub>t</sub> (Pa) dB(A)	4,0 2,3 20 32	2,3 1,7 7 27	1,6 1,4 3 23
500	138,9	V <sub>k</sub> (m/s) X (m) P <sub>t</sub> (Pa) dB(A)	5,0 2,8 32 37	2,9 2,2 11 31	2,1 1,8 5 28
600	166,7	V <sub>k</sub> (m/s) X (m) P <sub>t</sub> (Pa) dB(A)	6,0 3,4 46 41	3,5 2,6 16 35	2,5 2,2 8 31
700	194,4	V <sub>k</sub> (m/s) X (m) P <sub>t</sub> (Pa) dB(A)	7,0 4,0 62 44	4,1 3,0 21 38	2,9 2,5 10 35
800	222,2	V <sub>k</sub> (m/s) X (m) P <sub>t</sub> (Pa) dB(A)	8,0 4,5 81 47	4,7 3,4 28 41	3,3 2,9 14 37
1000	277,8	V <sub>k</sub> (m/s) X (m) P <sub>t</sub> (Pa) dB(A)		5,8 4,3 43 46	4,1 3,6 21 42
1200	333,3	V <sub>k</sub> (m/s) X (m) P <sub>t</sub> (Pa) dB(A)			4,9 4,3 31 46
1400	388,9	V <sub>k</sub> (m/s) X (m) P <sub>t</sub> (Pa) dB(A)			5,8 5,1 42 49

Table 5

### Selection

For a specific air flow, selection must take the noise level and the throw for the desired terminal velocity into consideration. The throws which are shown in the table correspond to a maximum velocity of 0.25 m/s in the occupied zone.

### Example:

#### Required specifications:

Air flow rate: \_\_\_\_\_ 600 m<sup>3</sup>/h  
 Required throw: \_\_\_\_\_ 2,5 m  
 Required sound power level (maximum): \_\_\_\_\_ 40 dB(A)  
 Required pressure drop (lower than): \_\_\_\_\_ 20 Pa

### Solution

In table 5, and for the air flow requested, we can select diffuser model KLD-Q-PANEL-600x600-2, which has the following specifications:

Air flow: \_\_\_\_\_ 600 m<sup>3</sup>/h  
 Throw (X): \_\_\_\_\_ 2,6 m  
 Sound power level: \_\_\_\_\_ 35 dB(A)  
 Pressure drop: \_\_\_\_\_ 16 Pa  
 No. of slots: \_\_\_\_\_ 2

### Tests

Esta tabla de selección está basada en ensayos reales de laboratorio según normas UNE-EN 12238, UNE-EN ISO 3741 y UNE-EN ISO 5135. Los niveles sonoros dB(A) han sido obtenidos en una sala reverberante según normas ISO 3741.

The Δt is equal to 0 °C (Isotherm conditions).

The maximum velocity in the occupied zone is 0.25 m/s.

The height of the room is 3 ± 0.5 m.

As the diffuser has been tested in the centre of a square room and aligned with the ceiling there are no correction factors for throw (X).

### Air flow measurement

See page 19.

### Symbols:

V<sub>k</sub> = Effective velocity in m/s

X = Throw in m

P<sub>t</sub> = Total pressure in Pa

dB(A) = Sound power level

A<sub>k</sub> = Effective area in m<sup>2</sup>

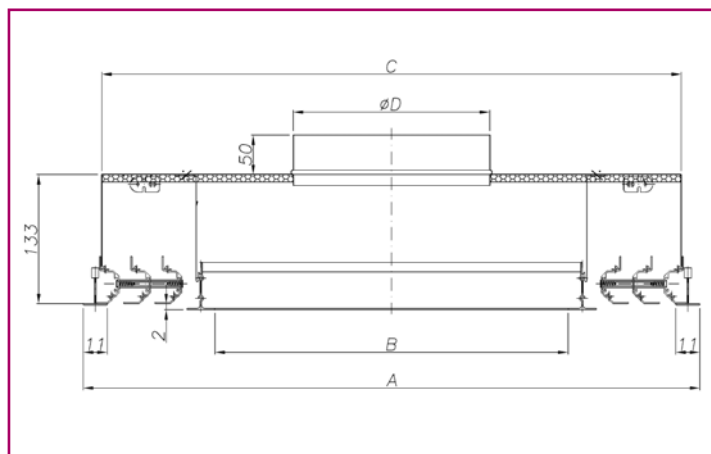
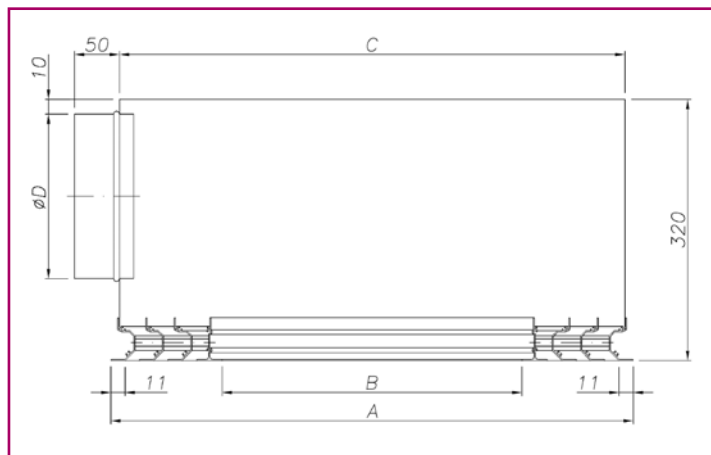
## Dimensions

