



VDL



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Description

For spaces with varying heat loads, the supply air often has to be either cool, isothermal or warm as required.

With the VDL adjustable swirl diffusers, the blade position can be altered (horizontal, angled or vertical air discharge) to give optimum penetration into the occupied zone when cooling or heating, at the same time meeting good comfort criteria.

With high air handling capacity, the swirl diffuser is suitable for use in industrial and comfort conditioning environments.

The diffuser can be used with large room to ceiling heights (e. g. factories, airport terminals, theatres, banking halls) also in lower ceiling applications 3.80 m (e. g. assembly rooms), particularly where the supply air temperature differential varies between -10 K and +15 K.

On the constructions with fixed air control blades, the air is discharged in a horizontal direction only.



Blade position for horizontal air discharge (supply air – cooling)



Construction · Dimensions

Construction

The VDL swirl diffusers are available in four sizes. The diffuser face comprises an outer ring incorporating a discharge nozzle, air control blades (adjustable or fixed), a central cover cap and a rear mounted spigot. The blade position can be adjusted either manually by taking off the cap and loosening the winged screw or by means of an electric actuator. The outer discharge ring is supplied on request with or without a flange.

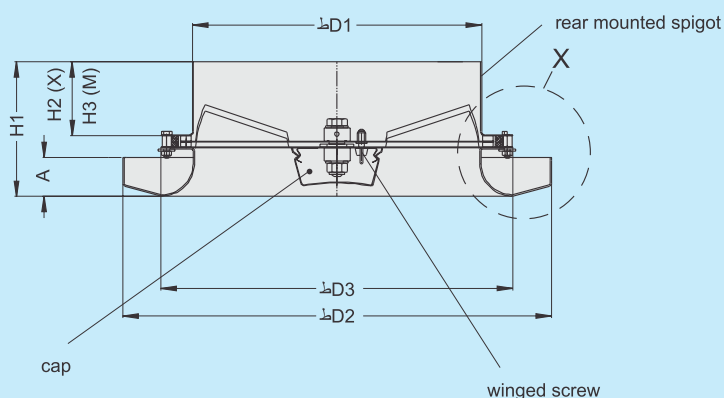
The units with a removable face have a safety cable between plenum box/casing and diffuser face. The face can easily be fitted or removed by means of 3 quick release fasteners.

The unit variants with top entry casings are connected directly to the duct. The casings are provided with a reinforcing edge. A lip seal is optional. The diffuser sizes 630 and 800 are supplied with additional opposed action swirl blades

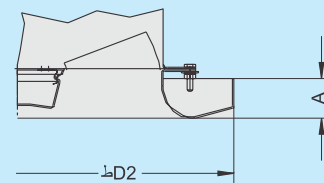
Dimensions in mm

Size	A	ØD1	ØD2	ØD3	H1	H2	H3	H4
315	42	313	464	381	145	92	80	215
400	45	398	567	468	157	101	89	236
630	51	628	871	700	204	117	105	367
800	55	798	1077	871	229	123	111	538

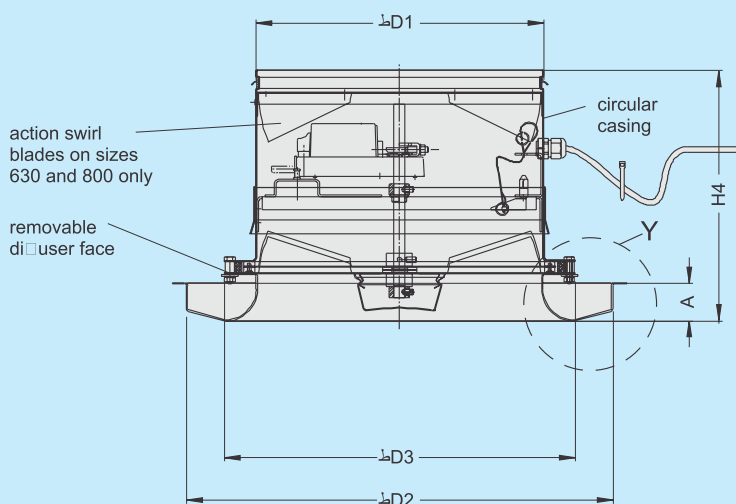
VDL-...-F
(VDL-A-F-M shown)



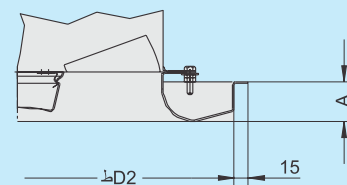
View X
Discharge ring without angle (A)



VDL-...-V
(VDL-B-V-D-E1...E3 shown)



View Y
Discharge ring with angle (B)





