



LINEAR SLOT DIFFUSERS

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OVERVIEW CHARACTERISTICS APPLICATIONS

OVERVIEW :

The KL series diffusers represent the best development for this type of air diffusion units.

Their particular structure allows to direct the flow of injected air along the ceiling. The effect is one of a progressive mix with the air in the room without the need of creating air currents or air vortexes that may be perceptible even in cooling mode. In contrast it is possible to direct the flow of injected air rapidly towards the floor, with a large forcing action to obtain a rapid heating of the room.

The modular structure allows for an unlimited number of rows, parallel slots, without any visible joint line showing. The KL series diffusers stand out thanks to their innovative design, characterised by its soft lines and curved edges, not purely for aesthetic value. It is a result of accurate fluid dynamic studies, carried out using innovative mathematic models, aimed at optimizing the distribution of the speed of air exiting the diffuser.

The KLV series diffusers are complemented with their own line of plenum boxes made in such a way that when installing, no particular tools or accessories are required for the job.

WORKING CHARACTERISTICS:

The KL series diffusers are made of a diffuser body constructed in aluminium, housing the various air expulsion slots and a series of deflecting blades, also in aluminium, for horizontal or vertical orientation flow of the air. The direction may be easily adjusted without the need to remove the diffuser itself.

The body of the diffuser may be integrated with a regulation damper having small square holes. This solution has been studied so as to obtain a precise calibration of the quantity of air injected into the room and at the same time, to reduce to a minimum the pressure loss with the damper fully opened.

APPLICATIONS:

The KL diffuser series are used in ventilations systems in facilities where the ceiling height is between 3 and 6 meters, such as open space offices, commercial galleries and hospital wards.

The achievable air flows vary in relation to the length of the diffuser and the number of slots. The capacities are included between 50m³/h and 120m³/h per meter per slot with temperature grades varying between +15 °C and -10 °C.

FITTING OF THE DIFFUSER:

The KL diffusers are fitted with specific plenums by means of suspension springs or with mounting bridges. This allows for a rapid fitting even after all masonry work has been completed.

FINISH:

The KL diffusers are constructed with an anodized or RAL 9010 painted aluminium body with deflecting blades also painted black or white RAL9010.

Other special finishes may be provided upon request.

MATERIALS:

Diffuser completely in naturally anodized extruded aluminium, plenum from galvanized steel sheet and external insulation in self-extinguishing Class B s2 d0 material.

UNSUITABLE ENVIRONMENTS

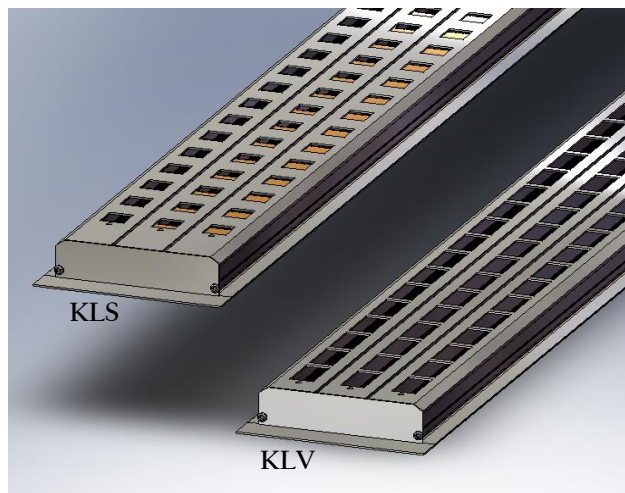
The aluminum products are not suitable for installation in environments with an atmosphere containing corrosive substances for this material and in particular containing chlorine, such as swimming pools, spas and some types of food industries.

VERSIONS :

KLV Series: identifiable from the large area that allows to minimise the pressure loss and noise even at elevated air flow capacities.

Adjustment can be made to the air flow via a damper in the plenum connector.

KLS Series: identifiable by the possibility of installing sliding regulation dampers inside the body of the diffuser to allow adjustment to the air flow individually for each linear slot.





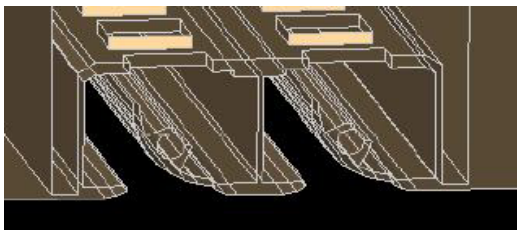
LINEAR SLOT DIFFUSERS

AIR FLOW REGULATION

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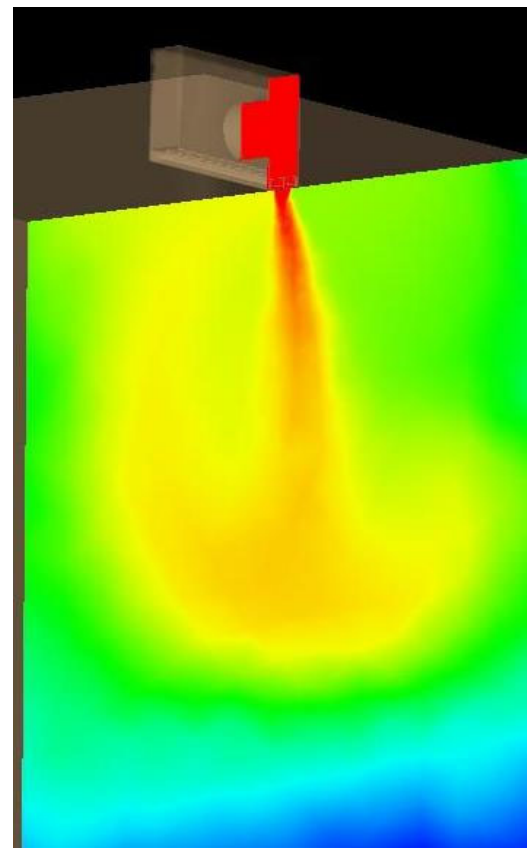
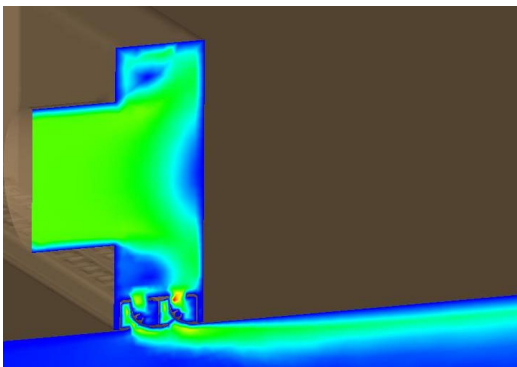
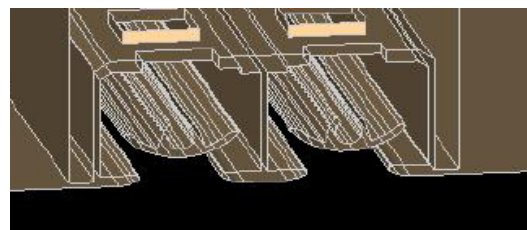
Configuration for a horizontal Flow

The flow follows the line of the ceiling
Guaranties the total absence of air currents
both in heating and cooling.



Configuration for a vertical flow

The flow penetrates the room directly
Prevents th for lengths greater or euqal to 1500mm
used for heating.



CHOICE OF DIRECTION OF THE FLOW:

The horizontal flow represents the more common use for this kind of diffuser, both in heating and cooling. The flow stays close to the ceiling and spreads horizontally inside the room. This generates a vertical recall effect of the air already present guarantying the perfect mix without the presence of air currents within the occupied zone.

The vertical flow, used when heating, allows to send hot air directly in the occupied zone, contrasting the common tendency of hot air to stratify due the lower density in the higher parts of the room.

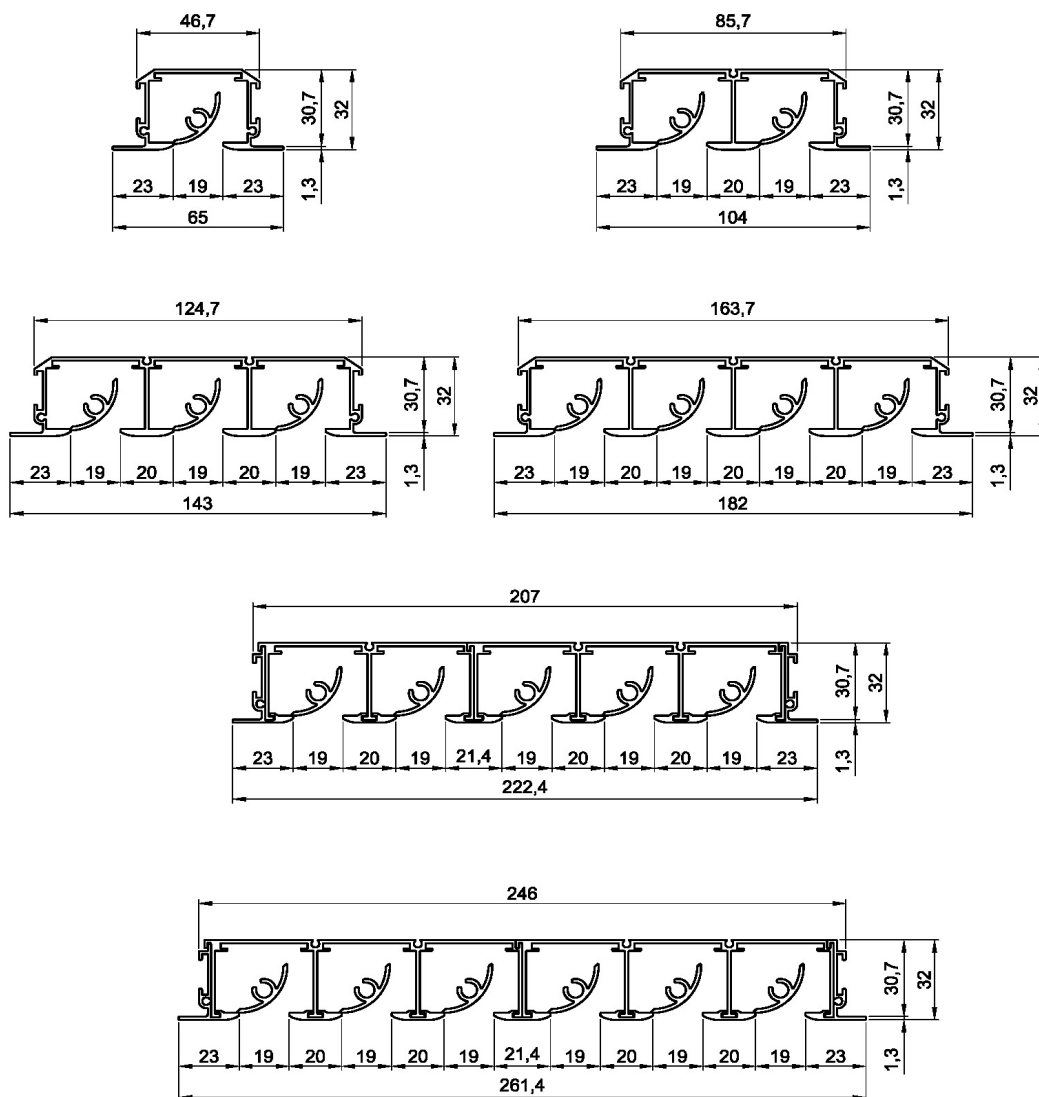
The change of direction of the flow is obtained turning the deflector blade from inclined to horizontal and vice versa. The blade is adjusted from outside the diffusers with a lever, at both the extremities of each slot.