### KLD-Q-PANEL dimensions and n°. of slots

Standard 1, 2, and 3 slot diffusers are adapted to an opening measurement of 600 x 600 mm, which can be perfectly adapted to false ceilings. They can be adapted to other sizes or ceiling modulations upon request.

### Plenum boxes and duct inlets

Diffusers can be supplied with the plenum pre-fixed. The diameters of the duct inlets are standard size in accordance with ISO standards, and can be located on the side of the plenum box (PL) or on the top (PS). A manual regulator can be fixed to the inlet spigot upon request so that the diffuser can be used with a constant air flow.



**General dimensions KLD-Q-Panel**

MODEL	NOMINAL	N° Slots	A	B	C	ØD
KLD-Q-PANEL PL	600x600	1	595	474	576	199
		2		410		
		3		346		249
		4		282		
	675x675	1	670	549	651	199
		2		485		249
		3		421		
		4		357		
KLD-Q-PANEL PS	600x600	1	595	484	586	199
		2		420		249
		3		356		

# KLD-Q-I/R diffuser



KLD-Q-I/R

## Description

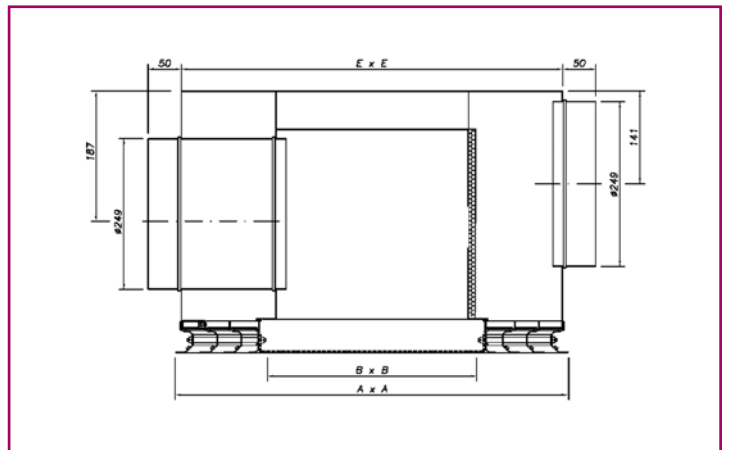
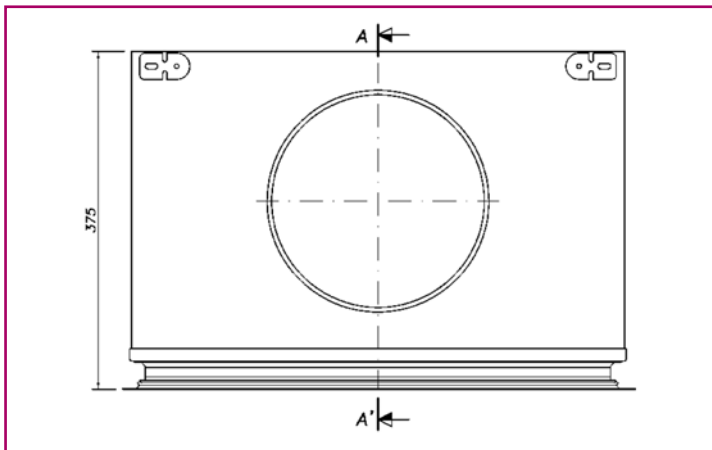
The KLD-Q I/R diffuser integrates supply and return in the same element. Square diffuser for false ceiling. Available in filter-holder version.

Ceiling diffuser for variable air flow especially designed to maintain the ceiling or Coanda effect even when primary air flow reduces to 80% of the nominal flow. Fixed blade four way. The central core is made of perforated plate allowing the air to return from the diffuser.