Construction · Dimensions · Materials

Construction

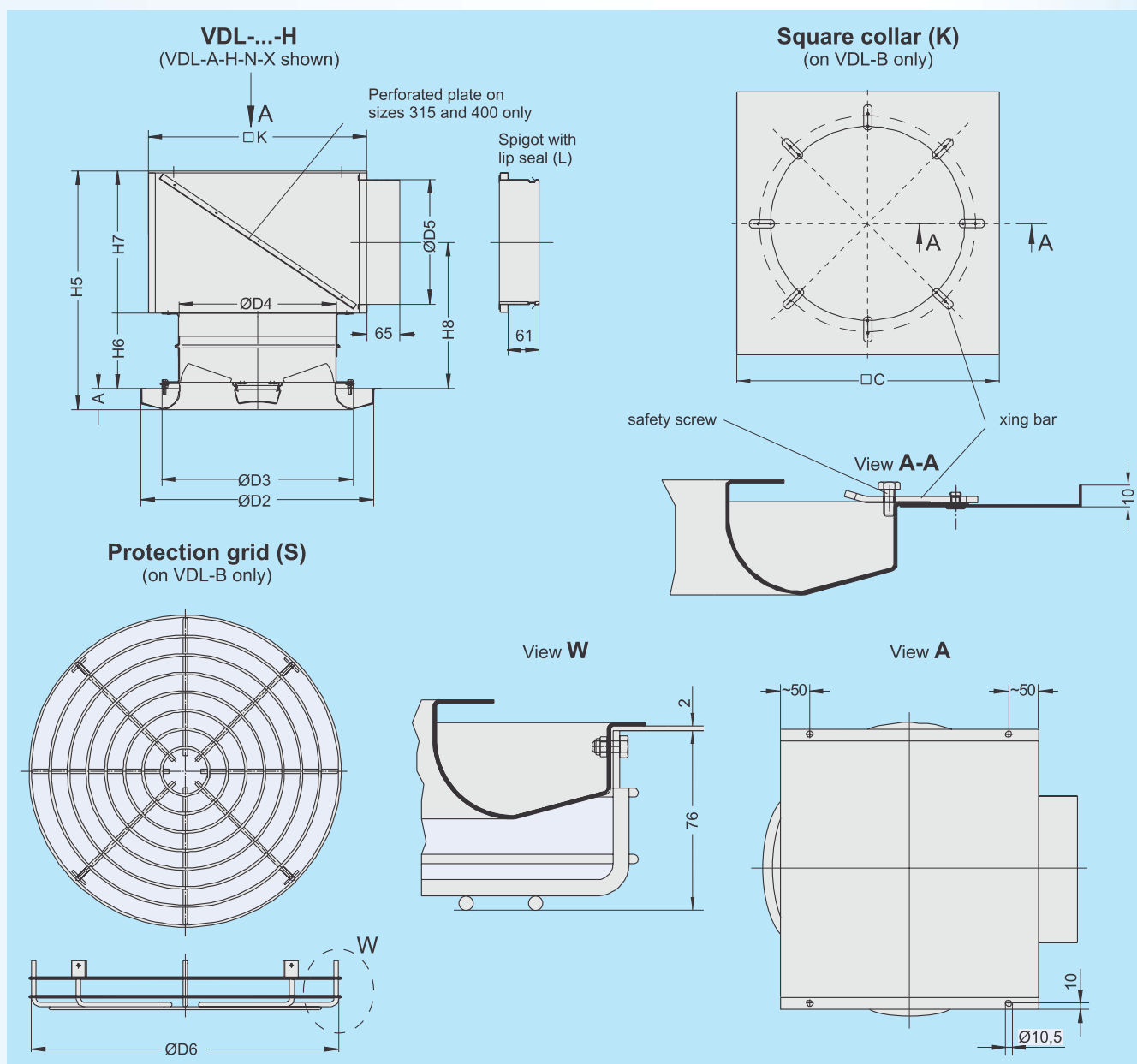
Type VDL-...-H swirl diuser sizes 315 and 400 with side entry spigots are supplied with an internal xed angled perforated plate in the plenum box. The diffuser sizes 630 and 800 are supplied with additional opposed action swirl blades. The circular spigot is supplied with a lip seal upon request. If the diuser is freely suspended from a ceiling, a square collar can be fitted to the diffuser face. An optional protection grid can be supplied for use in sports halls.

Materials

The outer ring incorporating a discharge nozzle and the central cover cap are made of aluminium. The blades, casing, spigots and plenum box are made of galvanised sheet steel. The surface of the diffuser face, collar and protection grid are powder-coated white (RAL 9010, gloss level 50 %), or in another RAL colour if requested (gloss level 70% or RAL 9006 gloss level 30 %).

Dimensions in mm

Size	A	ØD2	ØD3	ØD4	ØD5	ØD6	H5	H6	H7	H8	□ C	□ K
315	42	464	381	317	248	488	474	150	282	290	630	435
400	45	567	468	402	313	591	581	168	368	351	800	500
630	51	871	700	628	398	895	812	293	468	526	1260	750
800	55	1077	871	798	498	1101	1081	458	568	741	1600	1000





Installation

Due to their method of operation, the VDL swirl diffusers can be mounted flush in a ceiling or suspended in free space.

