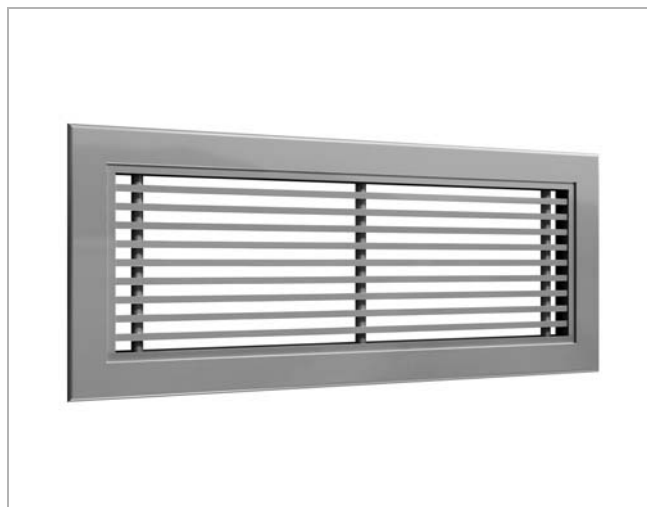


Grille

AL



Description

The AL is a linear bar grille with fixed blades made of aluminium. With several frame and grid combinations, the AL grille is very flexible and suitable for various kind of applications. The grille is available with several mounting options and can be delivered with mounting frame, opposed blade damper and plenum box accessories.

The AL can be delivered as a single grille in lengths up to the maximum size indicated in the following tables (Min.-max. dimensions).

Min. - max. dimensions

AL-0, 1 2, 3

H \ L	200	← →	2000
75			
↕			
600			

AL-4, 5

H \ L	200	← →	1500
50			
↕			
400			

AL-6

H \ L	200	← →	1200
100			
↕			
300			

Standard grilles are available in 50 mm steps within the above min. and max. sizes.

Customized sizes available on request.

For the lengths bigger than the maximum indicated in the above tables, the AL can be delivered in multiple pieces as a linear continuous grille line (see details page 4).

LindQST

Lindab advanced web tool can be used to calculate the full range of grilles, finding the suitable grille type and dimension for all applications.

Documentation search, product selection and room dimensioning easy available directly on the web and mobile devices.

Find this and much more at www.lindQST.com

Maintenance

Remove the grill to gain access to the plenum box or duct. External parts should be wiped with a damp cloth.

Accessories

Plenum box:	VBX, PBA
Mounting frame:	MFA
Opposed blade damper:	DGA

Materials and finish

Grille frame and blades:	Aluminium
Mounting frame:	Galvanized steel
Opposed blade damper:	Galvanized steel

Grille standard finish:

- Aluminium anodized
- RAL 9010 gloss 30
- RAL 9003 gloss 30

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

Order code

Product	AL	a	b	c	d	eeee x fff	gggg
Type	AL						
Frame (See page 2)		0, 1, 2, 3, 4, 5, 6					
Grid (See page 2)			0, 1, 3, 4, 5, 6, 7, 8				
Installation (See page 3)				- , V, VM, C, CM, H, HM, B, F			
Accessories (See page 3)					- , D		
Size							
L: 200 - 2000 mm							
H: 75 - 600 mm							
(For L longer than 2000 mm, see page 4).							
Grilles standard finish:							
-	Anodized aluminium						
9010	RAL 9010, gloss 30						
9003	RAL 9003, gloss 30						
xxxx	On request, other RAL colour						

Example 1: AL-1-1-CM-800 x 200-9010

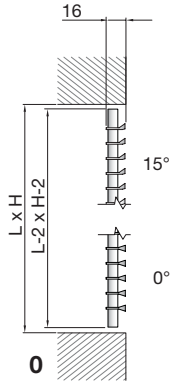
Example 2: AL-0-0-1000x100

Grille

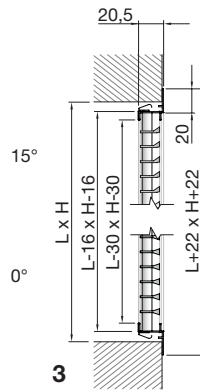
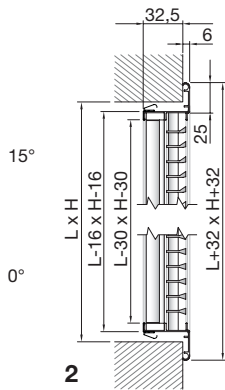
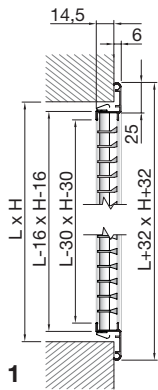
AL

Frame

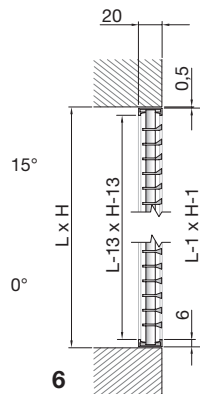
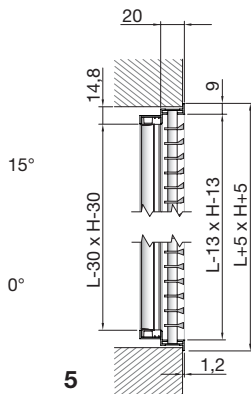
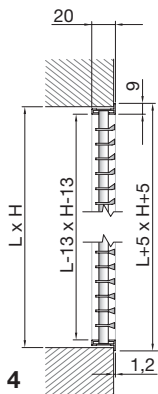
0 - No frame



1 - 25 mm frame
2 - 25 mm frame with direction
3 - 20 mm flat frame



4 - 9 mm flat frame
5 - 9 mm flat frame with direction
6 - Frame with no flange



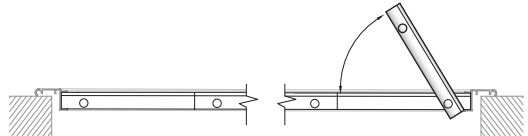
Grid

0 - Fixed grid 0°
1 - Fixed grid 15°

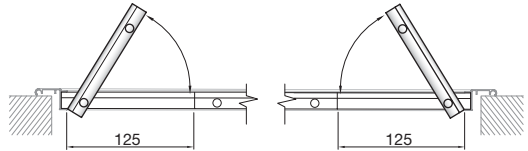
All frames
All frames



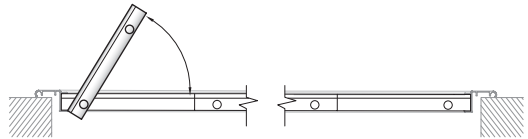
2 - 0° with door one side (Left or right) Only frame 1



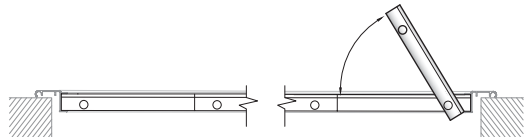
3 - 0° with doors, two sides Only frame 1