## Diffuser

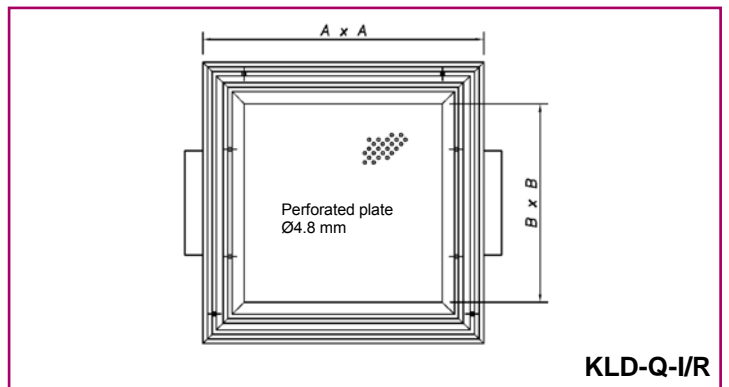
KLD-Q I/R diffuser, 2 or 3 slots, 595x595 mm o/a, painted in RAL 9010.

Supplied with side entry plenum box, insulated 1 face.



## Dimensions

NOMIAL	Slots	A	B	E
600x600	2	595	410	576
	3		346	576



KLD-Q-I/R

## Technical data

KLD-Q I/R	SOUND POWER - AIRFLOW - $\Delta P_{tot}$				
	$m^3/h (Pa)$				
	25 dB(A)	30 dB(A)	35 dB(A)	40 dB(A)	45 dB(A)
600x600 - 2	315 (7)	388 (10)	480 (16)	590 (24)	735 (37)
600x600 - 3	430 (8)	530 (13)	655 (20)	810 (30)	1000 (46)

# KDL-Q-Flash diffuser



KLD-Q-Flash

## Description

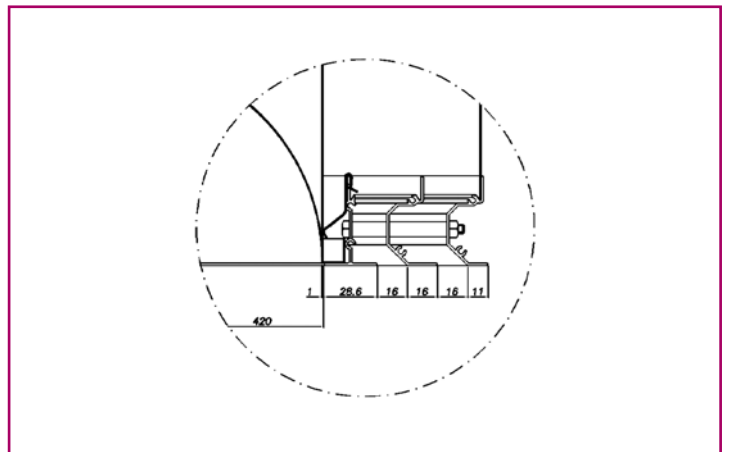
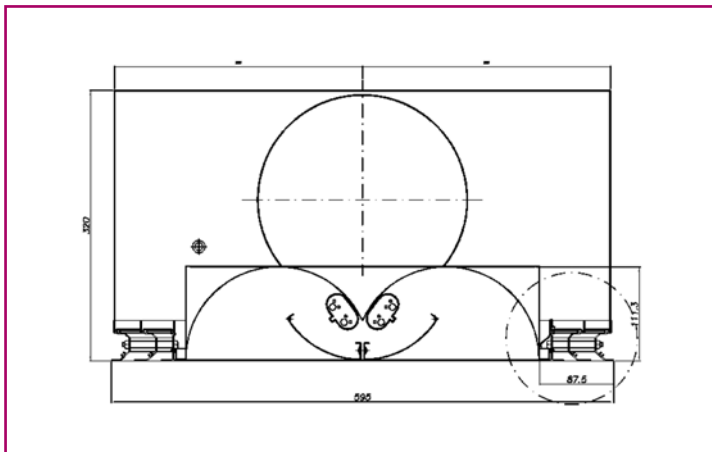
The KLD-Q Flash integrates light and air in the same element. Specially adapted for offices or Open Space applications.

Square diffuser for variable or constant air flow especially designed to maintain the ceiling or Coanda effect. Fixed blades four ways.

Direct/indirect lighting, fitted with P1 tube, 2 x 36 Watts and photometric class D with about 50 % efficiency.

## Diffuser

KLD-Q Flash, 2 slots, 595x595 mm o/a, painted in RAL 9010. Supplied with side entry plenum box.



## Technical data

SOUND POWER - AIRFLOW - $\Delta P_t$				
m <sup>3</sup> /h (Pa)				
25 dB(A)	30 dB(A)	35 dB(A)	40 dB(A)	45 dB(A)
375 (6)	475 (10)	600 (16)	760 (25)	960 (40)







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