When fitted flush in open grid ceilings, the discharge characteristics are the same as when suspended in free space. The angle of the air discharge is continuously adjustable.

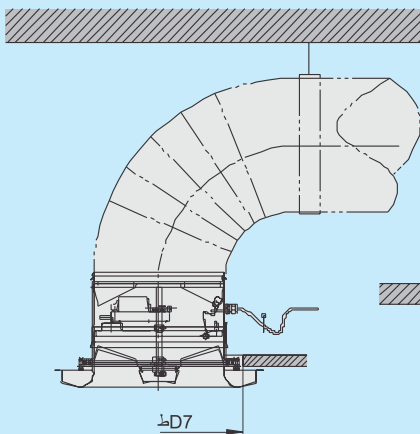
Type VDL-...-H swirl diffusers are suspended by the customer on cables or slotted strips using the drillings provided. Type VDL-...-F and VDL-...-V are mounted directly on the duct.

The installation of the diffuser face and access to or replacement of an actuator can easily be carried out by the operation of the 3 quick release fasteners (see detail Z).

Required opening sizes for flush installation in a ceiling

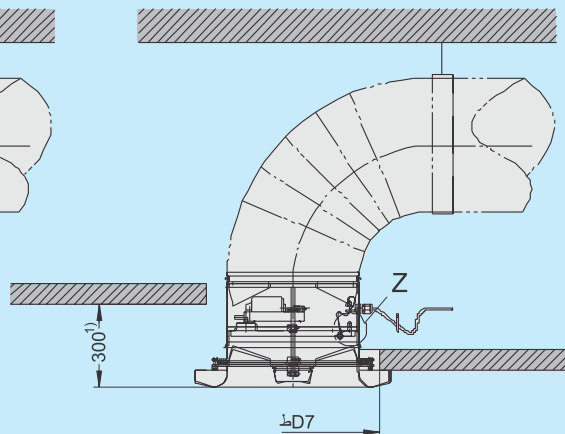
Size	315	400	630	800
ØD7	400	500	750	950

VDL-B-V (with ange)



On site mounting of the VDL unit on the supply duct

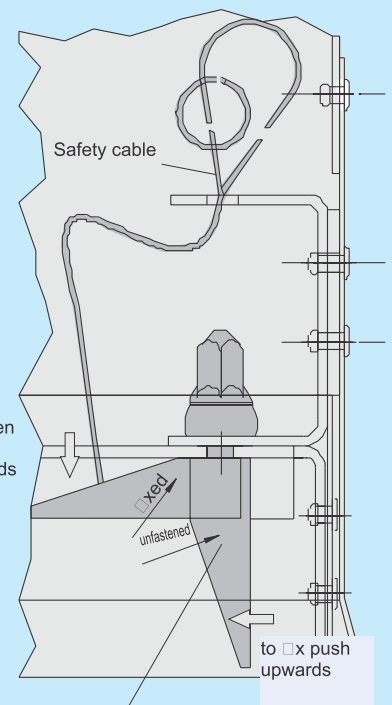
VDL-A-V (without ange)



1) Installed 300 mm beneath a ceiling for continuous adjustment of the air discharge angle.

View Z

Quick release fastener



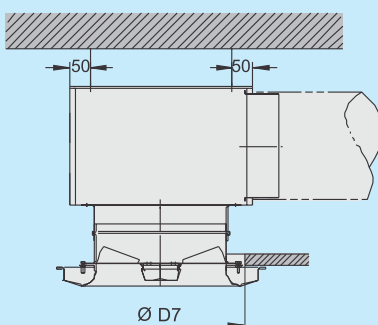
to unfasten
push
downwards

unfastened

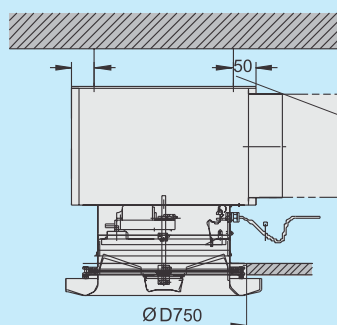
to fasten
push
upwards

3 quick release fasteners evenly distributed on the perimeter

VDL-B-H (with ange)



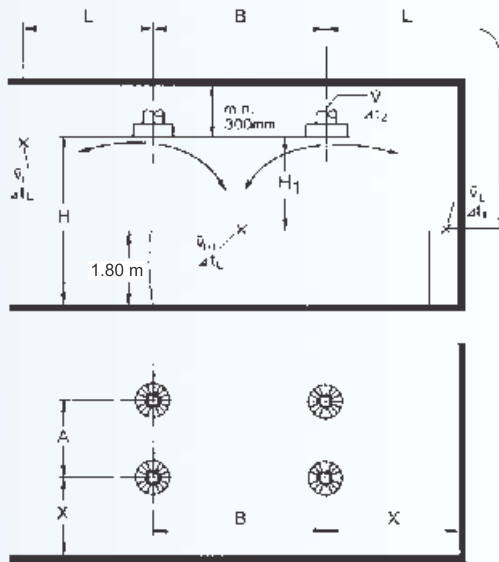
VDL-A-H (without ange)