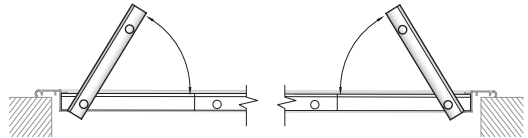
4 - 15° with door left side Only frame 1



5 - 15° with door right side Only frame 1

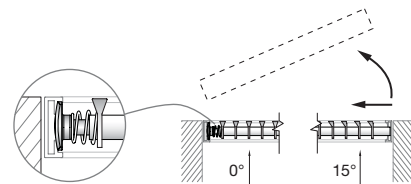


6 - 15° with doors two sides Only frame 1



7 - Removable grid 0°
8 - Removable grid 15°

Only frame 6
Only frame 6

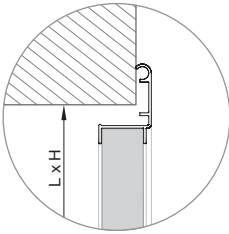


Grille

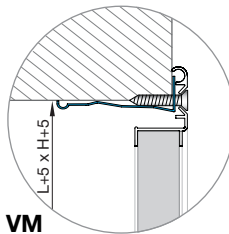
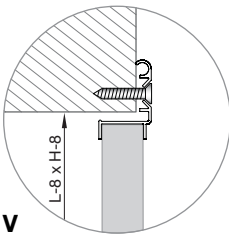
AL

Installation

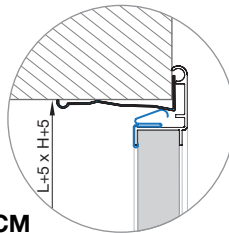
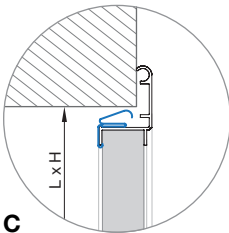
- **Not prepared**
All frames



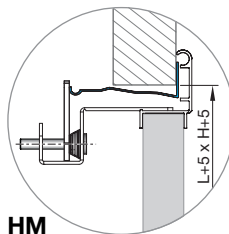
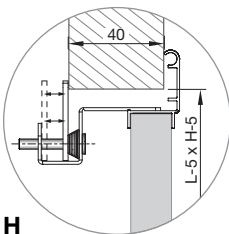
V Visible screw installation
VM Visible screws + mounting frame
Only frame 1+2



C Clips
CM Clips + mounting frame
Only frame 1+2+3

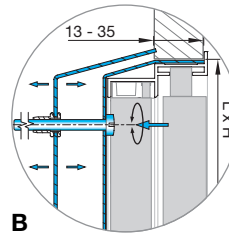


H Hidden screw installation
HM Hidden screws + mounting frame
Only frame 1+2+3

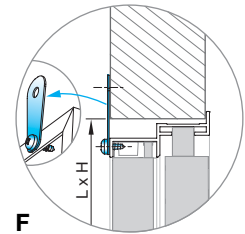


* Please note when using frame type 3, with CM or HM, a different type of mounting frame than standard MFA will be supplied !

B Mounting bridge
F Fixing brackets



B
Only frame 4+5+6

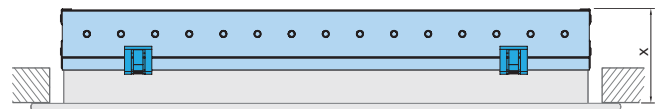


F
Only frame 4+5+6

Accessories

- **No accessories**

D Opposed blade damper DGA



AL with frame type 1, 2, 3 and installation type C, CM, V and VM.

A full length click-on DGA-damper is available.



AL with installation type H, HM or B has a shortend DGA damper option due to the hidden screw and mounting bridge installation type.

The damper is mounted from factory and is not detachable.

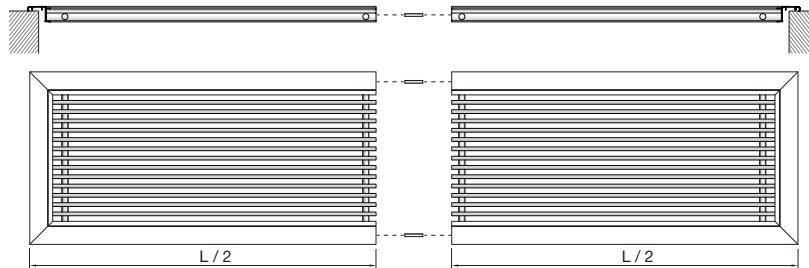
Frame type	x [mm]
1	51
2	69
3	51
4	73,4
5	73,4
6	68

Grille

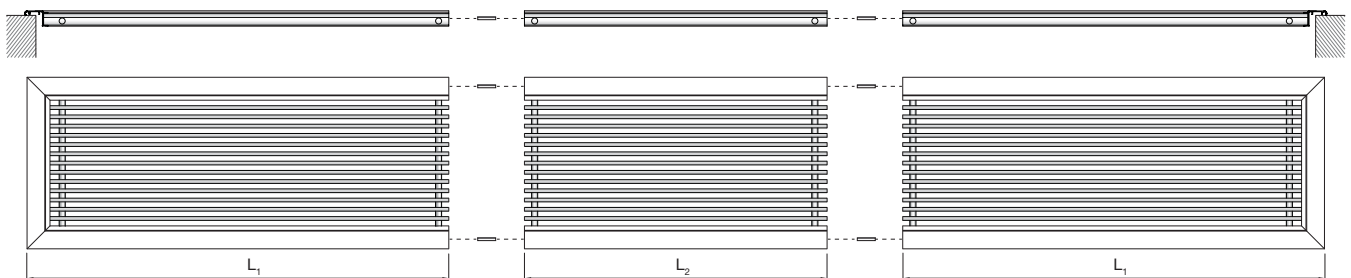
AL

L longer than 2000 mm

25 mm frame, $4000 \geq L > 2000$ mm



25 mm frame, $6000 \geq L > 4001$ mm



When the AL is ordered with:

- a) 25 mm frame, $5000 \geq L > 4001$ mm, the grille always is delivered in whole pieces of 1500 mm (L_1) and one piece (L_2) that will complete the desired length.
- b) 25 mm frame, $6000 \geq L > 5001$ mm, the grille always is delivered in whole pieces of 2000 mm (L_1) and one piece (L_2) that will complete the desired length.
- c) 25 mm frame, $L > 6001$ mm, like b)

For other frame types consult your local Lindab dealer.

