Lindab **DAD**

Supply air nozzle

Supply air nozzle DAD

Description

DAD is an adjustable supply air nozzle suitable for ventilation of large areas where long throws are required. The nozzle can be freely rotated 30 degrees in any direction in relation to the central line of the nozzle. The nozzle can be used for both heated and cooled air. The nozzle can be installed directly into a circular duct, fitting, wall or duct side. Supplied with screw holes through flange (DAD-0).

- Flexible adjustable nozzle
- Long throws
- Simple installation

Maintenance

The visible parts of the diffuser can be wiped with a damp cloth.

Materials and finish

Material:	Aluminium
Standard finish:	Powder-coated
Standard colour:	RAL 9003 or 9010, gloss 30

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Order code

Product **DAD** **a** **bbb**

Type

with flange 0

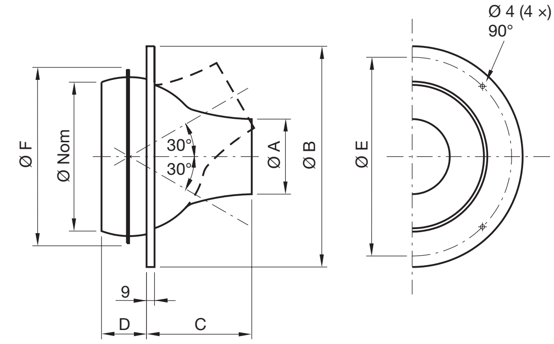
for circular ducts 1

Size

Dimensions

DAD-0

With flange for mounting on a wall or duct side.

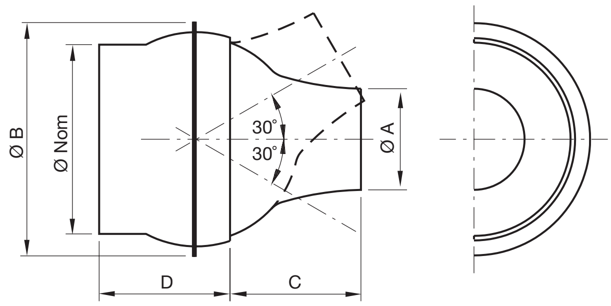


ØF = min. hole dimension.

Ø nom Size	ØA mm	ØB mm	C mm	D mm	ØE mm	ØF mm	Weight kg
160	85	248	120	51	225	200	0.60
200	110	298	150	66	270	245	0.90
250	140	363	190	81	320	295	1.40
315	175	448	255	90	390	360	2.40

DAD-1

Installation in circular duct.



$Ø_{Nom}$ includes male connection measure.

Ø nom Size	ØA mm	ØB mm	C mm	D mm	Weight kg
160	85	196	110	110	0.50
200	110	238	140	125	0.90
250	140	288	180	140	1.40
315	175	355	245	165	2.40

Free area for DAD nozzle – see section Nozzle calculations.

Supply air nozzle DAD

Technical data

Capacity

Volume flow q_v [l/s] and [m³/h], total pressure Δp_t [Pa], throw $l_{0.3}$ [m] and sound power level L_{WA} [dB(A)] can be seen in the diagrams.

Throw $l_{0.3}$

Throw $l_{0.3}$ can be seen in the diagrams for isothermal air at a terminal velocity of 0.3 m/s.

Resulting sound effect level

The sound effect level from the nozzles must be added logarithmically to the sound effect level from the flow noise in the duct. See sample calculation, section Nozzle calculations.