Suspension
by customer using
the Ø 10.5 mm
holes provided

Nomenclature · Quick Selection · Example

Denitions



- $\dot{V}$ in m³/h or l/s: Volume flow rate per diffuser
- A_1, B in m: Spacing between two diffusers
- X in m: Distance between centre of diffuser and the wall
- H_1 in m: Distance between diffuser face and occupied zone
- f_{H1} in m/s: (Max. time average air velocity between two diffusers at distance H_1 from diffuser face)
- L in m: Distance horizontal + vertical ($X + H_1$) when discharging towards the wall
- f_1 in m/s: (Max. time average air velocity at the wall)
- H_{1max} in m: Maximum penetration depth of the air flow for heating
- Δt_2 in K: Temperature difference between supply air and room air
- Δt in K: Difference between core and room temperature at distance $L = A/2 + H_1$ or $L = X + H_1$
- A_{eff} in m²: L Tective outlet area
- Δp in Pa: Total pressure drop
- L_{WA} in dB(A): A-weighted sound power level
- L_{WNC} : NC rating of sound power level
- $L_{WdF} = L_{WdC} + 12$
- L_{pA}, L_{pNC} : A weighting and NC rating respectively of room sound pressure level
 $L_{pA} \approx L_{WA} - 8 \text{ dB}$
 $L_{pNC} \approx L_{WNC} - 8 \text{ dB}$

Quick selection

Size	A_{eff} m ²	$\dot{V}_{min}$ l/s	$\dot{V}_{min}$ m ³ /h	$\dot{V}_{max(1)}$ l/s	$\dot{V}_{max(1)}$ m ³ /h	$H_{max(1)}$ m
115	0.022	70	252	100	1080	5
100	0.031	125	450	500	1800	6
630	0.077	230	828	1020	3672	8
800	0.106	320	1152	1320	4392	9

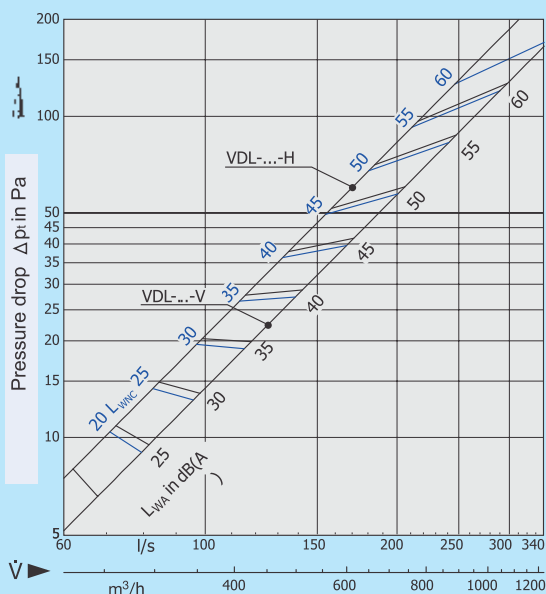
- 1) Sound power for VDL-...-F and VDL-...-V $\approx 60 \text{ dB(A)}$
- 2) with fixed construction $\dot{V}_{min} = 90 \text{ l/s} = 324 \text{ m}^3/\text{h}$
- 3) with fixed construction $\dot{V}_{min} = 250 \text{ l/s} = 900 \text{ m}^3/\text{h}$
- 4) with fixed construction $\dot{V}_{min} = 360 \text{ l/s} = 1300 \text{ m}^3/\text{h}$



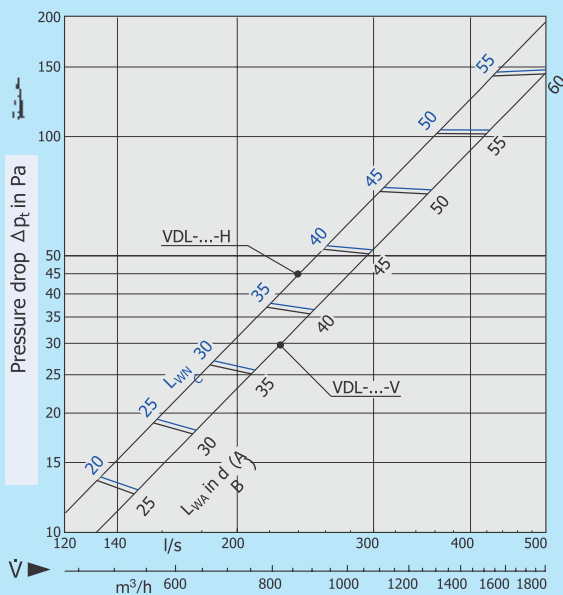
Acoustic Data · Pressure Drop (adjustable types)

The sound power level and pressure drop of type VDL-...-F correspond to the values of type VDL-...-V.