Order code

Product	AL	a	b	c	d	eeee	x	fff	gggg
Type	AL								
Frame (See page 2)		1, 2, 3, 4, 5, 6							
Grid (See page 2)			0, 1, 2						
Installation (See page 3)				- , V, VM, C, CM, H, HM, B, F					
Accessories (See page 3)					- , D				
Size									
L > 2000 mm									
H: 75 - 600 mm (Frame 1, 2, 3)									
H: 50 - 400 mm (Frame 4, 5, 6)									
Grilles standard finish:									
- Anodized aluminium									
9010 RAL 9010, gloss 30									
9003 RAL 9003, gloss 30									
xxxx On request, other RAL colour									

Example 1: AL-1-1-CM-4000-200-9010

Example 2: AL-4-0-5000-200

Free area

		AL - 1x Linear bar grille with 25 mm frame																	
		A_k (m²)																	
H \ L		200	250	300	350	400	450	500	550	600	700	800	900	1000	1100	1200	1300	1400	1500
75		0,007	0,008	0,010	0,012	0,014	0,016	0,018	0,020	0,022	0,026	0,030	0,034	0,038	0,042	0,046	0,049	0,053	0,057
100		0,010	0,014	0,017	0,020	0,023	0,026	0,029	0,032	0,035	0,042	0,048	0,054	0,060	0,066	0,073	0,079	0,085	0,091
150		0,018	0,024	0,029	0,034	0,040	0,045	0,051	0,056	0,062	0,073	0,083	0,094	0,105	0,116	0,127	0,138	0,149	0,160
200		0,026	0,034	0,041	0,049	0,057	0,065	0,073	0,080	0,088	0,104	0,119	0,135	0,150	0,166	0,181	0,197	0,212	0,228
250		0,034	0,044	0,054	0,064	0,074	0,084	0,094	0,104	0,114	0,135	0,155	0,175	0,195	0,215	0,236	0,256	0,276	0,296
300		0,041	0,054	0,066	0,079	0,091	0,104	0,116	0,128	0,141	0,166	0,190	0,215	0,240	0,265	0,290	0,315	0,339	0,364
350		0,049	0,064	0,079	0,093	0,108	0,123	0,138	0,152	0,167	0,197	0,226	0,256	0,285	0,315	0,344	0,374	0,403	0,432
400		0,057	0,074	0,091	0,108	0,125	0,142	0,159	0,176	0,194	0,228	0,262	0,296	0,330	0,364	0,398	0,432	0,467	0,501
450		0,065	0,084	0,104	0,123	0,142	0,162	0,181	0,200	0,220	0,259	0,297	0,336	0,375	0,414	0,453	0,491	0,530	0,569
500		0,073	0,094	0,116	0,138	0,159	0,181	0,203	0,225	0,246	0,290	0,333	0,377	0,420	0,463	0,507	0,550	0,594	0,637
550		0,080	0,104	0,128	0,152	0,176	0,200	0,225	0,249	0,273	0,321	0,369	0,417	0,465	0,513	0,561	0,609	0,657	0,705
600		0,088	0,114	0,141	0,167	0,194	0,220	0,246	0,273	0,299	0,352	0,404	0,457	0,510	0,563	0,615	0,668	0,721	0,774

		AL - 0x Linear bar grille with no frame																	
		A_k (m²)																	
H \ L		200	250	300	350	400	450	500	550	600	700	800	900	1000	1100	1200	1300	1400	1500
75		0,014	0,017	0,021	0,024	0,028	0,031	0,035	0,038	0,042	0,049	0,056	0,063	0,070	0,077	0,084	0,091	0,098	0,105
100		0,019	0,023	0,028	0,033	0,037	0,042	0,047	0,051	0,056	0,065	0,074	0,084	0,093	0,102	0,112	0,121	0,130	0,140
150		0,028	0,035	0,042	0,049	0,056	0,063	0,070	0,077	0,084	0,098	0,112	0,126	0,140	0,153	0,167	0,181	0,195	0,209
200		0,037	0,047	0,056	0,065	0,074	0,084	0,093	0,102	0,112	0,130	0,149	0,167	0,186	0,205	0,223	0,242	0,260	0,279
250		0,047	0,058	0,070	0,081	0,093	0,105	0,116	0,128	0,140	0,163	0,186	0,209	0,233	0,256	0,279	0,302	0,326	0,349
300		0,056	0,070	0,084	0,098	0,112	0,126	0,140	0,153	0,167	0,195	0,223	0,251	0,279	0,307	0,335	0,363	0,391	0,419
350		0,065	0,081	0,098	0,114	0,130	0,146	0,163	0,179	0,195	0,228	0,260	0,293	0,326	0,358	0,391	0,423	0,456	0,488
400		0,074	0,093	0,112	0,130	0,149	0,167	0,186	0,205	0,223	0,260	0,298	0,335	0,372	0,409	0,446	0,484	0,521	0,558
450		0,084	0,105	0,126	0,146	0,167	0,188	0,209	0,230	0,251	0,293	0,335	0,377	0,419	0,460	0,502	0,544	0,586	0,628
500		0,093	0,116	0,140	0,163	0,186	0,209	0,233	0,256	0,279	0,326	0,372	0,419	0,465	0,512	0,558	0,605	0,651	0,698
550		0,102	0,128	0,153	0,179	0,205	0,230	0,256	0,281	0,307	0,358	0,409	0,460	0,512	0,563	0,614	0,665	0,716	0,767
600		0,112	0,140	0,167	0,195	0,223	0,251	0,279	0,307	0,335	0,391	0,446	0,502	0,558	0,614	0,670	0,725	0,781	0,837