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DIMENSIONS



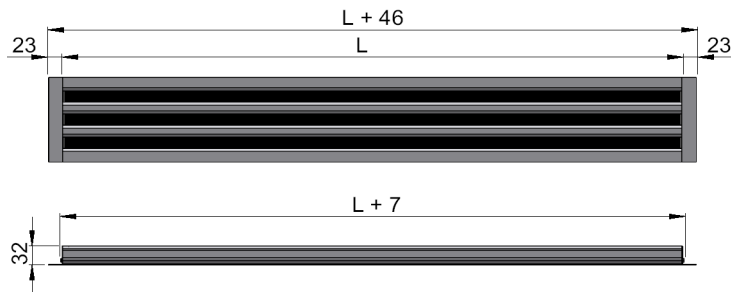
efficient section AK for a diffuser L=1 m (m ²)						
	1 slot	2 slots	3 slots	4 slots	5 slots	6 slots
lancio orizzontale	0,00845	0,01650	0,02287	0,03070	0,03840	0,04574
lancio verticale	0,01478	0,02890	0,04328	0,05700	0,07123	0,08550



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DIMENSIONS



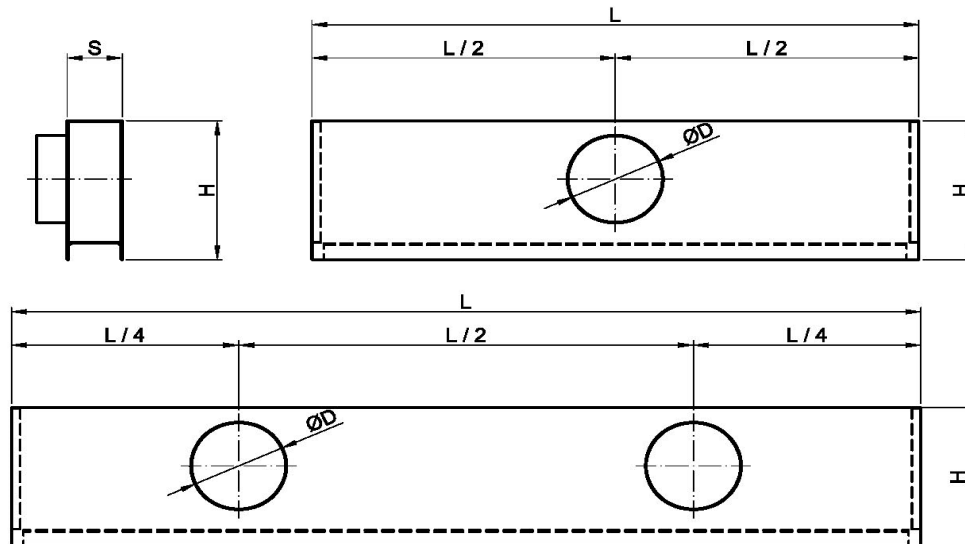
Holes in counter ceiling

Given L as the nominal length of the diffuser, the holes in the counter ceiling will need to be:

	lunghezza		larghezza	
diffuser 1 slot	L+15	x	57	mm
diffuser 2 slots	L+15	x	95	mm
diffuser 3 slots	L+15	x	134	mm
diffuser 4 slots	L+15	x	177	mm
diffuser 5 slots	L+15	x	212	mm
diffuser 6 slots	L+15	x	251	mm

Example:

1 slot diffuser L=2000
hole 2015x57 mm



OVERALL DIMENSIONS			L < 1500 mm		1500 ≤ L ≤ 2000 mm		
Slots	H mm	S mm	connector qty	ØD mm	connector qty	ØD mm	
1	200	52	1	123	2	123	ABS(*)
2	250	91	1	155	2	155	ABS(*)
3	300	130	1	195	2	195	ABS(*)
4	300	172	1	195	2	195	ABS(*)
5	315	212	1	298	2	298	Acciaio
6	365	251	1	298	2	298	Acciaio

(*) Steel on request



LINEAR SLOT DIFFUSERS

METHOD OF ANALYSIS OF PERFORMANCE

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Test Method

The analysis of the aerodynamic performances of the KLV series diffusers have been carried out by means of a "virtual test laboratory". All the tests and the relative measurements have been conducted by means of an advanced CFD (Computational Fluid Dynamics) software.

This applies the method of the finite elements to the fluid dynamic for the analysis of speeds, air flow distribution and pressure losses.

The dimensions of the virtual room in the test configuration for each single diffuser are:

Width of the test room: $b_r=5.6$ m

Length of the test room: $l_r=7.5$ m

Height of the test room: $h_r=3.0$ m

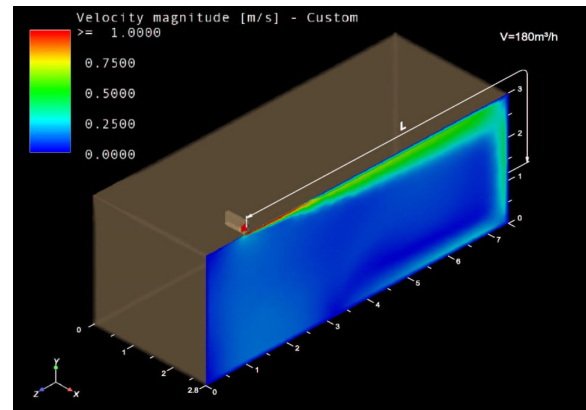
The Values of **flow length** of each diffuser have been defined in isothermal conditions in accordance with ISO 5219 regulation with deflectors angled in "cooling" position, for horizontal flow. The length of the flow is indicated by values obtained from the speed along the trajectory of the air vein.

An analysis has also been carried out of the intersection of the flow of two diffusers with equal flow rate placed opposite at a distance of 4.5 meters. In this case the obtained results show the air speed of the intermediate zone between the two diffusers at different heights.

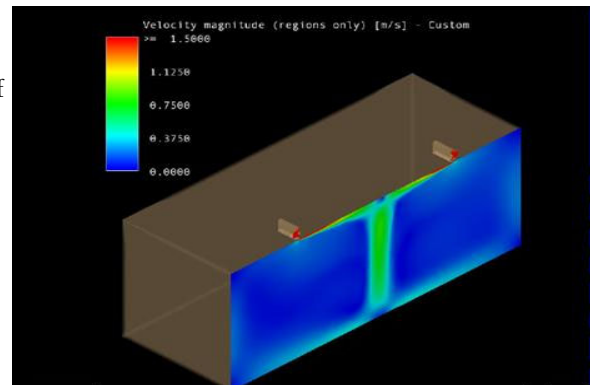
The values of the **depth of penetration** have been defined with the deflectors angled in "heating" position with a temperature difference between injected and room temperature of 10 °C. The best possible adherence to real conditions has been followed considering the dissipation of heat throw surfaces of the virtual test room.

The values of **pressure loss** have been defined in isothermal conditions with deflectors angled both at "heating" and "cooling" positions.

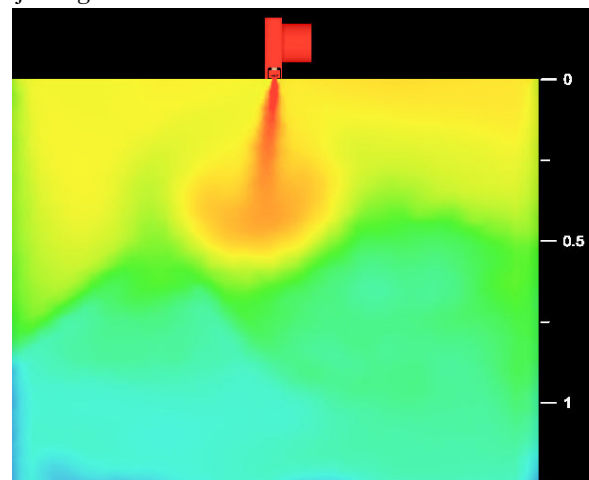
The A_k values (efficient section for the expulsion of the air flow) have been defined in accordance with ISO 5219 regulation.



cooling conditions
deflectors angled for horizontal flow



cooling conditions
joining of flows



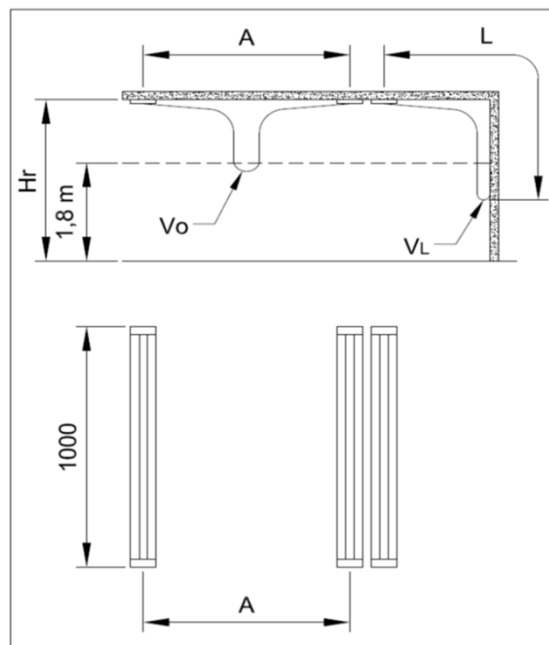
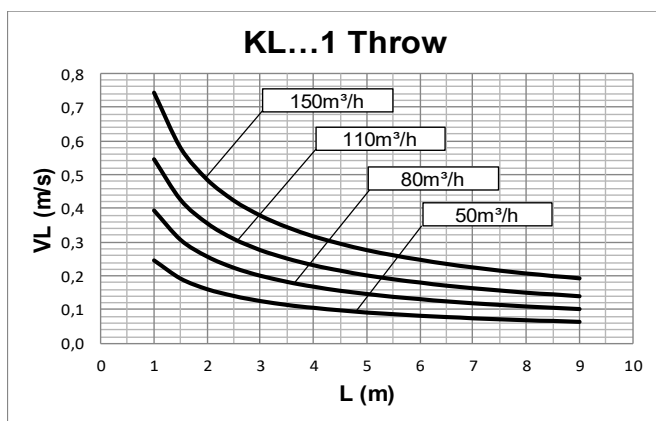
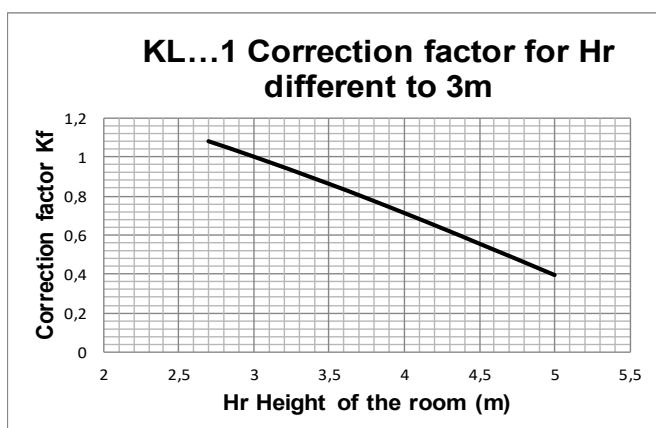
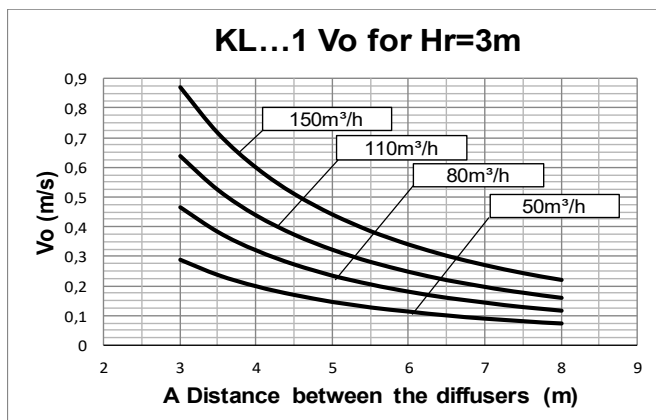
heating conditions
deflectors angled for vertical flow



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PERFORMANCE ONE SLOT

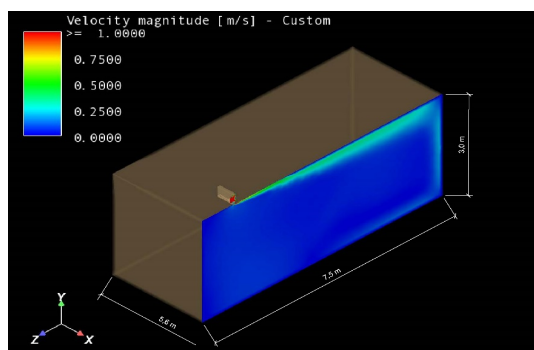
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Data obtained from CFD mathematical model in a virtual test room, operating in isothermic conditions in accordance with international standard: ISO 5219 1984: Air distribution and air diffusion - Laboratory. Aerodynamic testing and rating of air terminal devices.