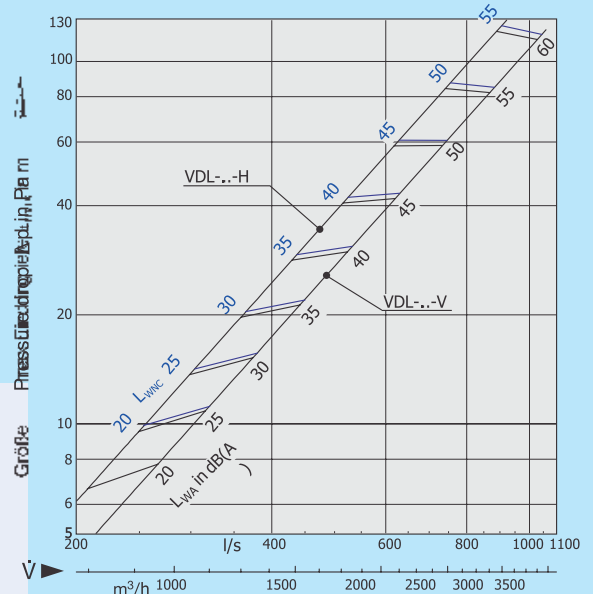
1 Sound power level and pressure drop
Size 315



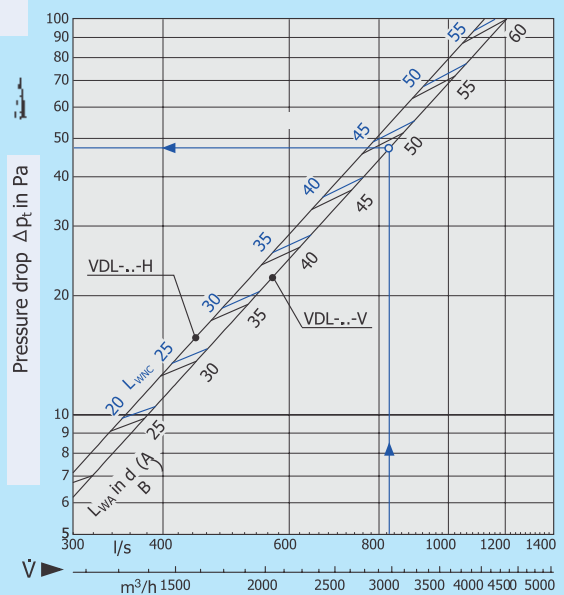
2 Sound power level and pressure drop
Size 400



3 Sound power level and pressure drop
Size 630



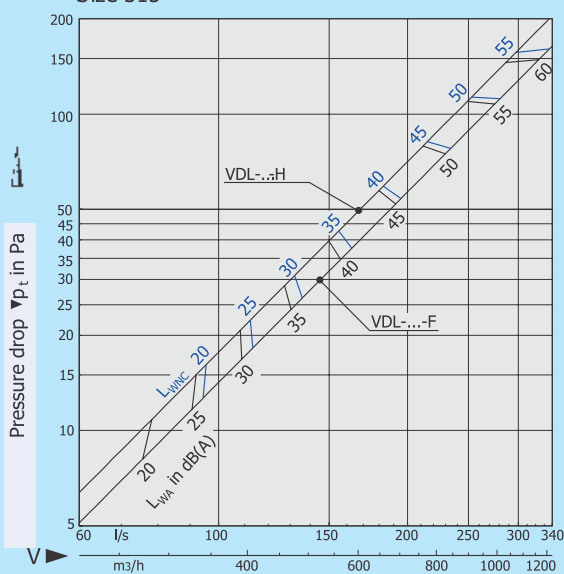
4 Sound power level and pressure drop
Size 800



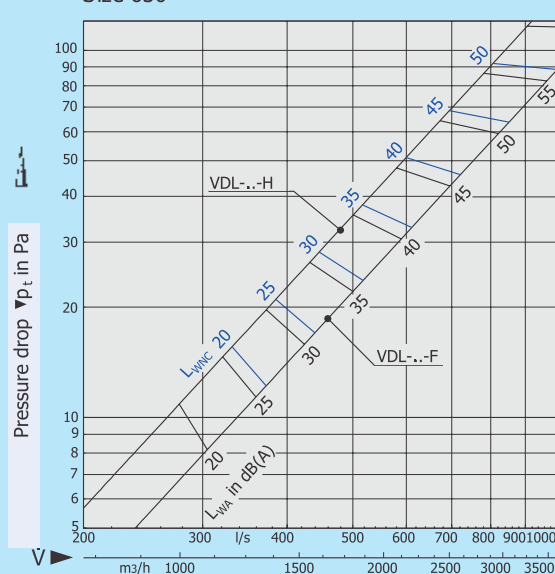


Acoustic Data · Pressure Drop (fixed types)