Quick selection, Extract air, AL - 10/11

Grille size [mm]		Air flow rate																				
A _k [m ²]	m ³ /h l/s	100	150	200	250	300	350	400	500	600	700	800	900	1000	1250	1500	2000	2500	3500			
		(28)	(42)	(56)	(69)	(83)	(97)	(111)	(139)	(167)	(194)	(222)	(250)	(278)	(347)	(417)	(556)	(694)	(972)			
H=100	200x100 (0,01)	L _{WA} [dB(A)]	30	42																		
		V _k [m/s]	2,7	4																		
		Δp _t [Pa]	13	30																		
	300x100 (0,017)	L _{WA} [dB(A)]	<20	30	39	45																
		V _k [m/s]	1,7	2,5	3,4	4,1																
		Δp _t [Pa]	5	12	21	31																
	400x100 (0,023)	L _{WA} [dB(A)]	<20	22	31	37	43	47														
		V _k [m/s]	1,2	1,8	2,4	3	3,6	4,2														
		Δp _t [Pa]	3	6	11	17	24	33														
	500x100 (0,029)	L _{WA} [dB(A)]		<20	25	31	36	41	45													
		V _k [m/s]		1,4	1,9	2,4	2,9	3,3	3,8													
		Δp _t [Pa]		4	7	10	15	20	27													
600x100 (0,035)	L _{WA} [dB(A)]		<20	20	26	31	36	40	47													
	V _k [m/s]		1,2	1,6	2	2,3	2,7	3,1	3,9													
	Δp _t [Pa]		3	5	7	10	14	18	28													
800x100 (0,048)	L _{WA} [dB(A)]			<20	<20	24	28	32	39	45	49											
	V _k [m/s]			1,2	1,4	1,7	2	2,3	2,9	3,5	4,1											
	Δp _t [Pa]			3	4	6	8	10	15	22	30											
H=150	300x150 (0,029)	L _{WA} [dB(A)]		<20	25	31	36	41	45													
		V _k [m/s]		1,4	1,9	2,4	2,9	3,3	3,8													
		Δp _t [Pa]		4	7	10	15	20	27													
	400x150 (0,04)	L _{WA} [dB(A)]			<20	23	28	33	37	44	49											
		V _k [m/s]			1,4	1,7	2,1	2,4	2,8	3,5	4,2											
		Δp _t [Pa]			4	5	8	11	14	22	32											
	500x150 (0,051)	L _{WA} [dB(A)]			<20	<20	22	27	31	38	43	47										
		V _k [m/s]			1,1	1,4	1,6	1,9	2,2	2,7	3,3	3,8										
		Δp _t [Pa]			2	3	5	7	9	14	20	27										
	600x150 (0,062)	L _{WA} [dB(A)]				<20	<20	22	26	33	38	43	47	50								
		V _k [m/s]				1,1	1,3	1,6	1,8	2,3	2,7	3,1	3,6	4,1								
		Δp _t [Pa]				2	3	5	6	9	13	18	24	30								
800x150 (0,083)	L _{WA} [dB(A)]						<20	<20	25	30	35	39	42	46								
	V _k [m/s]						1,2	1,3	1,7	2	2,3	2,7	3	3,3								
	Δp _t [Pa]						2	3	5	7	10	13	16	20								
H=200	400x200 (0,057)	L _{WA} [dB(A)]				<20	<20	24	28	35	40	45	49									
		V _k [m/s]				1,2	1,5	1,7	1,9	2,4	2,9	3,4	3,9									
		Δp _t [Pa]				3	4	5	7	11	16	21	28									
	500x200 (0,073)	L _{WA} [dB(A)]					<20	<20	22	28	34	38	42	46	49							
		V _k [m/s]					1,1	1,3	1,5	1,9	2,3	2,7	3,1	3,4	3,8							
		Δp _t [Pa]					2	3	4	7	10	13	17	22	27							
	600x200 (0,088)	L _{WA} [dB(A)]						<20	<20	24	29	33	37	41	44							
		V _k [m/s]						1,1	1,3	1,6	1,9	2,2	2,5	2,8	3,2							
		Δp _t [Pa]						2	3	5	7	9	12	15	18							
	800x200 (0,1191)	L _{WA} [dB(A)]								<20	21	26	30	33	36	43	49					
		V _k [m/s]								1,2	1,4	1,6	1,9	2,1	2,3	2,9	3,5					
		Δp _t [Pa]								2	4	5	6	8	10	16	22					
H=300	500x300 (0,116)	L _{WA} [dB(A)]							<20	<20	22	26	30	34	37	44	49					
		V _k [m/s]								1	1,2	1,4	1,7	1,9	2,2	2,4	3	3,6				
		Δp _t [Pa]								2	3	4	5	7	9	11	16	24				
	600x300 (0,141)	L _{WA} [dB(A)]									<20	21	26	29	32	39	44					
		V _k [m/s]									1	1,2	1,4	1,6	1,8	2	2,5	3				
		Δp _t [Pa]									2	3	3	5	6	7	11	16				
800x300 (0,19)	L _{WA} [dB(A)]											<20	<20	21	25	31	37	45				
	V _k [m/s]											1	1,2	1,3	1,5	1,8	2,2	2,9				
	Δp _t [Pa]											2	2	3	4	6	9	16				

10 ≤ L_{WA} < 30 30 ≤ L_{WA} < 40 40 ≤ L_{WA} < 50

Data valid for:

- Extract air

Terminology:

- A_k = effective free area
- V_k = effective face velocity
- Δp_t = total pressure loss
- L_{WA} = sound power level

Grille

AL

Technical data

Capacity

Air flow rate q_v [l/s] and [m³/h], total pressure loss Δp_t [Pa], throw $l_{0,2}$ [m] and sound power level L_{WA} [dB(A)] can be seen in the diagrams.

Air Jet Dispersal

Throw l_{xx} [m] at an average speed of 0,2, 0,25 and 0,3 m/s, frontal fixed blades at 0° and, (if present), a second row of adjustable blades settled at 0° , without ceiling effect, (distance from grille to ceiling over 800 mm), can be seen in the diagrams.

Sound power level L_{WA}

Sound power level L_{WA} [dB(A)] for frontal fixed blades at 0° and, (if present), a second row of adjustable blades settled at 0° , can be seen in the diagrams.

The sound power levels apply for grilles without an opposed blade damper. See the table below for correction of sound power levels on damper settings [dB].

Frequency-related sound power level

The sound power level in the frequency band is defined as

$$L_{Wf} = L_{WA} + K_{ok}$$

K_{ok} values are given in the table below.

	Centre frequency Hz							
	63	125	250	500	1K	2K	4K	8K
Supply air	6	5	1	-3	-9	-14	-12	-8
Extract air	8	6	0	-4	-7	-12	-10	-9

Opposed blade damper DGA

Correction of total pressure loss Δp_t [Pa] and sound power level L_{WA} [dB(A)] using a damper. See table below.

Damper position	Open	25%	50%
		Closed	Closed
Total pressure loss ΔP_t	x 1.2	x 1.9	x 10
Sound power level L_{WA}	+ 1	+ 9	+ 27

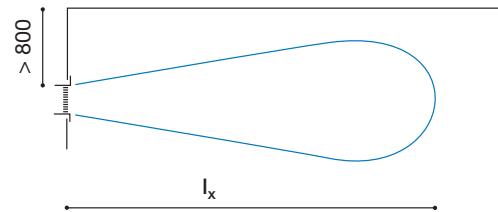
Extract air

Total pressure loss Δp_t	x 0.83
Sound power level L_{WA}	- 2

Throw and air jet dispersal

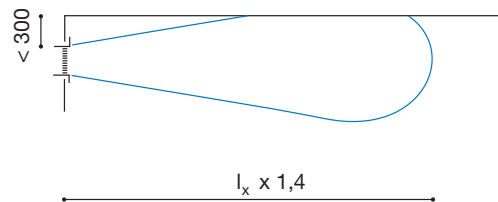
Throw

All given throw data applies for installation more than 800 mm from the ceiling.