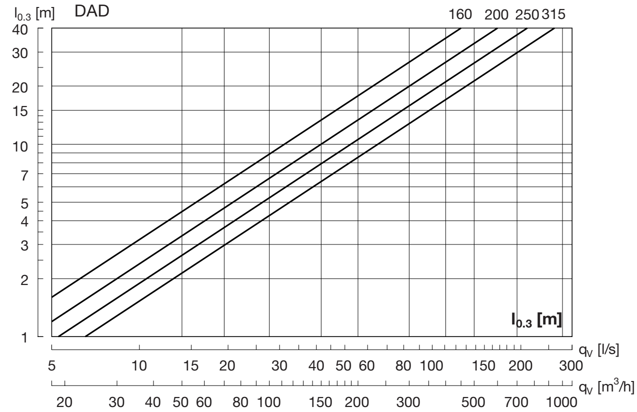
Frequency-related sound effect level

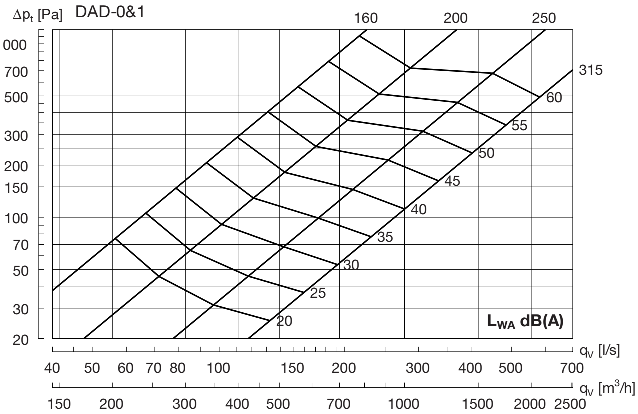
The sound effect level in the frequency band is defined as L_{WA} + K_{ok} K_{ok} values are given in charts beneath the diagrams on the following pages.

Table

	Centre frequency Hz							
Size	63	125	250	500	1K	2K	4K	8K
160	10	-1	-5	-5	-5	-8	-9	-10
200	11	1	1	-4	-4	-10	-16	-23
250	17	0	0	-4	-4	-13	-21	-29
315	16	1	-1	-2	-4	-13	-21	-32

Supply air





Supply air nozzle

Calculation

Resulting sound effect level
To calculate the resulting sound effect level from the nozzles, add the sound effect level from the nozzles (L_{WA} nozzle) and the sound effect level from the flow noise in the duct (L_{WA} duct) logarithmically.

Diagram 1, sound effect duct, L_{WA} duct.

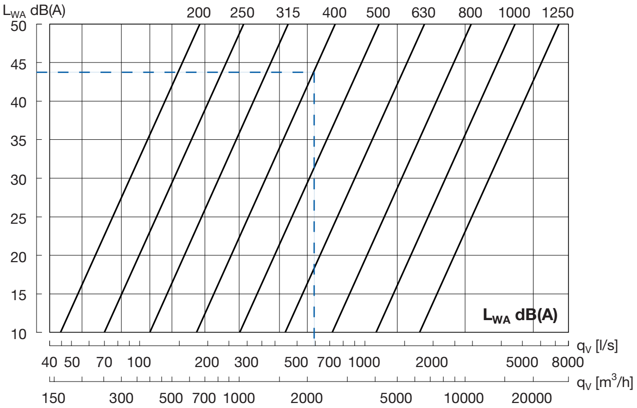
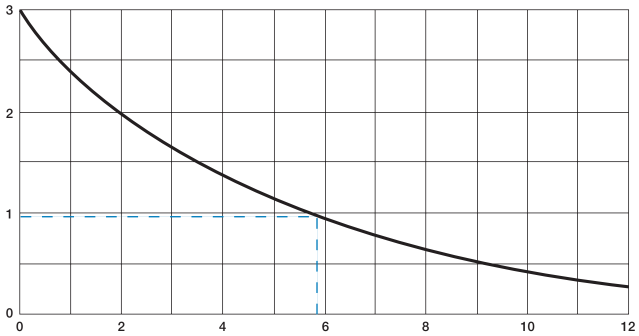
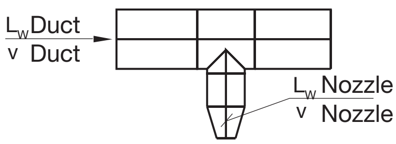


Diagram 2, addition of sound levels.
Difference to be added to the highest dB value (dB).