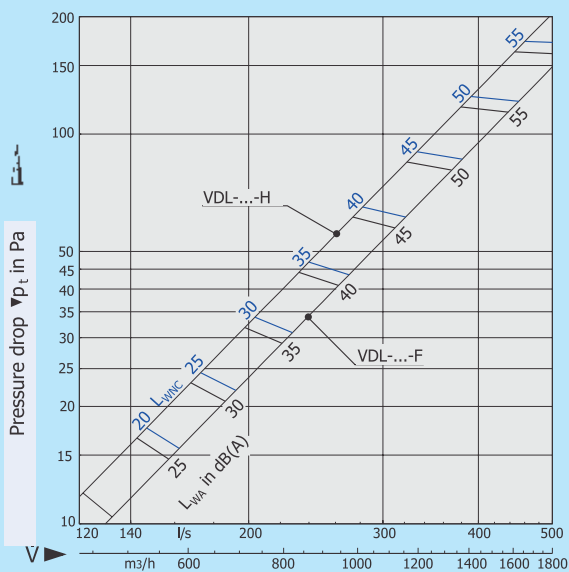
5 Sound power level and pressure drop
Size 315



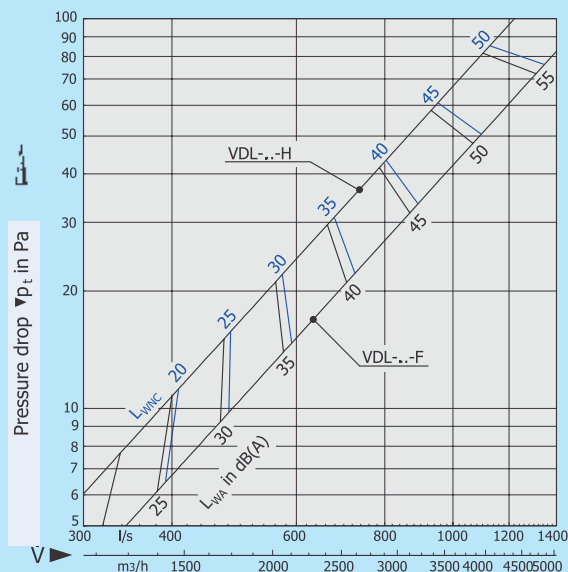
7 Sound power level and pressure drop
Size 630



6 Sound power level and pressure drop
Size 400



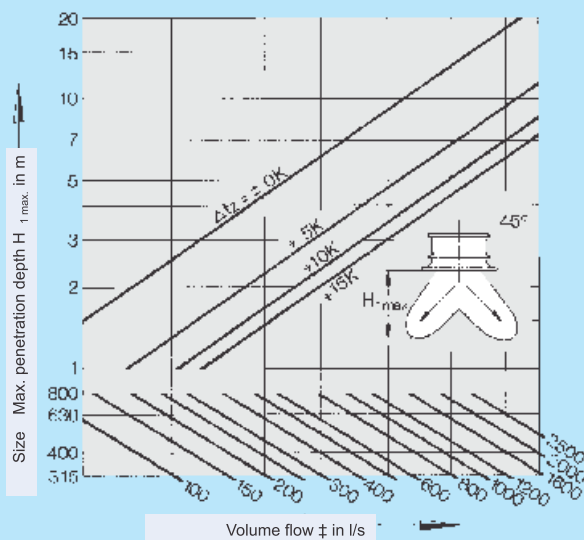
8 Sound power level and pressure drop
Size 800



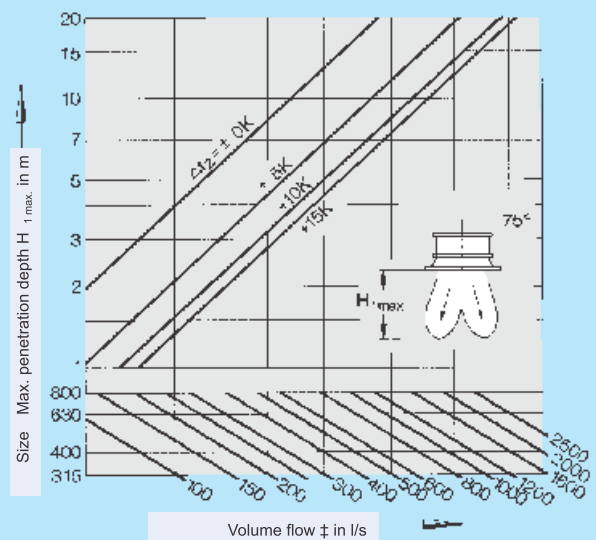


Aerodynamic Data for Heating

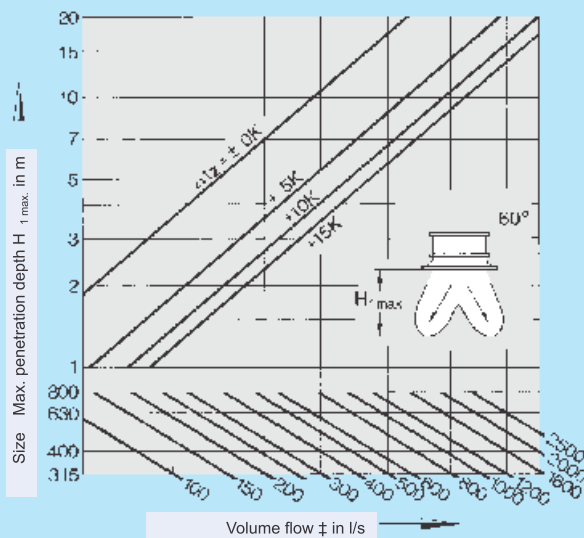
9 Max. penetration depth discharge angle 45°