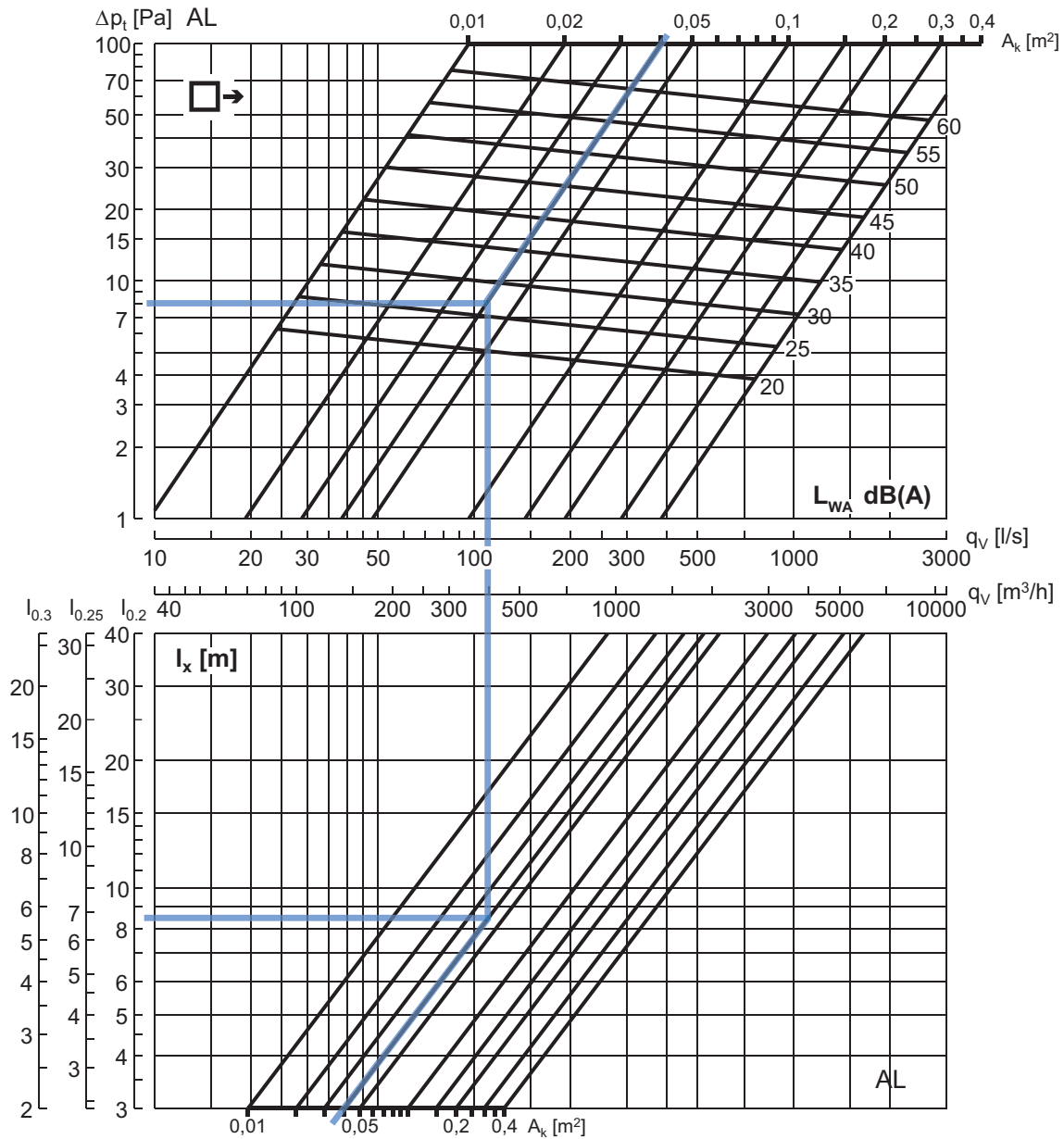


For grilles installed less than 300 mm from the ceiling, the air throw is extended by 40% so that:

$$l_{x \text{ result}} = 1,4 \times l_{x \text{ diagram value}}$$



Technical data- Supply air



Example:

Grille size (LxH): 400x150 mm
 Free area A_K : 0,04 m²
 Air flow rate q_v : 400 m³/h (111 l/s)

Result:

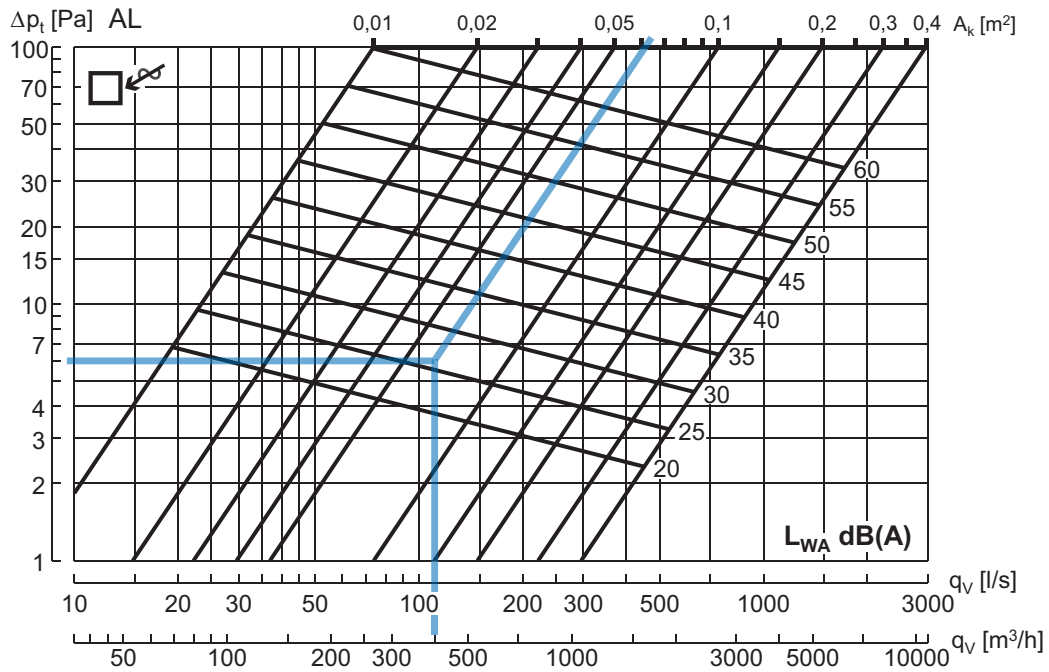
Sound power level L_{WA} : ~27 [dB(A)]
 Total pressure loss Δp_t : ~8 [Pa]
 Throw $l_{0,2}$: ~8,5 [m]

Data valid for:

- Supply air
- Blade setting 0
- Isotherm conditions
- Throw without ceiling effect (distance >800 mm. to ceiling)

For grilles with free area > 0,4 m² we refer to use Lindab online calculation tool on www.lindab.com.

Technical data- Extract



Example:

Grille size (LxH): 600x150 mm
 Free area A_k : 0,062 m²
 Air flow rate q_v : 400 m³/h (111 l/s)

Data valid for

- Extract air
 For grilles with free area > 0,4 m², we refer to use Lindab's online calculation tool on www.lindab.com.