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 L (m) horizontal distance in meters from centre of the diffuser
 V_L (m/s) maximum speed in air stream at distance L

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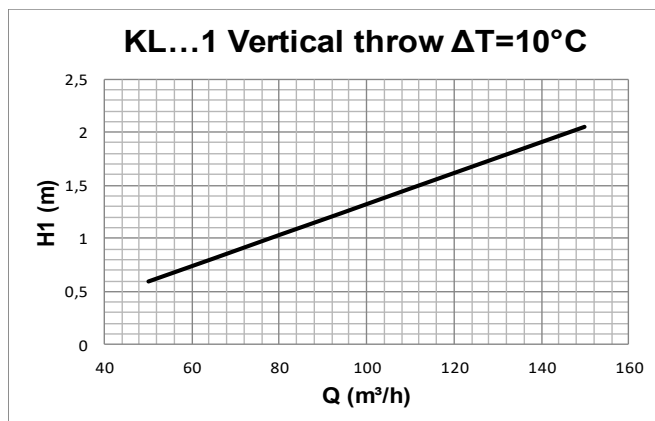




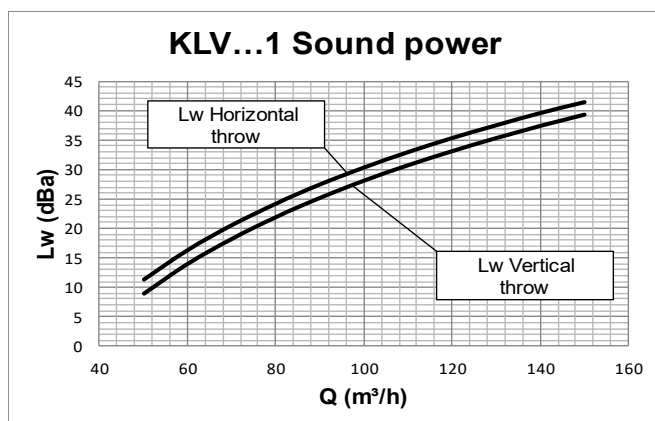
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PERFORMANCE ONE SLOT

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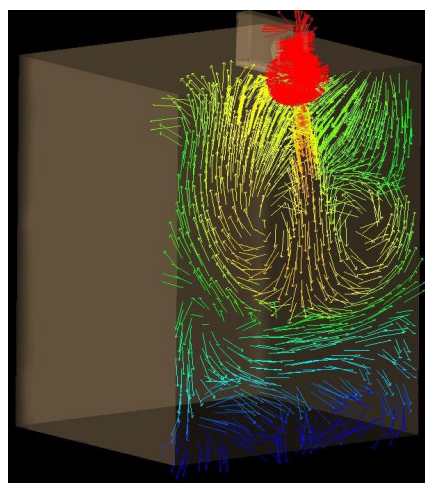
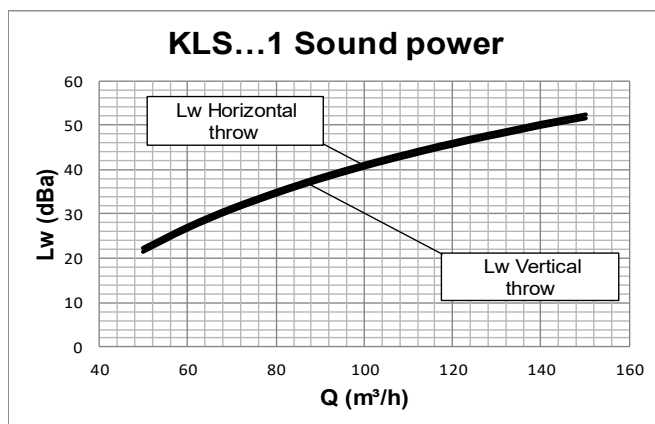
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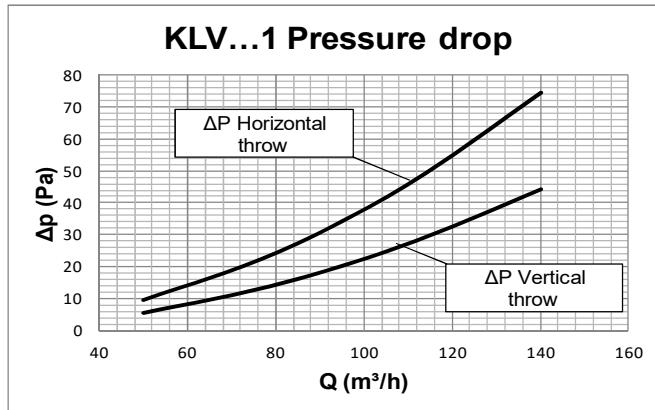




LINEAR SLOT DIFFUSERS

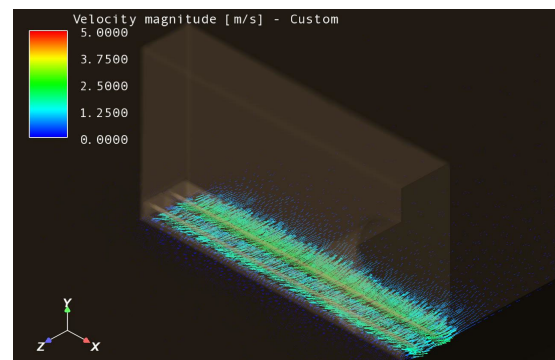
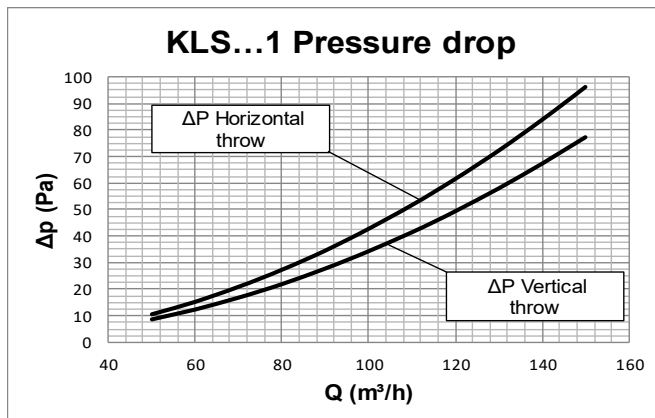
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PERFORMANCE ONE SLOT



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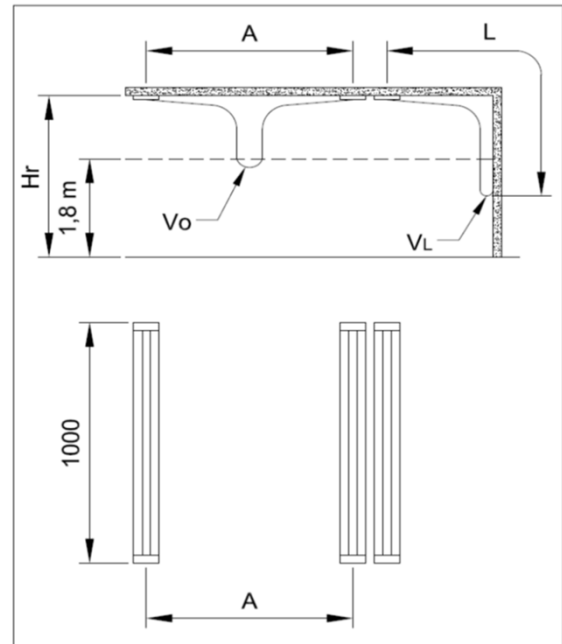
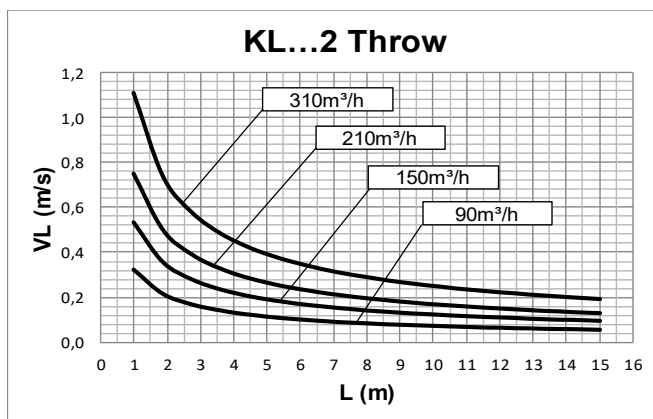
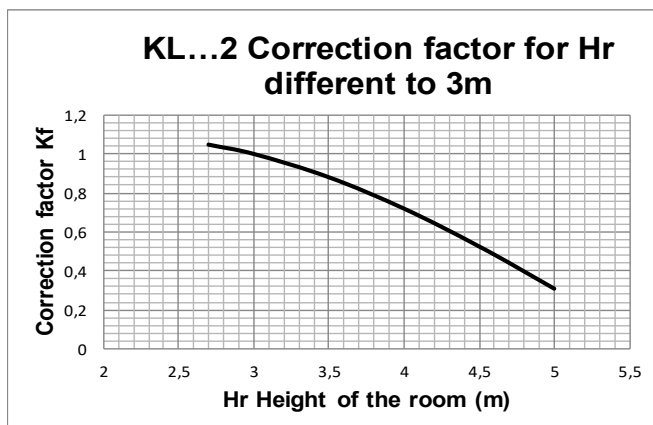
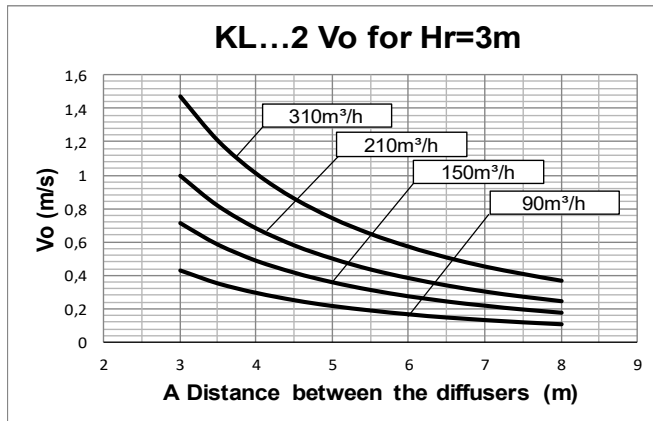




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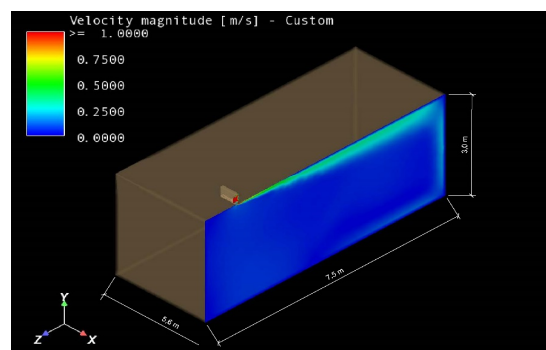
PERFORMANCE TWO SLOTS



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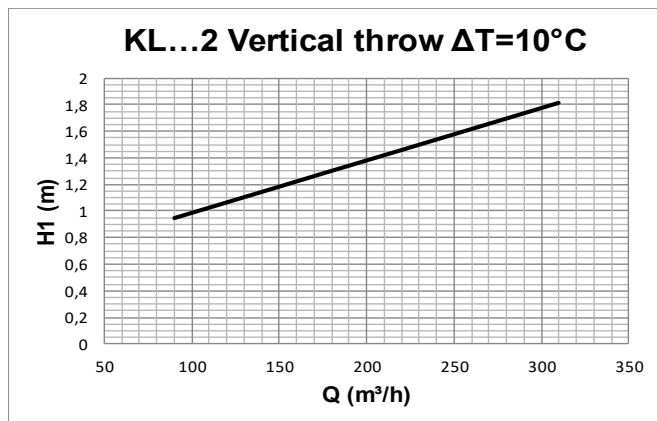




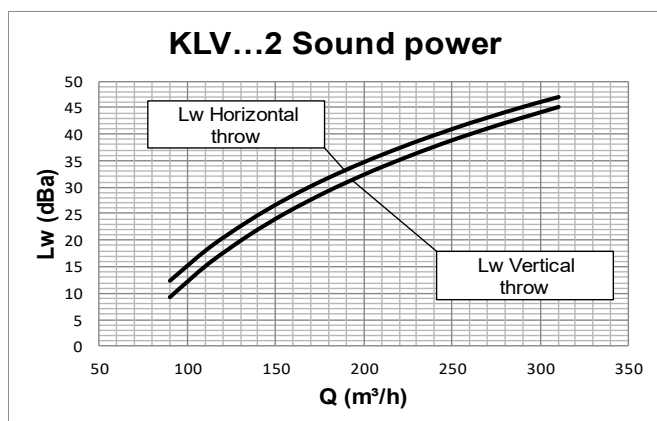
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PERFORMANCE TWO SLOTS