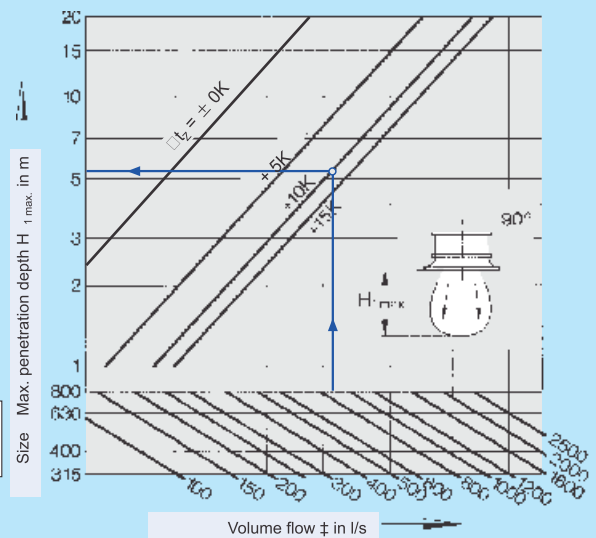
11 Max. penetration depth discharge angle 75°



10 Max. penetration depth discharge angle 60°



12 Max. penetration depth discharge vertical



$$\dot{V} [\text{m}^3/\text{h}] = \dot{V} [\text{l/s}] \times 3.6$$



Aerodynamic Data for Cooling

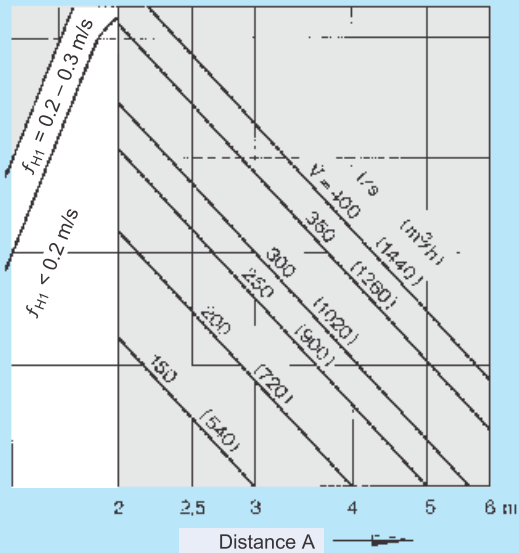
The diagrams are applicable to cooling mode, horizontal discharge diffuser in free space – no ceiling.

Supply air temperature difference: isothermal to -10 K

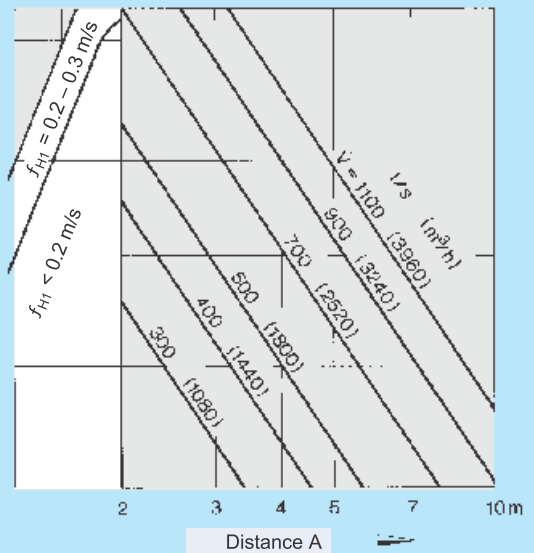
Correction:

For flush mounting in continuous ceiling, the values for f_{H1} must be multiplied by 1.4.

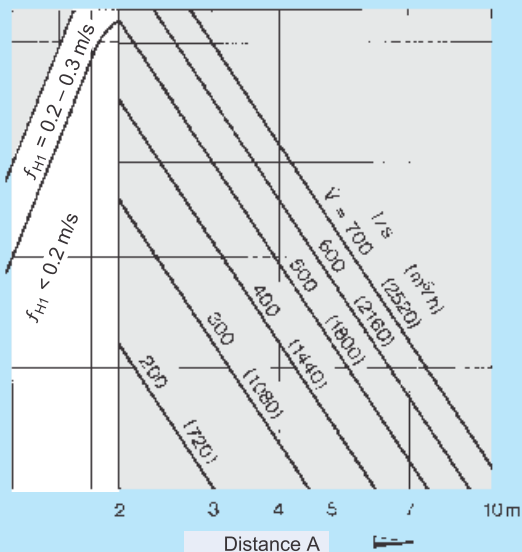
13 Determination of spacing between diffuser centres A
 $B \geq 5.00\text{ m}$ Size 315
 $H_1 = 2\text{ m}$ 3 m $4 \geq 5\text{ m}$