Result:

Sound power level L_{WA} : ~26 [dB(A)]
 Total pressure loss Δp_t : ~6 [Pa]

Plenum box

VBX



Description

VBX is a plenum box for supply and extract air intended to achieve a stable flow to a rectangular grille or other types of face plates. VBX is equipped with an adjustment damper and pressure measurement device. The plenum box can be connected from the side, the top or the back. The adjustment damper is operated from the front of the box by means of a graduated handle with integrated locking mechanism. VBX is equipped with a telescopic connection for easy installation.

- Can be used for both supply and extract air
- Easy-to-detach face plate for access to duct
- Same box used for all front grilles (AD, AE, AL, AR)

Maintenance

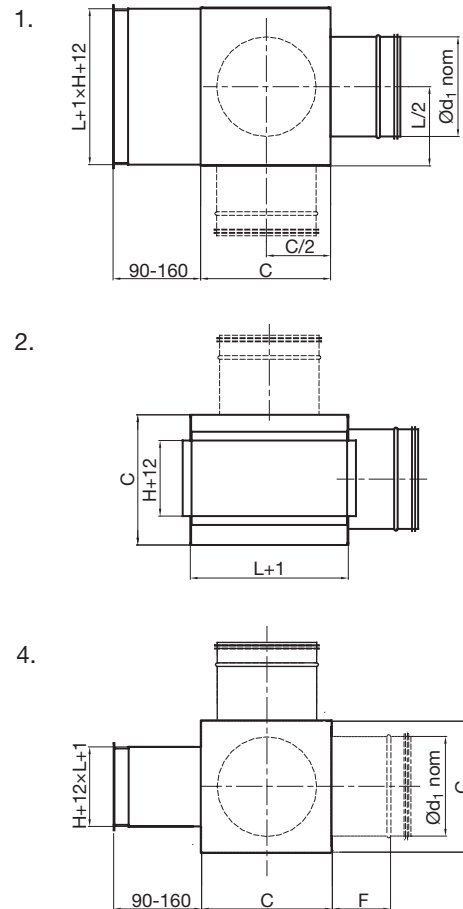
The grille can be removed in connection with cleaning of the internal parts of the plenum box.

Order code

Product	VBX	a	bbb	x	ccc
Type					
VBX					
Connection					
1 - Back connection					
2 - Side connection					
4 - Top connection					
Size					
L : 200 - 800 mm					
H : 100 - 300 mm					

Example: VBX-2-600-200

Dimensions



L	x	H	Ød ₁ mm	C	F
200	x	100	125	165	90
300	x	100	160	200	110
300	x	150	200	240	130
400	x	100	160	200	110
400	x	150	250	290	155
400	x	200	250	290	155
500	x	100	200	240	130
500	x	150	250	290	155
500	x	200	315	355	190
500	x	300	400	440	215
600	x	100	250	290	155
600	x	150	250	290	155
600	x	200	315	355	190
600	x	300	400	440	215
800	x	100	250	290	155
800	x	150	315	355	190
800	x	200	315	355	190
800	x	300	400	440	215

Materials and finish

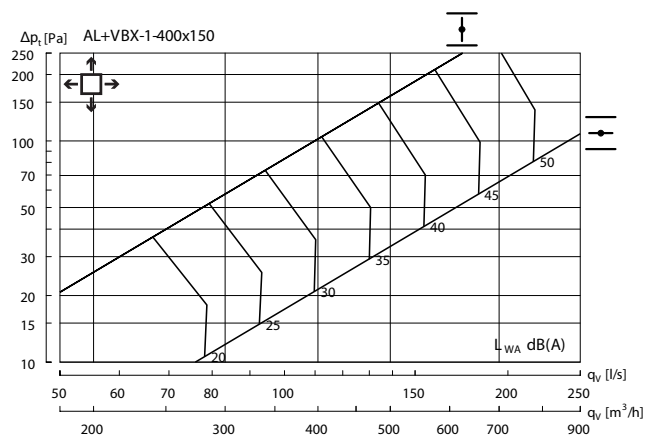
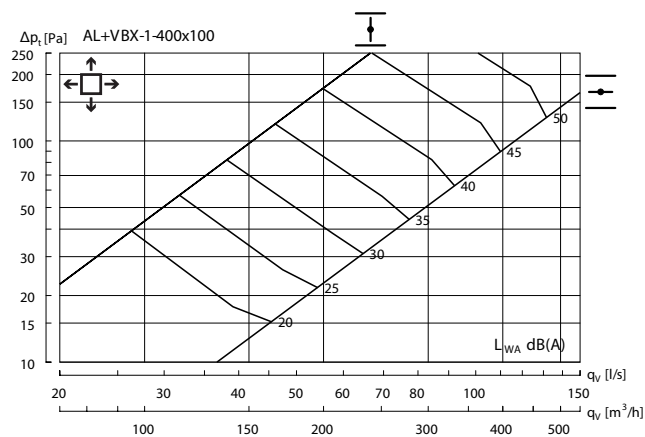
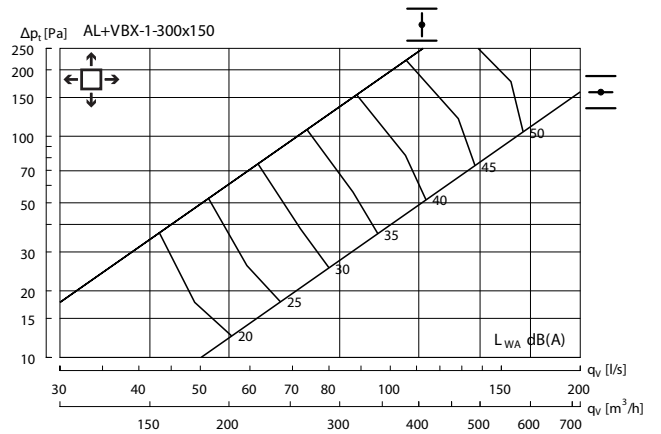
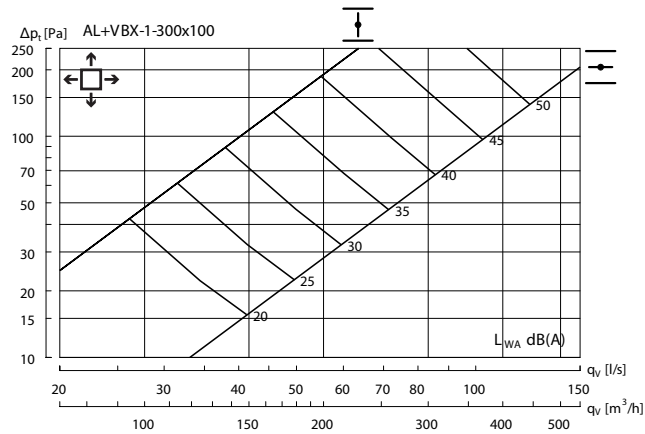
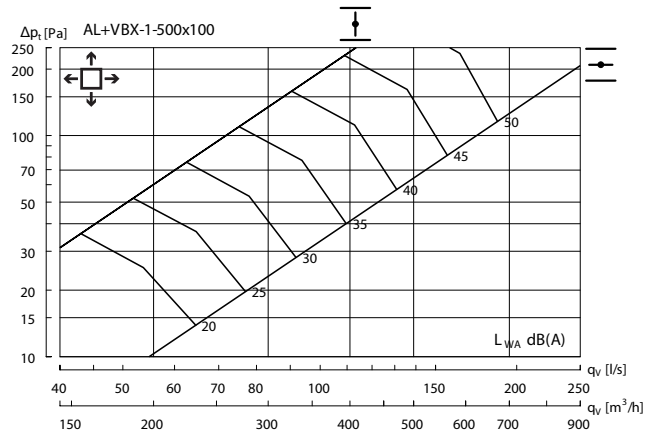
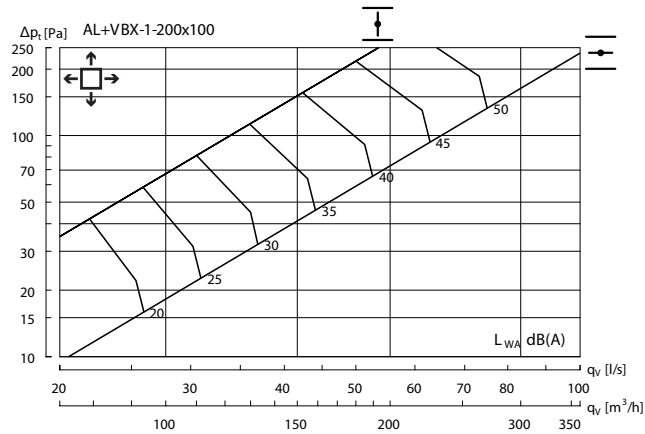
Box, plenum plate and damper are made of hot-galvanised steel plate.