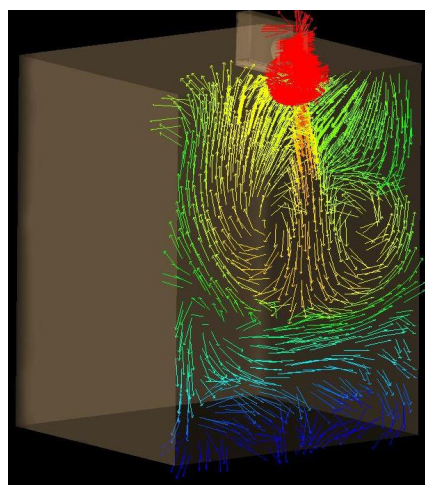
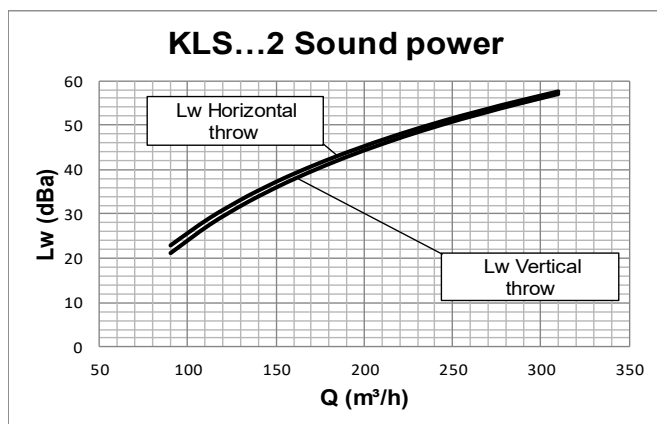
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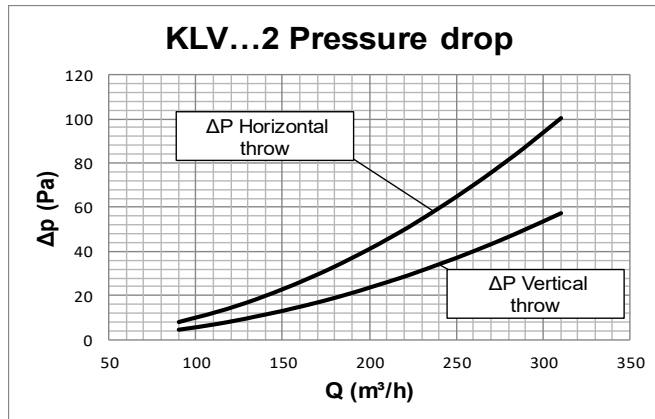




LINEAR SLOT DIFFUSERS

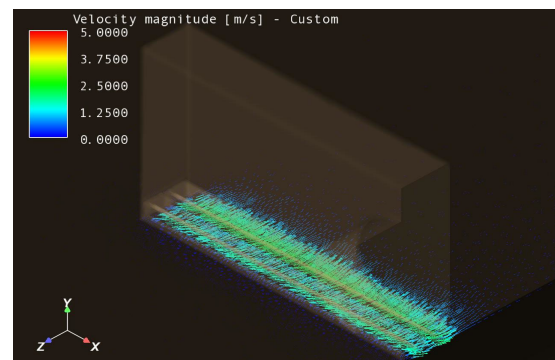
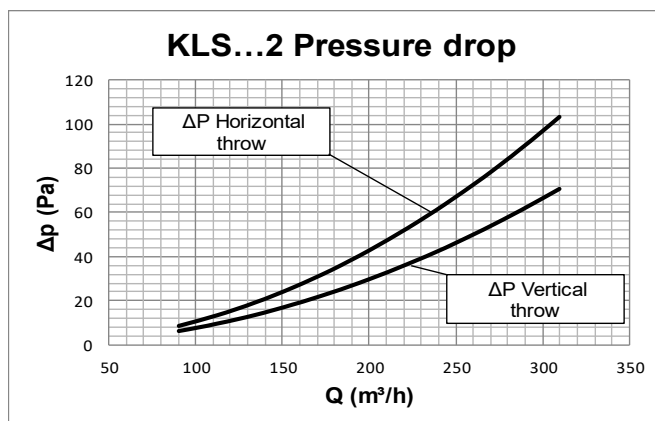
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PERFORMANCE TWO SLOTS



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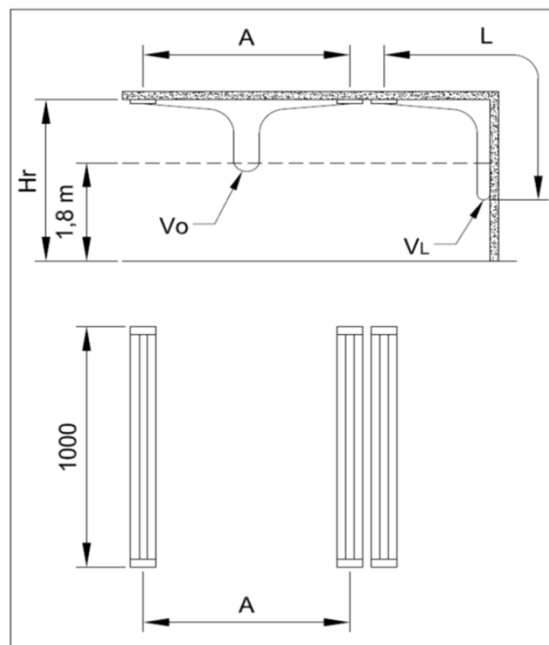
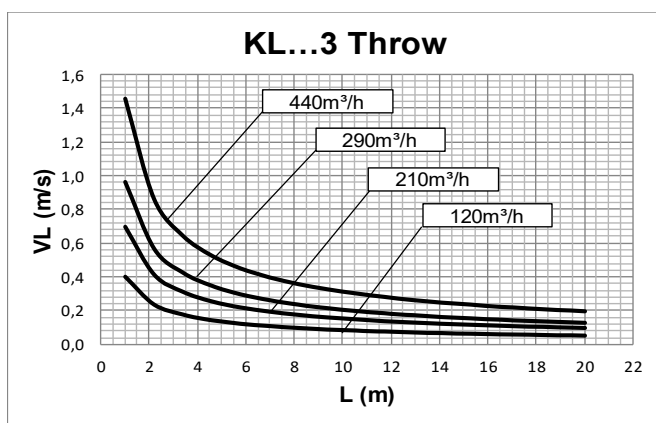
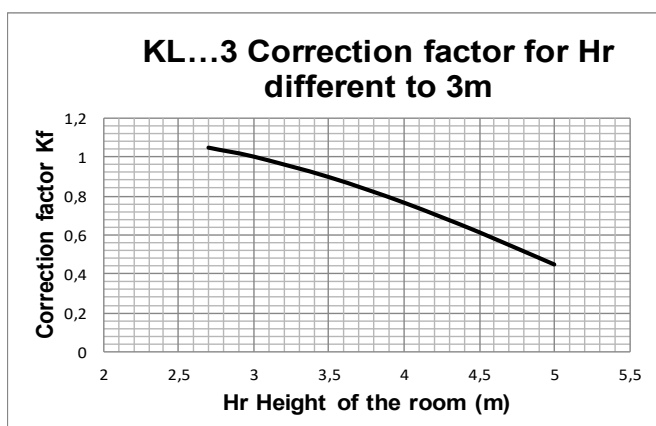
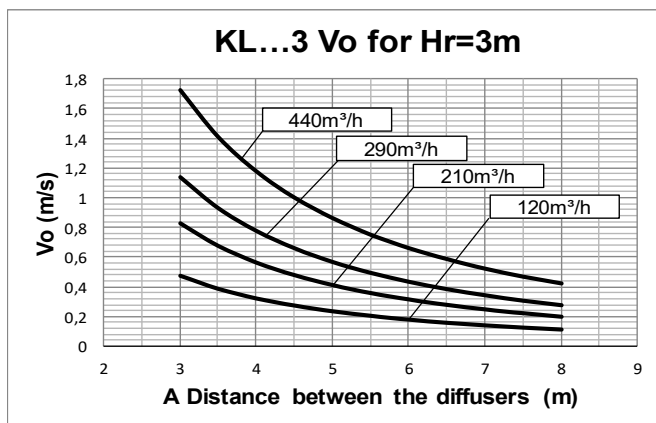




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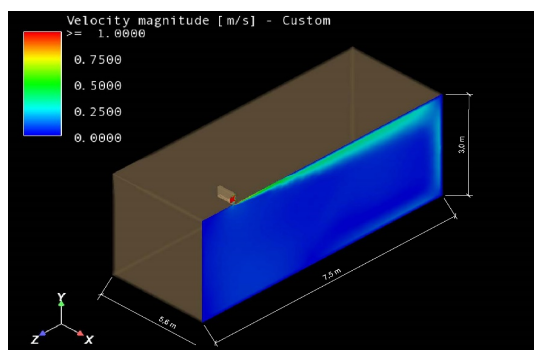
PERFORMANCE
THREE SLOTS



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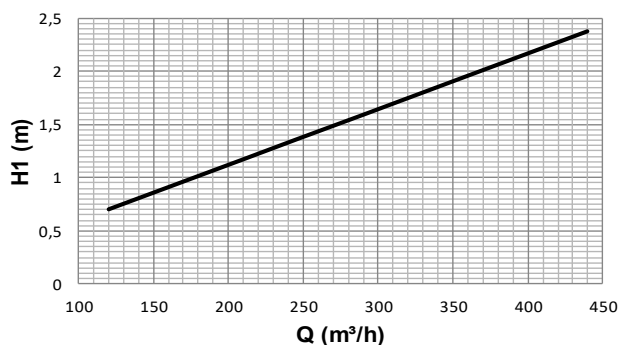


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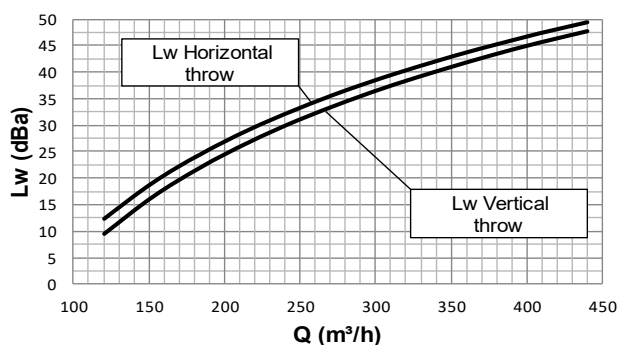
PERFORMANCE THREE SLOTS

KL...3 Vertical throw $\Delta T=10^{\circ}\text{C}$



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KLV...3 Sound power

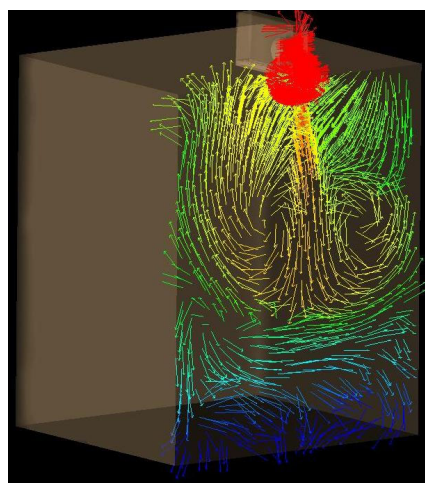
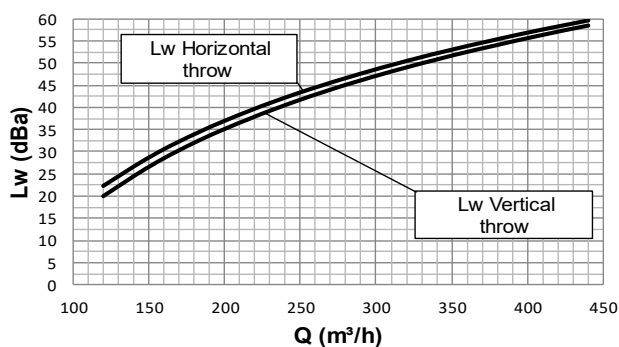