Difference between the dB values (dB).



Sample calculation:

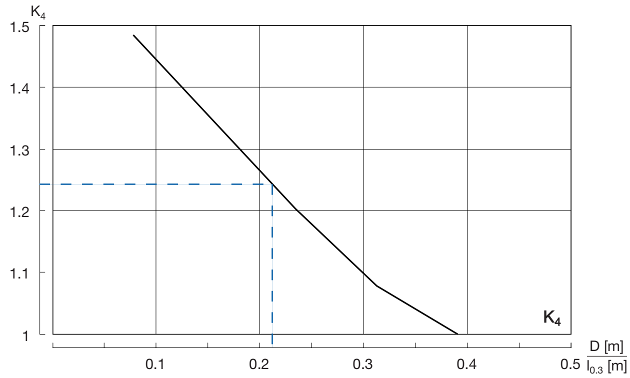
LAD-200	q = 100 l/s
ΔP_t nozzle	90 Pa

Duct size:
In order to achieve a sensible distribution of the air out to the nozzles without using a damper, it is recommended that the pressure loss in the nozzle be 3 times higher than the dynamic pressure in the duct system.

Selected duct dimension:	Ø400
Number of nozzles at joint:	6
Volume of air in the duct:	6x100 = 600 l/s
L_{WA} duct (can be seen in diagram 1):	43 dB(A)
L_{WA} nozzle (can be seen in product diagram):	37 dB(A)
Difference between db values:	6 dB(A)
Value to be added to the highest dB value (diagram 2):	1 dB(A)
Resulting sound effect level:	43+1=44 dB(A)

Extension of throw for two nozzles, positioned side by side:

If two nozzles are positioned next to each other, the air jets will be amplified, thereby extending the throw. To calculate this, use the diagram below, in which the distance between the nozzles is designated D. The calculation factor K_4 must be multiplied by the throw $l_{0.3}$. The throw is not extended further with more nozzles.



Sample calculation:

LAD-125. Distance D = 1.5 metres.
Volume of air: q = 15 l/s

Diagram throw under selected nozzle
Specified throw: $l_{0.3}$ = 7 m
D [m] / $l_{0.3}$[m]: 1.5 / 7 = 0.21

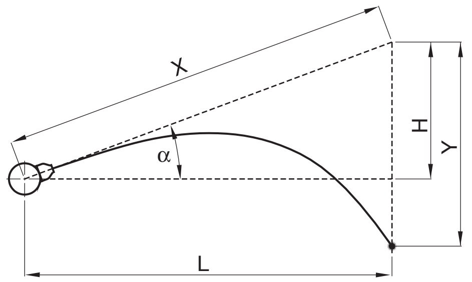
K_4 calculation factor
Can be seen in the diagram: K_4 = 1.25

Resulting throw
$K_4 \times l_{0.3} = 1.25 \times 7$ m = 8.75 m

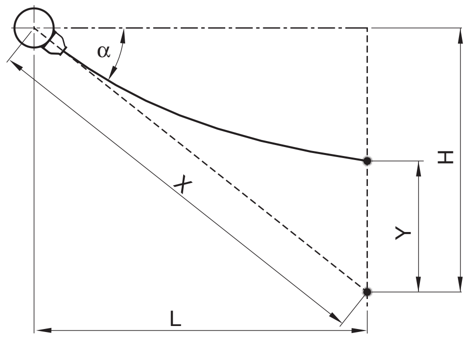
Supply air nozzle

Calculation

Supply air with cooled air



Supply air with heated air



$$X = \frac{L}{\cos \alpha} = \frac{H}{\sin \alpha}$$

$$H = L \times \tan \alpha$$

Terminal velocity V_x:

$$v_x = K_1 \times \frac{q}{X}$$

Deflection Y:

$$Y = K_2 \times \frac{X^3}{q^2} \times \Delta t$$

Sample calculation: Cooled air

LAD-200: $q = 400\ m^3/h$
$\Delta t = 6K\ \alpha = 30°$
Final velocity $v_x = 0.3$ m/s

$$v_x = K_1 \times \frac{q}{X}$$

$$X = K_1 \times \frac{q}{v_x} = 0.020 \times \frac{400}{0.3} = 27 \text{ m}$$

$$Y = K_2 \times \frac{X^3}{q^2} \times \Delta t = 24 \times \frac{27^3}{400^2} \times 6 = 17.7 \text{ m}$$