Grille

AL+VBX

Technical data

Supply air

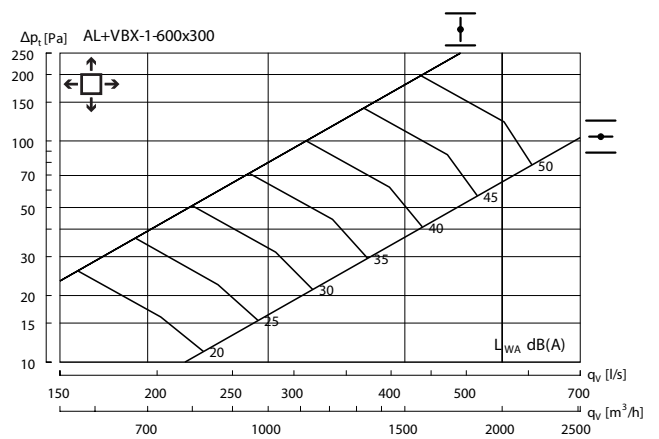
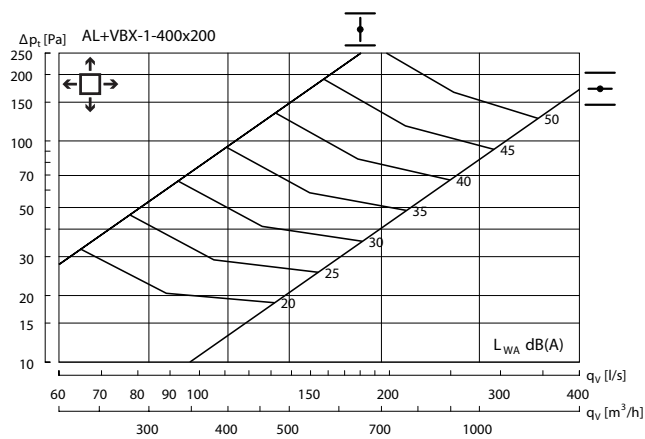
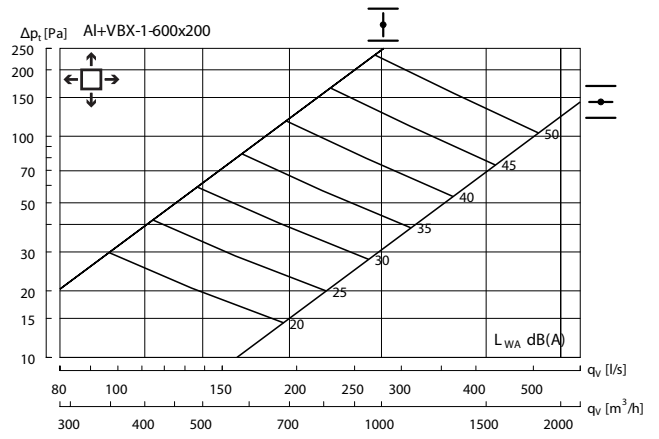
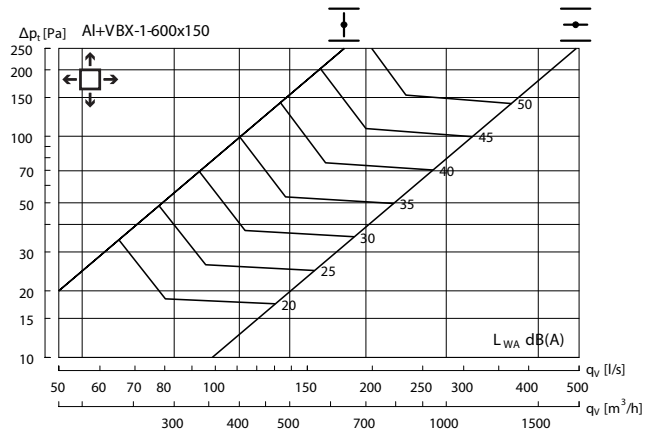
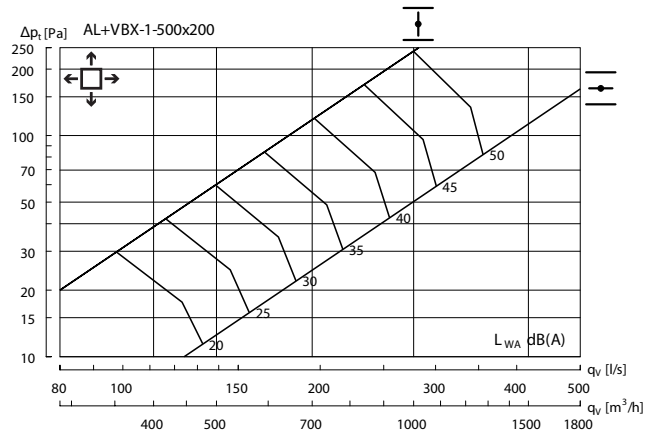
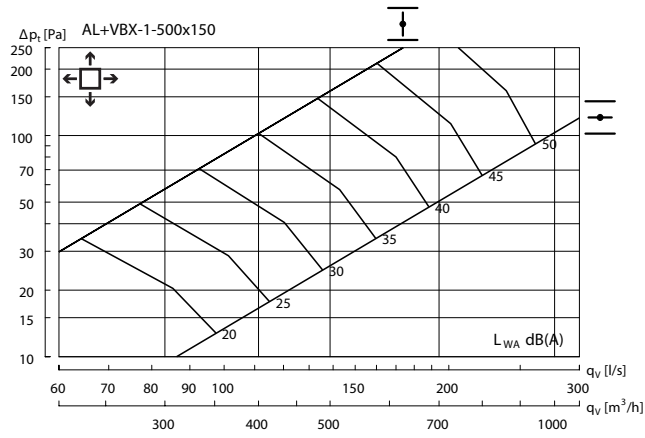