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KLS...3 Sound power

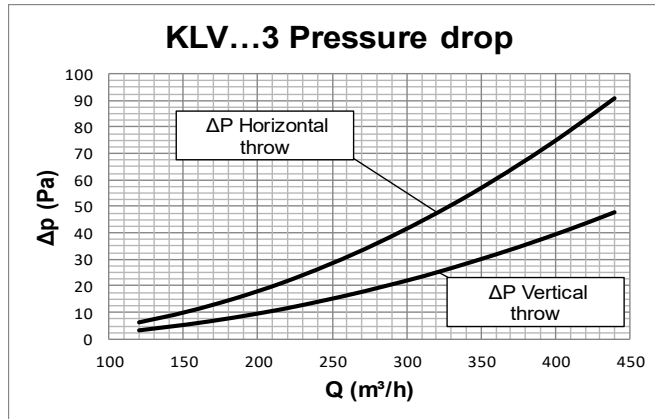




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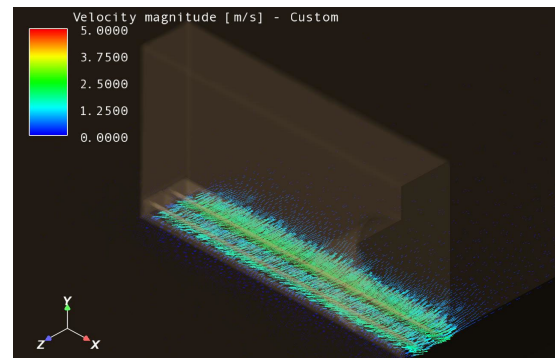
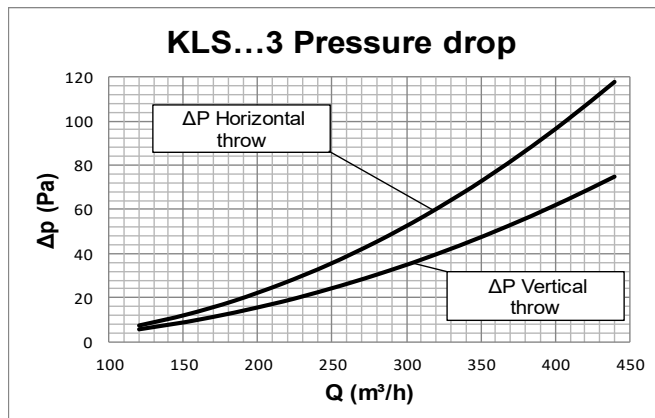
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PERFORMANCE
THREE SLOTS



Data obtained from CFD mathematical model in a virtual test room, operating in isothermic conditions in accordance with international standard:

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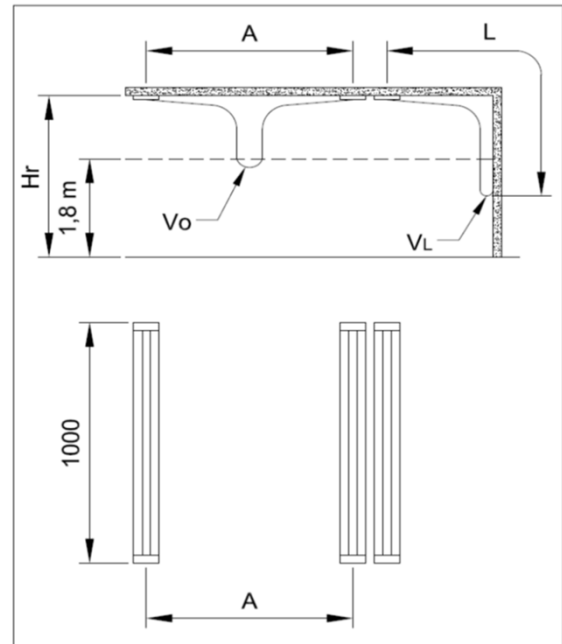
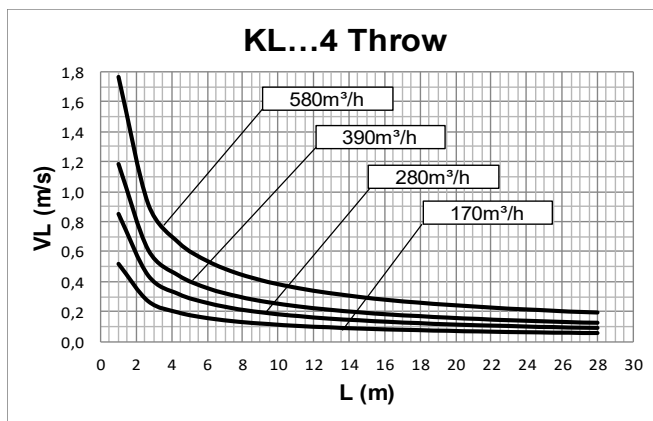
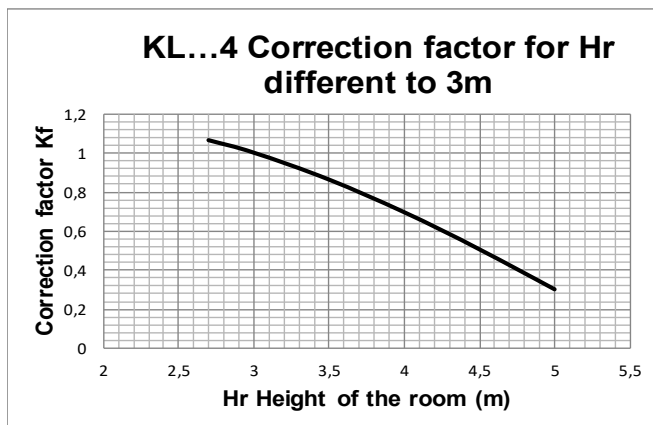
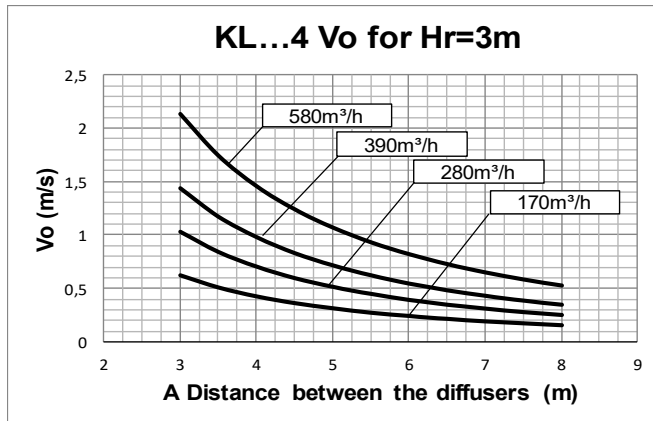




LINEAR SLOT DIFFUSERS

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PERFORMANCE
FOUR SLOTS



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A (m) distance between diffusers

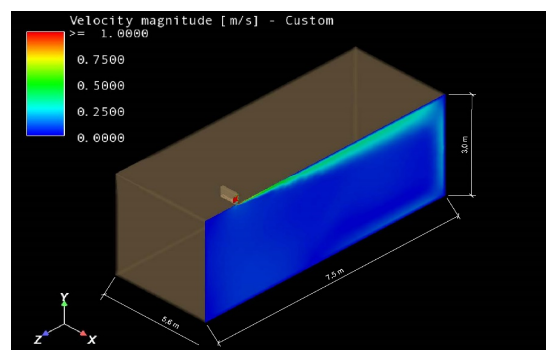
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$$Vo(h) = Vo \times Kf$$

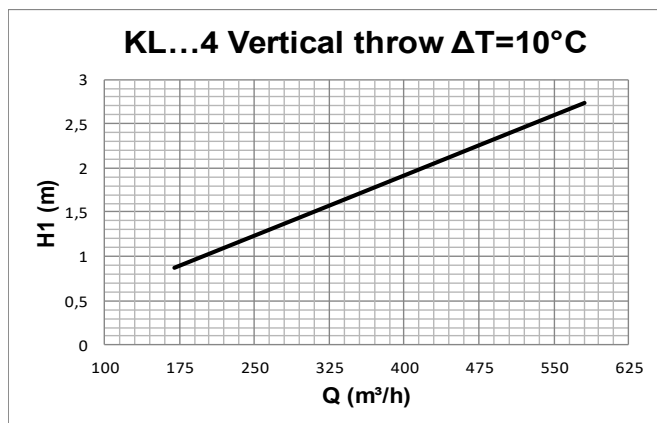




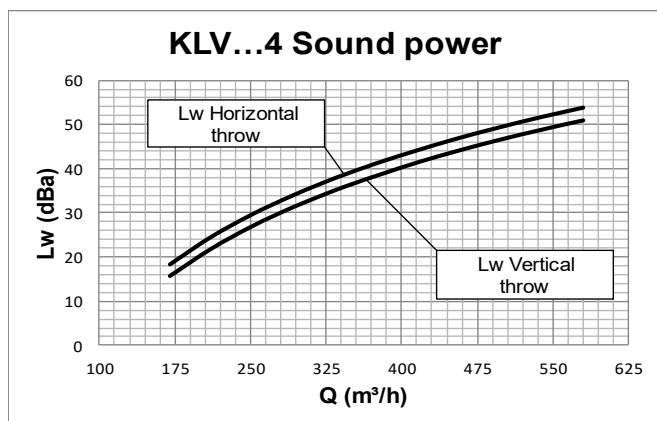
LINEAR SLOT DIFFUSERS

PERFORMANCE
FOUR SLOTS

KLV
KLS
SERIES



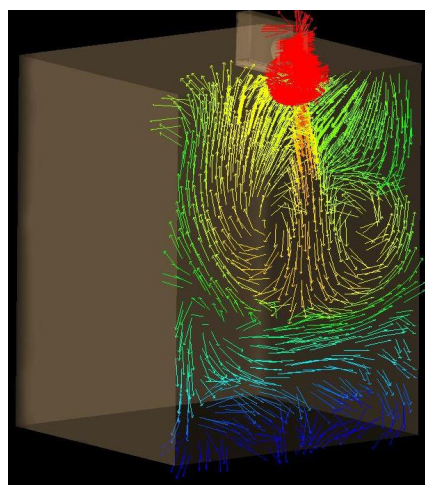
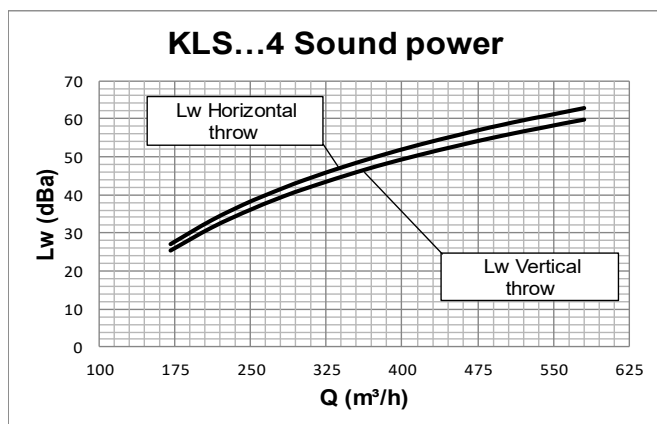
Data obtained from CFD mathematical model in a virtual test room operating in heating conditions with $\Delta T=10^{\circ}\text{C}$ in accordance with international standard: ISO 5219 1984: *Air distribution and air diffusion - Laboratory. Aerodynamic testing and rating of air terminal devices.* H1 (m) vertical distance in meters from the centre of the diffuser where the inversion of the air flow occurs.



Data measured in reverberating room in accordance with the following international standards: ISO 3741 1999: *Acoustic - determination of sound power levels of noise sources using sound pressure - Precision methods for reverberation rooms*

ISO 5135 1997: *Acoustic - determination of sound power levels of noise from air-terminal devices; air terminal units; dampers and valves by measurement in a reverberation room.*

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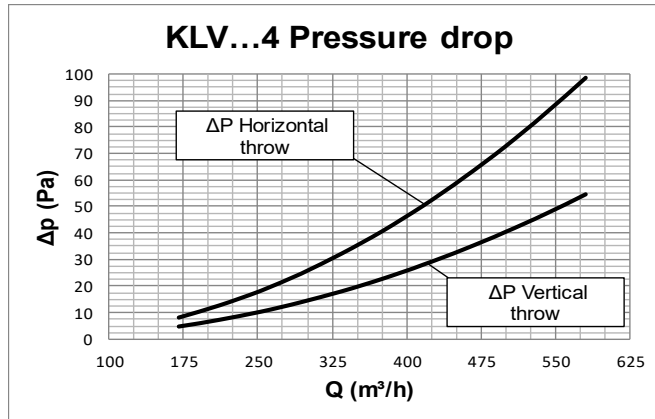




LINEAR SLOT DIFFUSERS

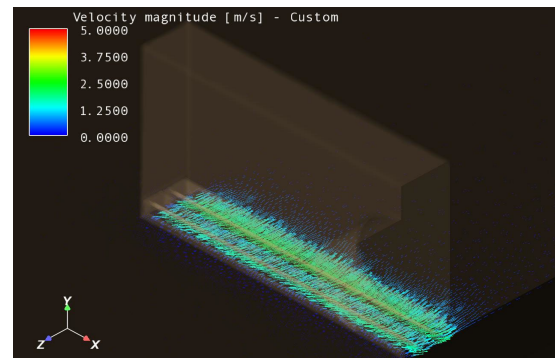
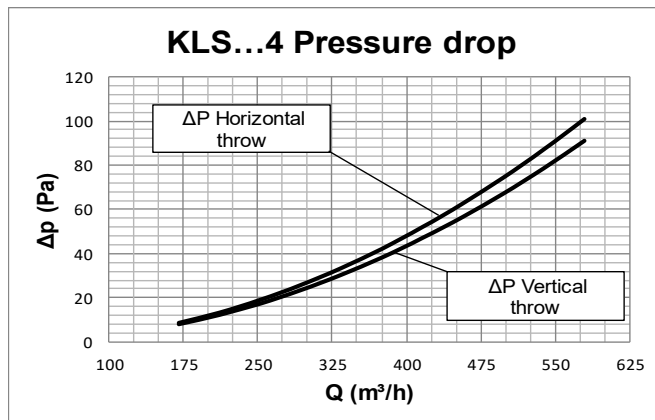
KLV
KLS
SERIES