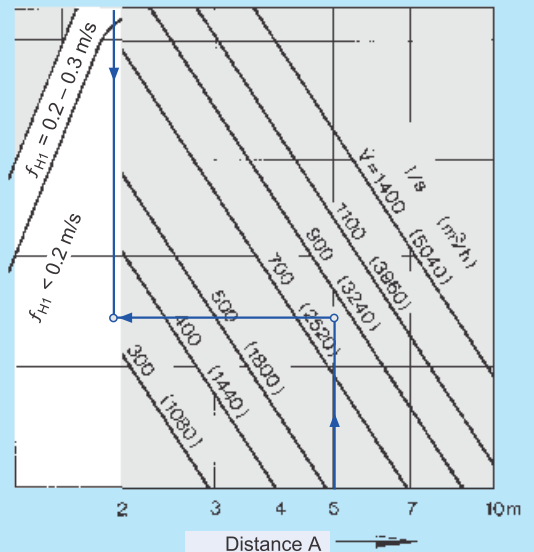
15 Determination of spacing between diffuser centres A
 $B \geq 5.00\text{ m}$ Size 630
 $H_1 = 2\text{ m}$ 3 m $4 \geq 5\text{ m}$



14 Determination of spacing between diffuser centres A
 $B \geq 5.00\text{ m}$ Size 400
 $H_1 = 2\text{ m}$ 3 m $4 \geq 5\text{ m}$



16 Determination of spacing between diffuser centres A
 $B \geq 5.00\text{ m}$ Size 800
 $H_1 = 2\text{ m}$ 3 m $4 \geq 5\text{ m}$



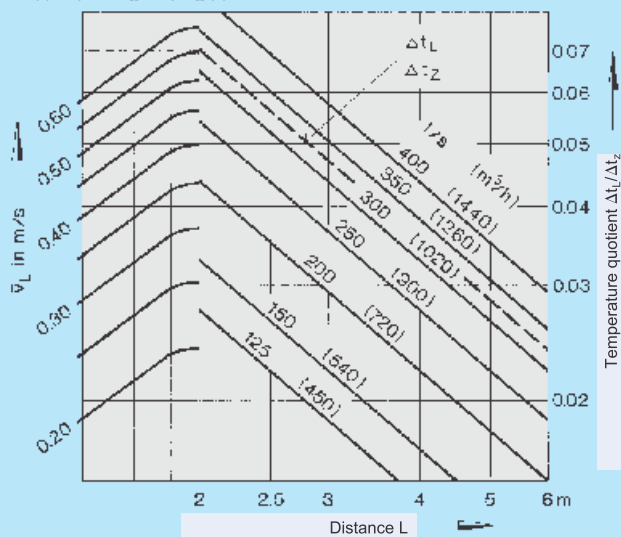


Aerodynamic Data for Cooling

The diagrams are applicable to cooling mode, horizontal discharge diffuser in free space – no ceiling.
Supply air temperature difference: isothermal to -10 K
Correction:
For flush mounting in continuous ceiling, the values for f_L and $\Delta t_L/\Delta t_z$ must be multiplied by 1.4.

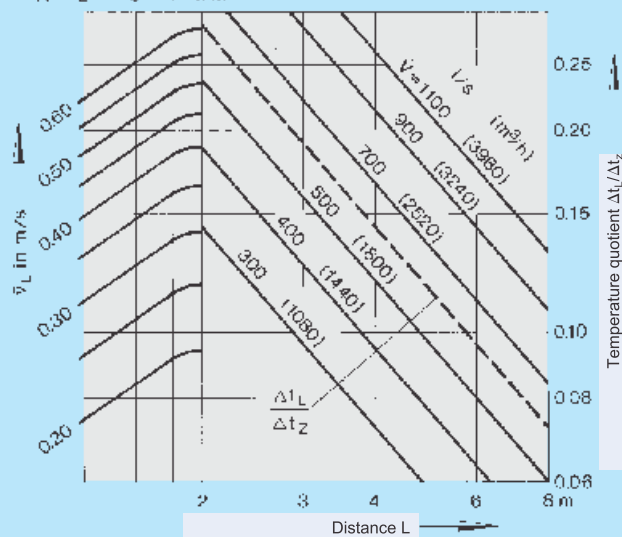
17 Air velocity at the wall and temperature quotient
Size 315

A = 2 3 4 $\geq 5\text{ m}$



19 Air velocity at the wall and temperature quotient
Size 630

A = 2 3 4 $\geq 5\text{ m}$



18 Air velocity at the wall and temperature quotient
Size 400

A = 2 3 4 $\geq 5\text{ m}$