Grille

AL+VBX

Technical data

Supply air

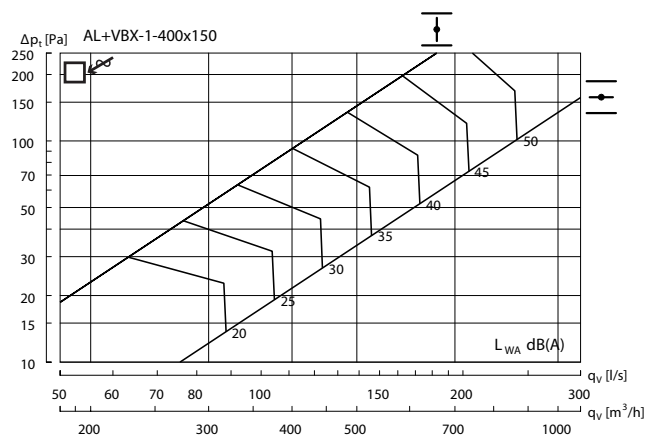
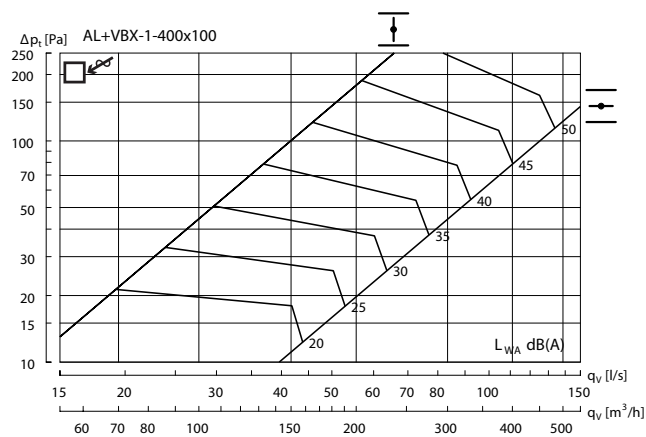
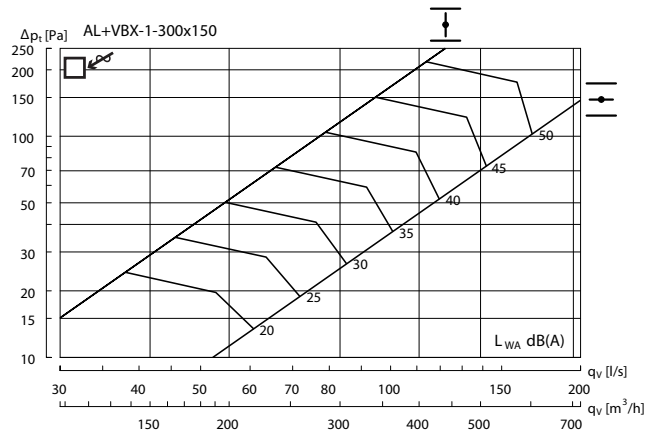
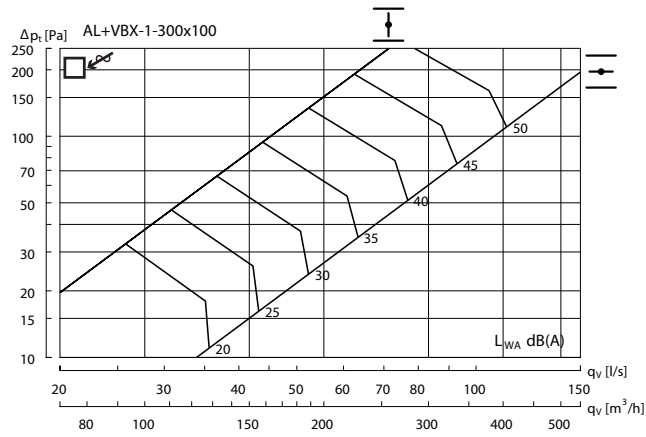
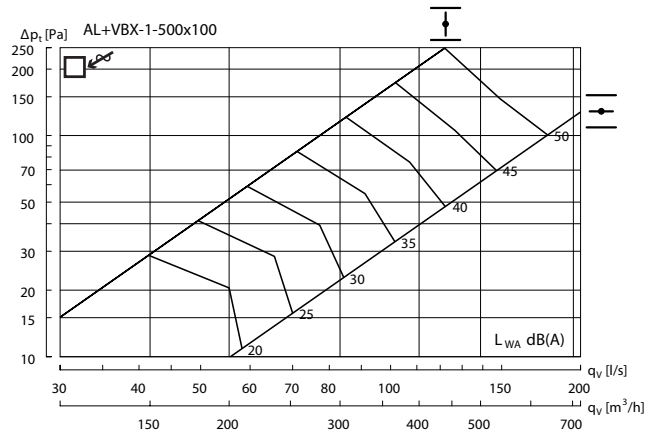
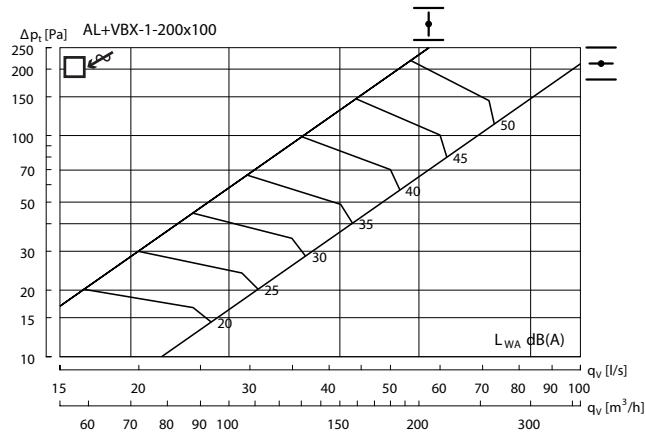


Grille

AL+VBX

Technical data

Extract air



Grille

AL+VBX

Technical data

Extract air