PERFORMANCE
FOUR SLOTS



Data obtained from CFD mathematical model in a virtual test room, operating in isothermic conditions in accordance with international standard:

ISO 5219 1984: *Air distribution and air diffusion - Laboratory. Aerodynamic testing and rating of air terminal devices.*

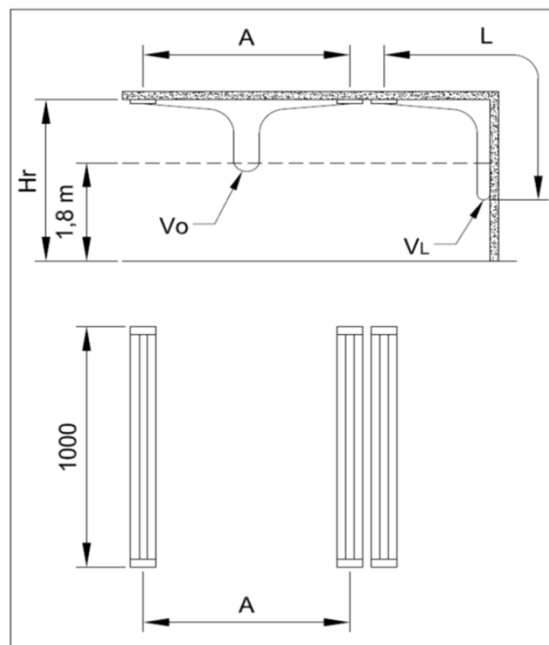
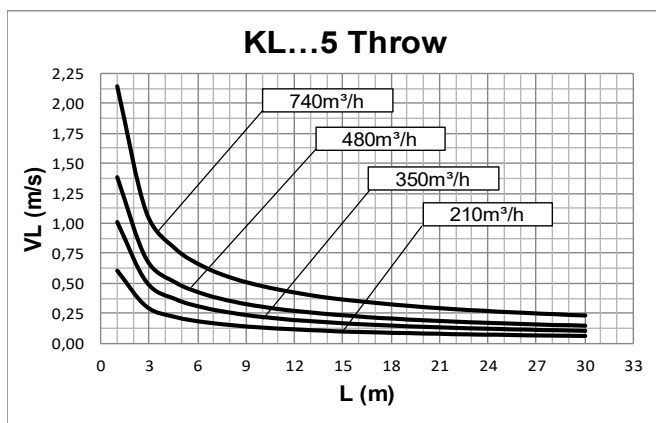
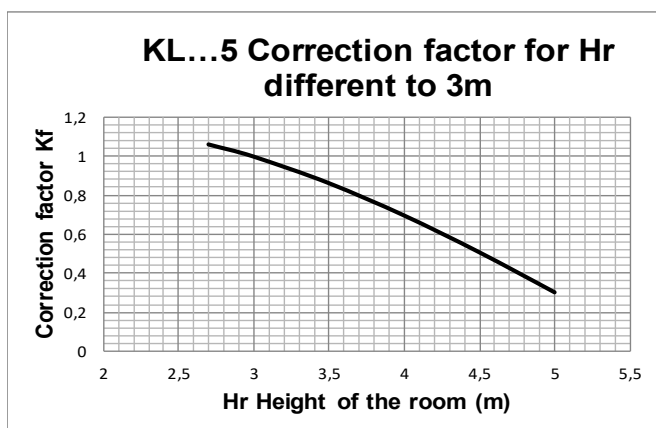
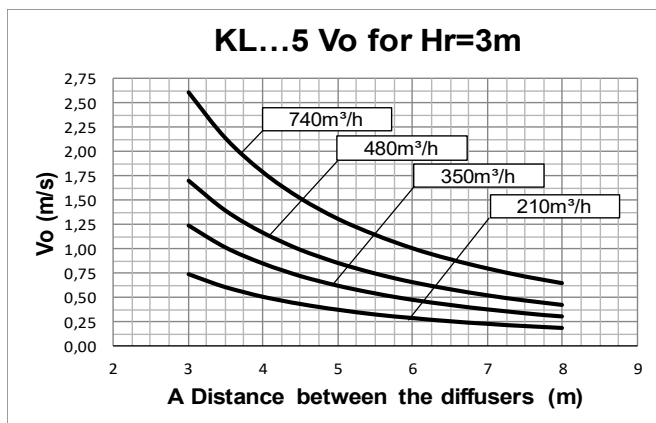




LINEAR SLOT DIFFUSERS

KLV
KLS
SERIES

PERFORMANCE FIVE SLOTS



Data obtained from CFD mathematical model in a virtual test room, operating in isothermic conditions in accordance with international standard: ISO 5219 1984: Air distribution and air diffusion - Laboratory. Aerodynamic testing and rating of air terminal devices.

A (m) distance between diffusers

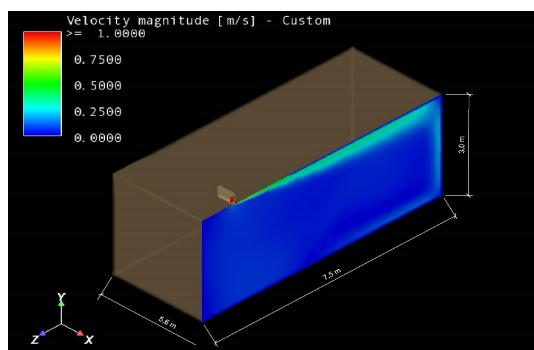
Vo (m/s) speed at external limit of occupied area

L (m) horizontal distance in meters from centre of the diffuser

VL (m/s) maximum speed in air stream at distance L

For Hr different to 3m, use the multiplier factor KF:

$$Vo(h) = Vo \times Kf$$

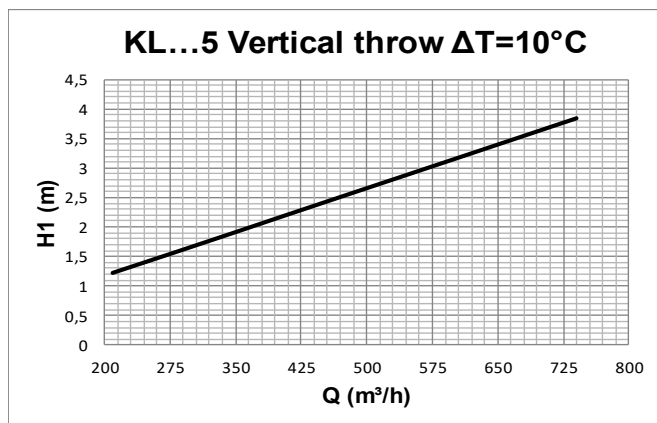




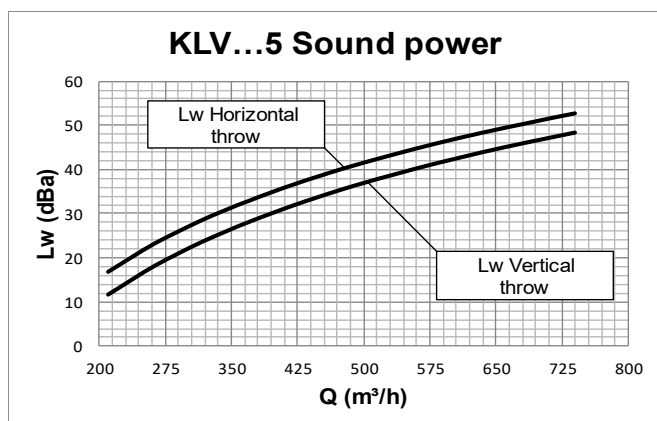
LINEAR SLOT DIFFUSERS

KLV
KLS
SERIES

PERFORMANCE FIVE SLOTS



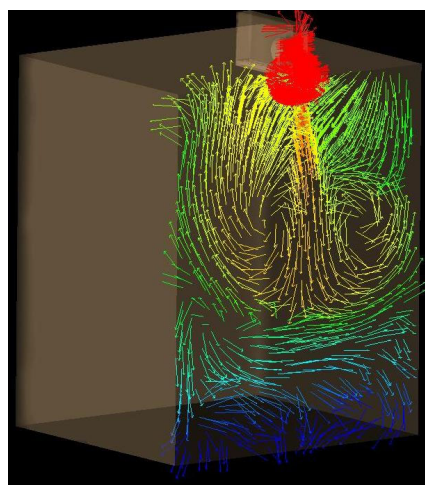
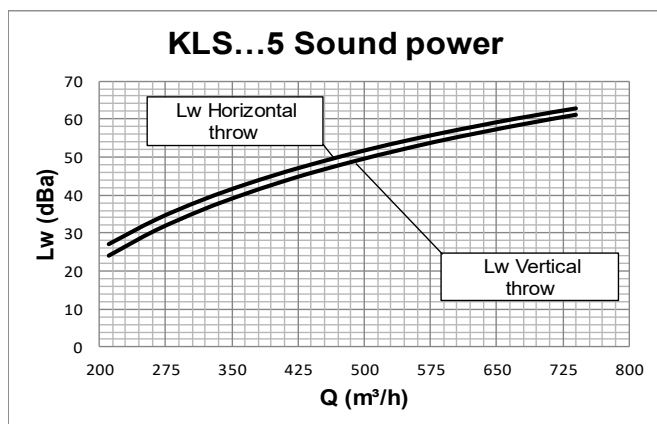
Data obtained from CFD mathematical model in a virtual test room operating in heating conditions with $\Delta T=10^{\circ}\text{C}$ in accordance with international standard: ISO 5219 1984: *Air distribution and air diffusion - Laboratory. Aerodynamic testing and rating of air terminal devices.* H1 (m) vertical distance in meters from the centre of the diffuser where the inversion of the air flow occurs.



Data measured in reverberating room in accordance with the following international standards: ISO 3741 1999: *Acoustic - determination of sound power levels of noise sources using sound pressure - Precision methods for reverberation rooms*

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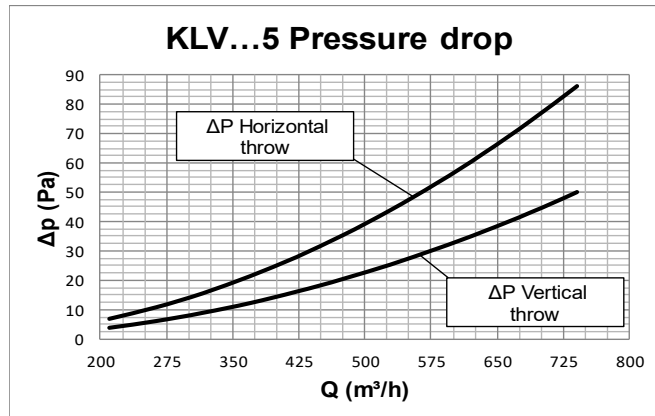




LINEAR SLOT DIFFUSERS

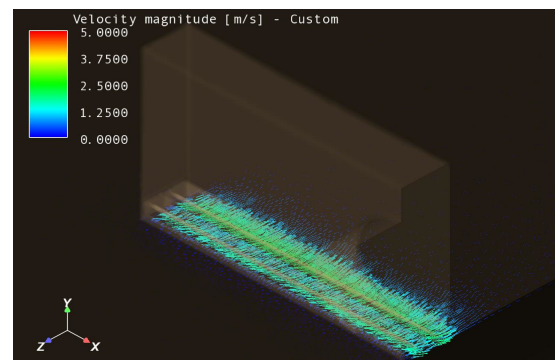
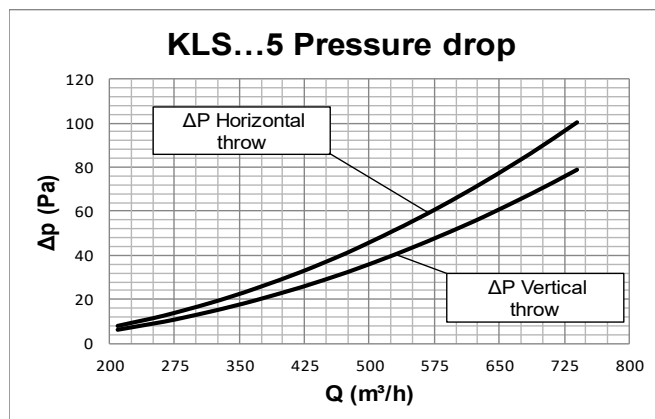
KLV
KLS
SERIES