$H = X \times \sin \alpha = 27 \times 0.5 = 13.5$ m
$L = X \times \cos \alpha = 27 \times 0.87 = 23.4$ m

Sample calculation: Heated air

LAD-200: $q = 400\ m^3/h$
$\Delta t = 6K\ \alpha = 60°$
Final velocity $v_x = 0.3$ m/s

$$X = K_1 \times \frac{q}{v_x} = 0.020 \times \frac{400}{0.3} = 27 \text{ m}$$

$$Y = K_2 \times \frac{X^3}{q^2} \times \Delta t = 24 \times \frac{27^3}{400^2} \times 6 = 17.7 \text{ m}$$

$H = X \times \sin \alpha = 27 \times 0.87 = 23.4$ m
$L = X \times \cos \alpha = 27 \times 0.5 = 13.5$ m

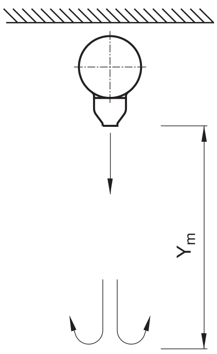
Supply air nozzle

Calculation

Calculation factors:

Size	Free area Am²	K_1 m³/h	K_1 l/s	K_2 m³/h	K_2 l/s	K_3 m³/h	K_3 l/s
LAD							
125	0.0029	0.037	0.133	3.9	0.30	0.24	0.86
160	0.0071	0.023	0.083	15.6	1.20	0.122	0.44
200	0.0095	0.020	0.072	24.0	1.85	0.097	0.35
250	0.0165	0.0153	0.055	54.4	4.2	0.064	0.230
315	0.0254	0.0122	0.044	104	8.0	0.046	0.166
400	0.0398	0.0097	0.035	206	15.9	0.033	0.119
DAD							
160	0.0056	0.026	0.094	10.7	0.83	0.145	0.52
200	0.0095	0.020	0.072	24.0	1.85	0.097	0.35
250	0.0154	0.0157	0.057	49.0	3.78	0.068	0.24
315	0.0240	0.0127	0.046	96.0	7.41	0.048	0.17
GD							
	0.0027	0.038	0.137	3.5	0.27	0.26	0.92
GTI-1							
200	0.0200	0.0090	0.032	114	8.8	0.048	0.173
250	0.0310	0.0073	0.026	219	16.9	0.034	0.122
315	0.0490	0.0058	0.021	435	34	0.024	0.086
400	0.0780	0.0046	0.017	875	68	0.017	0.062

Vertical supply air with heated air



$$Y_m = K_3 \times \frac{q}{\sqrt{\Delta t}} \text{ (m)}$$

Sample calculation:

LAD-160

q = 200 m³/h
Δt = 10 K

The distance to the turning point of the air jet:

$$Y_m = K_3 \times \frac{q}{\sqrt{\Delta t}} \text{ (m)}$$

$$Y_m = 0{,}143 \times \frac{200}{\sqrt{10}} \text{ (m)}$$

$$Y_m = 9 \text{ m}$$

Most of us spend the majority of our time indoors. Indoor climate is crucial to how we feel, how productive we are and if we stay healthy.

We at Lindab have therefore made it our most important objective to contribute to an indoor climate that improves people's lives. We do this by developing energy-efficient ventilation solutions and durable building products. We also aim to contribute to a better climate for our planet by working in a way that is sustainable for both people and the environment.

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