PERFORMANCE
FIVE SLOTS



Data obtained from CFD mathematical model in a virtual test room, operating in isothermic conditions in accordance with international standard:

ISO 5219 1984: *Air distribution and air diffusion - Laboratory. Aerodynamic testing and rating of air terminal devices.*

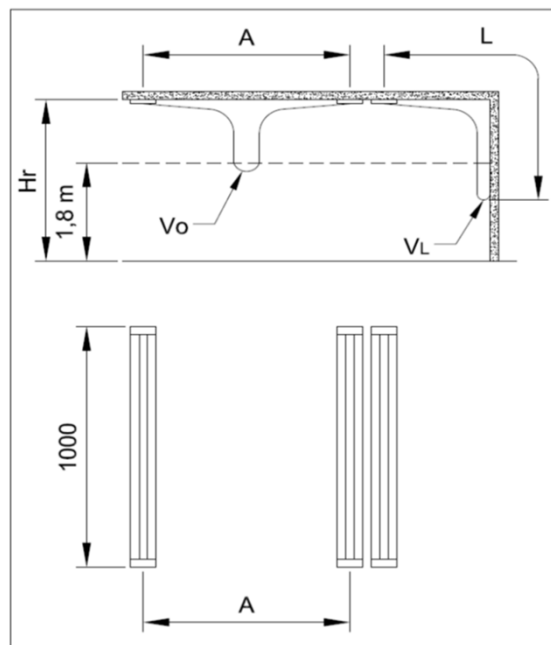
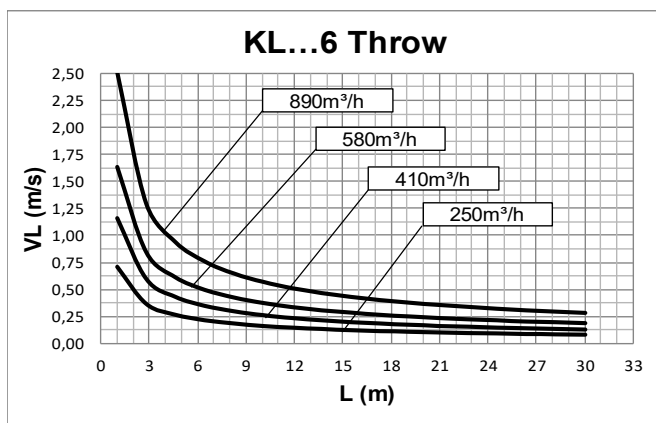
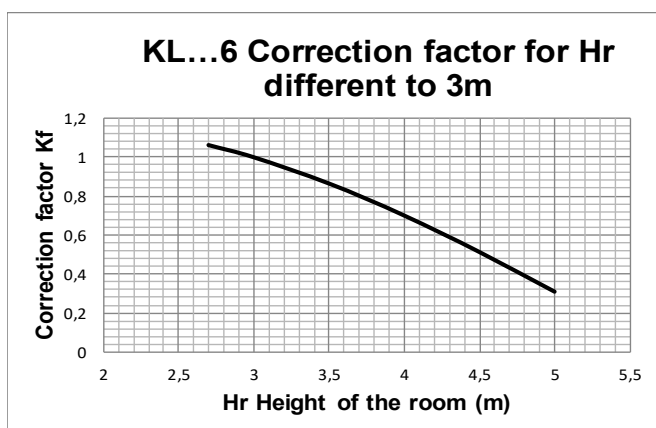
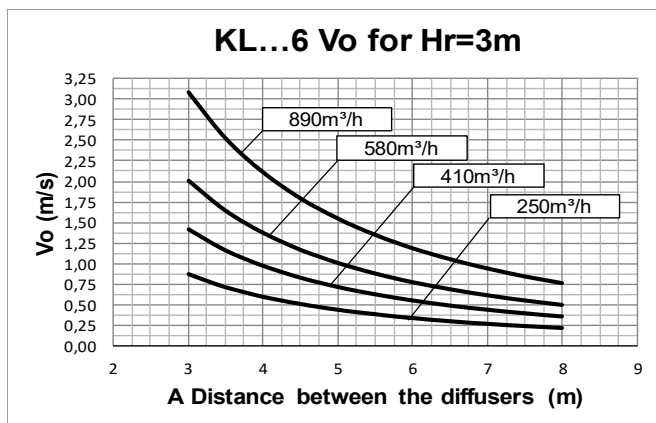




LINEAR SLOT DIFFUSERS

PERFORMANCE SIX SLOTS

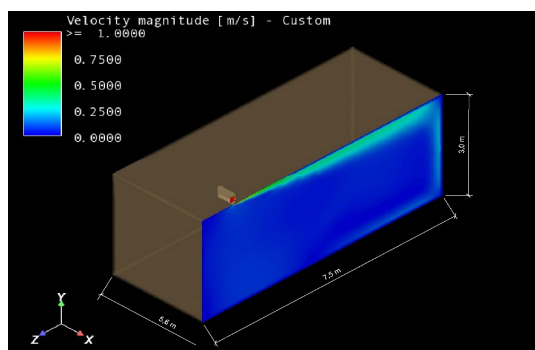
KLV
KLS
SERIES



Data obtained from CFD mathematical model in a virtual test room, operating in isothermic conditions in accordance with international standard: ISO 5219 1984: Air distribution and air diffusion - Laboratory. Aerodynamic testing and rating of air terminal devices.

A (m) distance between diffusers
Vo (m/s) speed at external limit of occupied area
L (m) horizontal distance in meters from centre of the diffuser
VL (m/s) maximum speed in air stream at distance L

For Hr different to 3m, use the multiplier factor KF:
 $V_o(h) = V_o \times K_f$

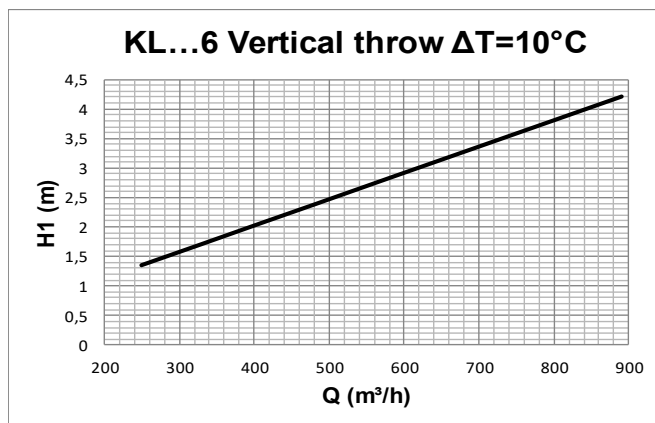




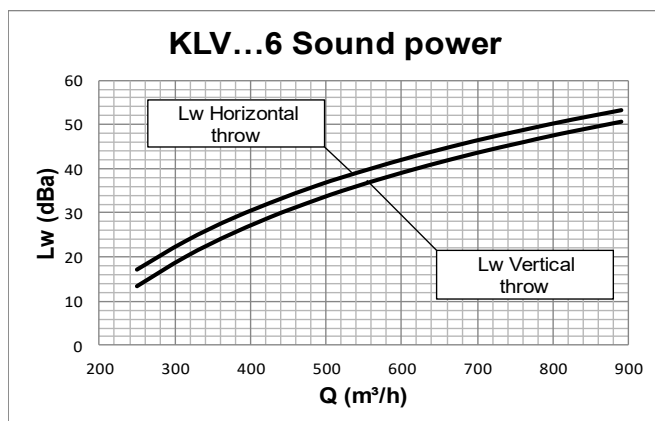
LINEAR SLOT DIFFUSERS

PERFORMANCE
SIX SLOTS

KLV
KLS
SERIES



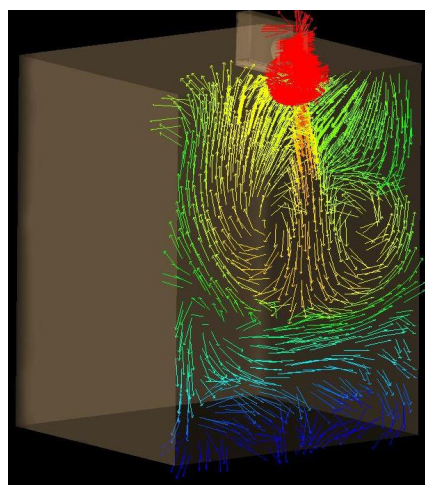
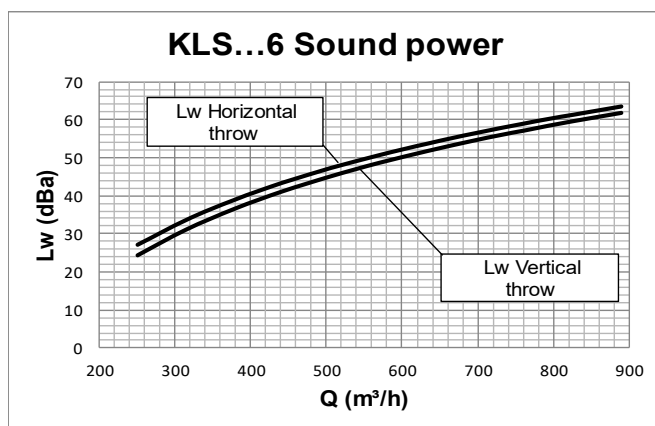
Data obtained from CFD mathematical model in a virtual test room operating in heating conditions with $\Delta T=10^\circ\text{C}$ in accordance with international standard: ISO 5219 1984: *Air distribution and air diffusion - Laboratory. Aerodynamic testing and rating of air terminal devices.* H1 (m) vertical distance in meters from the centre of the diffuser where the inversion of the air flow occurs.



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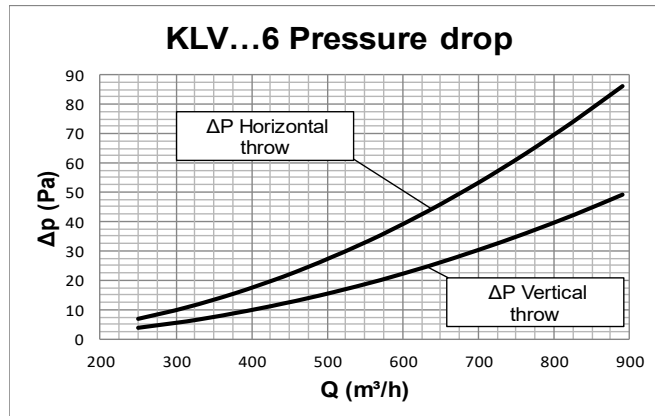




LINEAR SLOT DIFFUSERS

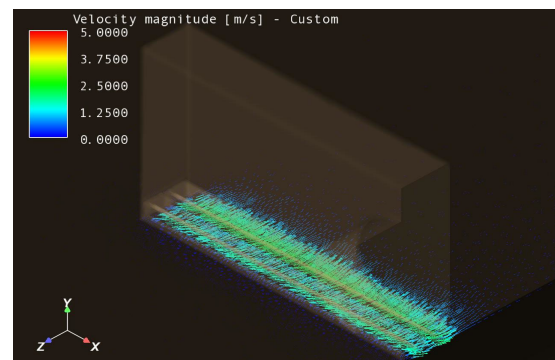
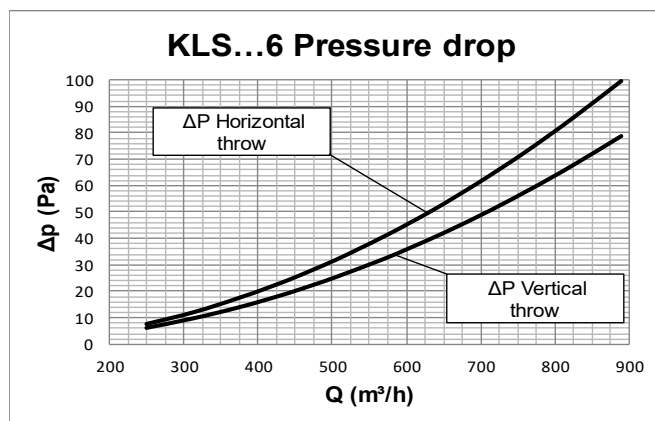
KLV
KLS
SERIES

PERFORMANCE SIX SLOTS



Data obtained from CFD mathematical model in a virtual test room, operating in isothermic conditions in accordance with international standard:

ISO 5219 1984: *Air distribution and air diffusion - Laboratory. Aerodynamic testing and rating of air terminal devices.*

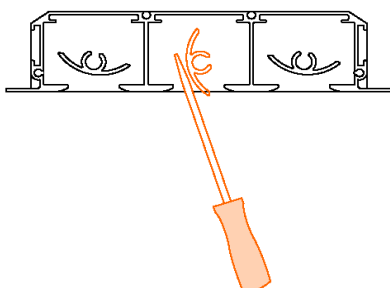
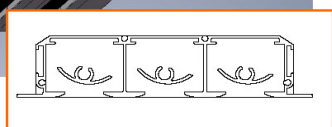
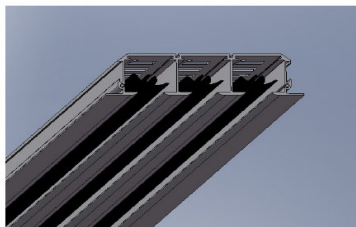




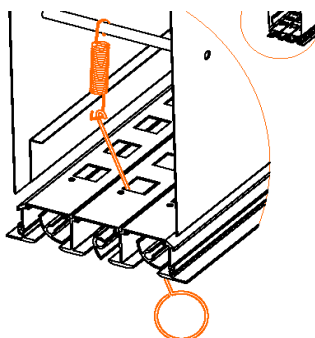
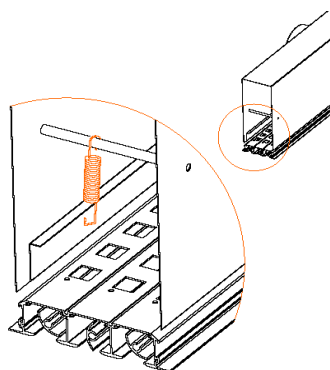
LINEAR SLOT DIFFUSERS

KLV
KLS
SERIES

ASSEMBLY INSTRUCTIONS VERSION WITH FIXING SPRING



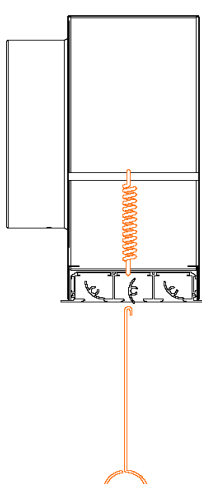
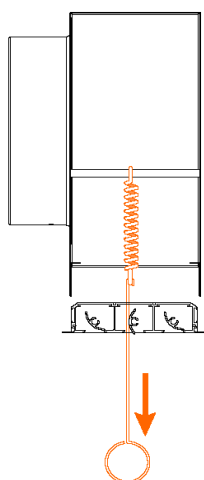
Vertically position the lug slot centrally or near the centre acting as shown in the picture, with a screwdriver at the ends of the deflector (without applying pressure to the centre of it).



Locate the spring attached inside the plenum (shown above in section).

Thread the hook shown in the picture through the slot with the deflector previously positioned vertically taking care to insert it on the side of the fixing hole shown.

Number of springs:
- 2 springs for diffuser, regardless of length



Using the hook stretch the spring and hook it to the fixing hole.

Repeat on the other side.

Release the diffuser that as a result of the tension in the springs will stay aligned with the plenum.

NOTE

For lengths up to 2000mm there are two springs already included in the product code of the diffuser.

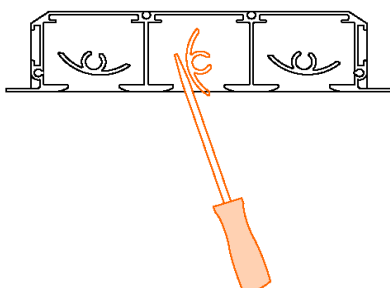
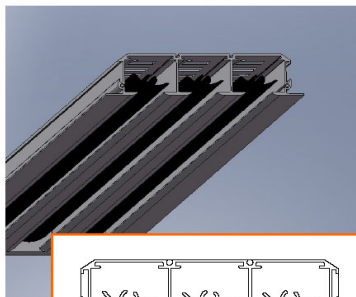
For lengths over 2000mm composed of several diffusers, two mounting springs for each unit should be foreseen.



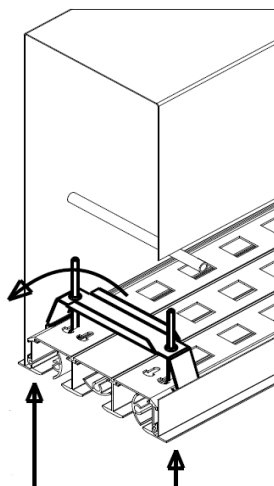
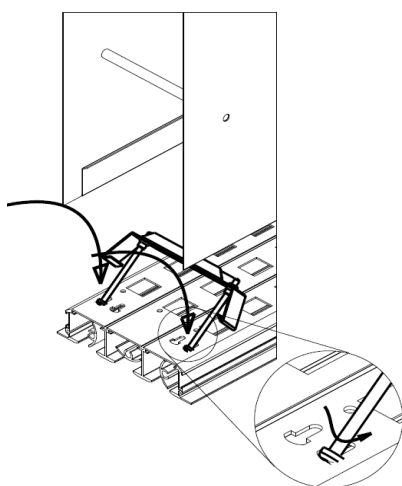
LINEAR SLOT DIFFUSERS

KLV
KLS
SERIES

FITTING INSTRUCTIONS FOR VERSIONS WITH FIXING BRIDGE

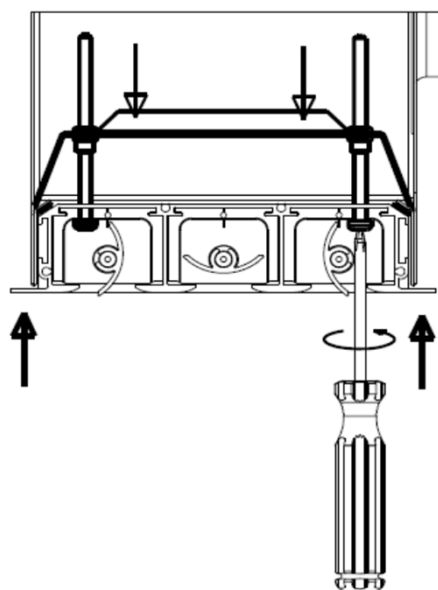


Vertically position the lug of the central slot or near the centre acting as shown in the figure, with a screwdriver at the ends of the deflector (without applying pressure to the centre of it).



Attach fixing bridges to the diffuser by inserting the screw heads in its slots. Insert the diffuser into the plenum and, turning the screws, place the bridge on the folds of sheet metal cut into the sides of the plenum.

Number of bridges:
- Up to 1500mm length; 2 bridges
- 1500mm length over: 3 bridges.



turn the screws until the diffuser completely touches the ceiling.

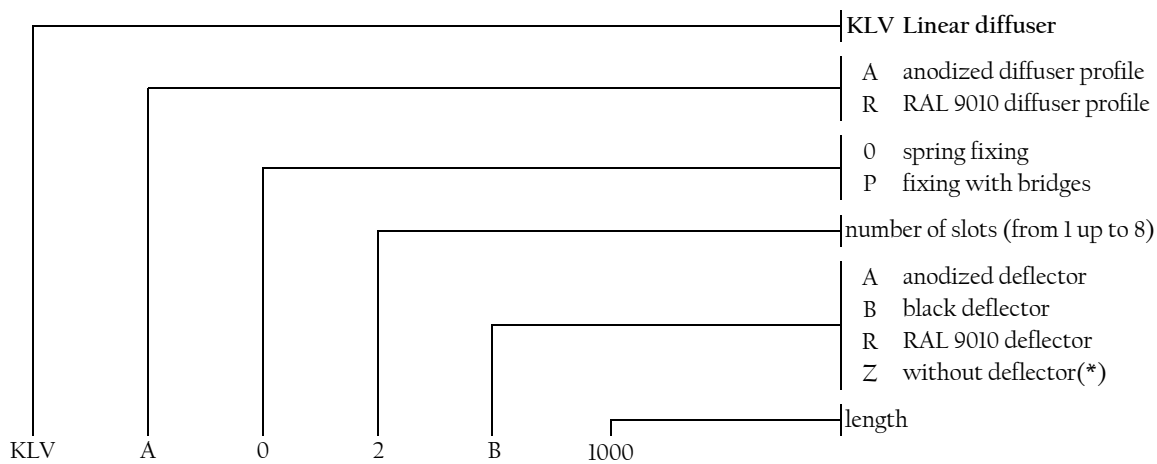
NOTE
For lengths up to 1500mm two bridges are already included in the code of the diffuser.
For lengths over 1500mm up to 2000mm three bridges are already included in the code of the speaker.
For lengths over 2000mm composed by various elements, it is necessary to foresee:
2 fixing bridges for each element of length up to 1500mm;
3 fixing bridges for each element of lengths greater than 1500mm.



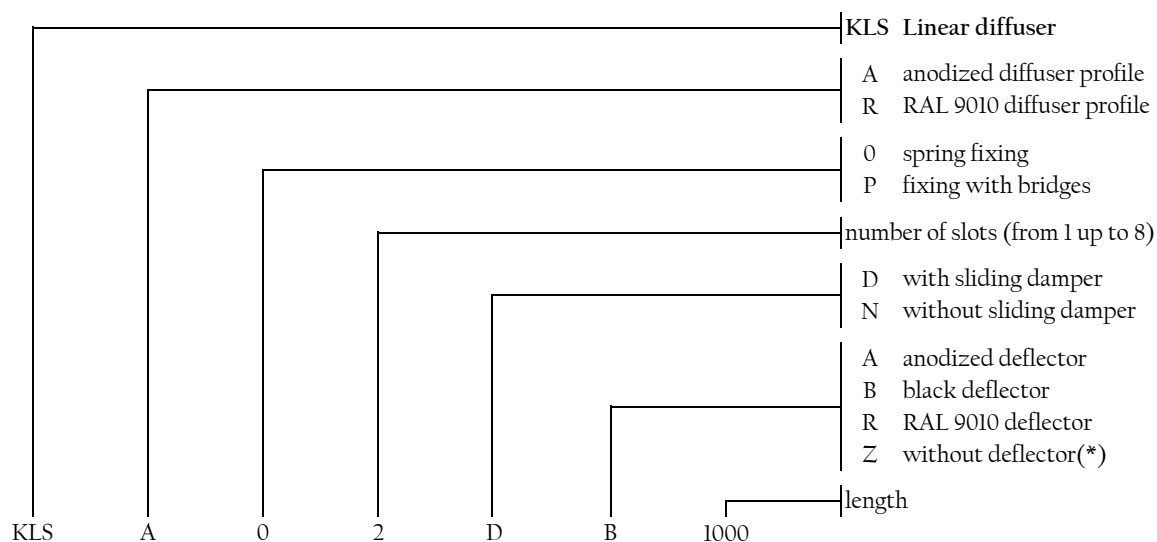
LINEAR SLOT DIFFUSERS

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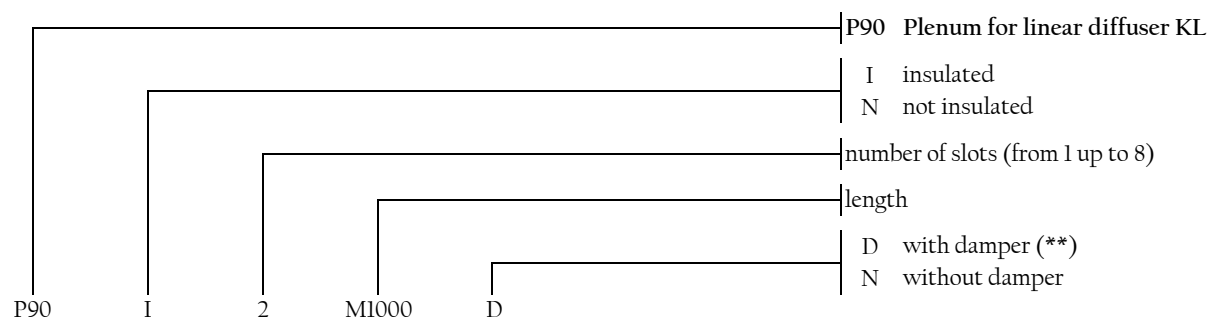
HOW TO ORDER



(*) the version without deflectors is best used for the return of air.



(*) the version without deflectors is best used for the return of air.



(**) for the KLS series it is not recommended to use the damper in the plenum connector

Standard lengths:

800 mm
1000 mm
1500 mm
2000 mm

All intermediate sizes are available on request

Plenums longer or equal to 1500mm are supplied with two connections