

VIREO Ceiling with ALX

Square ceiling air diffuser with nozzles for supply air, with plenum box



QUICK FACTS

- Flush design
- Suitable for VAV-applications
- Fast and easy installation
- Sealing ring, standard for spigot
- Energy efficient with tightness class C, EN 1751:2014
- Plenum box, 360° rotatable
- Standard swirl spread, alternative 3-way and vertical spread
- Standard black or white rectangular nozzles

AIR FLOW - SOUND PRESSURE ROOM (Lp10A) *)						
VIREO C Size	25 dB(A)		30 dB(A)		35 dB(A)	
	l/s	m ³ /h	l/s	m ³ /h	l/s	m ³ /h
125-600	35	126	42	151	48	173
160-600	43	155	52	187	60	216
200-600	78	281	89	320	103	371
250-600	92	331	106	382	122	439
315-600	118	425	136	490	158	569
400-600	170	612	195	702	225	810

VIREO C Size	ALX (without DAMPER) Size	25 dB(A)		30 dB(A)		35 dB(A)	
		l/s	m ³ /h	l/s	m ³ /h	l/s	m ³ /h
125-600	100-125	26	94	31	112	36	130
160-600	100-160	34	122	39	140	45	162
160-600	125-160	38	137	43	155	52	187
200-600	125-200	53	191	61	220	70	252
200-600	160-200	63	227	73	263	85	306
250-600	160-250	73	263	85	306	99	356
250-600	200-250	81	292	92	331	105	378
315-600	200-315	105	378	121	436	138	497
315-600	250-315	111	400	128	461	149	536
400-600	250-400	132	475	153	551	176	634
400-600	315-400	142	511	164	590	190	684

VIREO C Size	ALX (with DAMPER) Size	25 dB(A)		30 dB(A)		35 dB(A)	
		l/s	m ³ /h	l/s	m ³ /h	l/s	m ³ /h
125-600	100-125	17	61	22	79	30	108
160-600	100-160	18	65	23	83	31	112
160-600	125-160	26	94	35	126	46	166
200-600	125-200	26	94	35	126	55	198
200-600	160-200	44	158	56	202	70	252
250-600	160-250	45	162	58	209	80	288
250-600	200-250	58	209	78	281	97	349
315-600	200-315	65	234	88	317	120	432
315-600	250-315	95	342	120	432	140	504
400-600	250-400	98	353	125	450	148	533
400-600	315-400	135	486	155	558	175	630

The data specified in the table applies to 50 Pa total pressure.

*) L_{p10A} = Sound pressure incl. A-filter with 4 dB room attenuation and 10 m² room absorption area.

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Technical description

Design

- The air diffuser consists of a backing box and a diffuser face.
- The diffuser face has plastic rectangular nozzles and is designed for discharging high airflows. Nozzles can easily be changed from standard swirl spread to 3-way or vertical spread. Information in separate Instructions/Manuals.
- Quick Access system makes it easier and faster to open and close the diffuser face for installation cleaning, see figure 1.
- Plenum box ALX is an accessory.
- Plenum box is 360° rotatable, which makes duct installation easier and flexible ducts are not necessary.
- Telescopic vertically fine adjustment is possible between the plenum box and the air diffuser to reach alignment with the ceiling.
- Tightness class C, according to EN 1751:2014, for the plenum box gives an energy efficient system and all the supply air will be utilized in the room.

Materials and finish

- The backing box and diffuser face are made of sheet steel, the spigot is made of galvanized sheet steel.
- The plenum box is made of galvanized sheet steel.
- The sheet steel is painted.
- Standard colour:
 - White semi-gloss, lustre 40, RAL 9003/NCS S 0500-N
- Alternative standard colours:
 - Silver gloss, lustre 80, RAL 9006
 - Grey aluminium gloss, lustre 80, RAL 9007
 - White semi-gloss, lustre 40, RAL 9010
 - Black semi-gloss, lustre 35, RAL 9005
 - Grey semi-gloss, lustre 30, RAL 7037
- Non-painted finish and other colours available on request.
- The rectangular nozzle is made of environmentally friendly plastic (PP-polypropylene) and is available in black and white.

Accessories

Plenum box:

- ALX. Made of galvanized sheet steel. Without insulation, damper and measuring device. Only standard height for installation in ceiling. Plenum box is available with 1 or 2 changes in dimension between the inlet and outlet.

Damper:

- ALX Damper. Factory mounted fixed damper in the inlet duct of the plenum box, adjustable with strings.

Frame:

- SAR K. For aesthetic installation of a lowered diffuser.



Adapter for suspended ceilings:

- ADAPTER. For adaptation to various variants and makes of suspended ceiling systems. See separate product sheet for ADAPTER.

Project design

- The air diffuser (backing box and diffuser face) is delivered with plenum box.
- The air diffuser has the dimensions 595 x 595mm. It can be placed directly in suspended ceilings with visible grid 600x600 mm.
- Air diffusers with plenum box should be fixed to the ceiling and duct system.

Installation

- To dismantle the diffuser face, insert a thin object, for example a Quick Access card.
- Insert the card in between the diffuser face and the diffuser backing box in order to release the springs.
- Move the card from the centre out towards the corner, see figure 1.
- The inlet spigot of the diffuser backing box can be secured to the connecting duct by means of self-tapping screws or a blind rivets.
- For flush-mounting in suspended ceiling systems, secure the air diffuser by means of screws into place in the framework through either the sides or top of the diffuser backing box.
- The air diffuser is designed for installation in modular suspended ceiling systems. The air diffuser can be placed directly in suspended ceiling systems, with visible T-bar framework, then fix to the plenum box.
- The plenum box ALX must be secured to the building structure by means of hangers or mounting brackets.
- Extension with 500 mm circular duct between the plenum box and the air diffuser can be made, see figure 2.

Maintenance

- The air diffuser and the plenum box can be cleaned, if necessary, using lukewarm water with dishwashing detergent added or by vacuum cleaning using a brush nozzle.

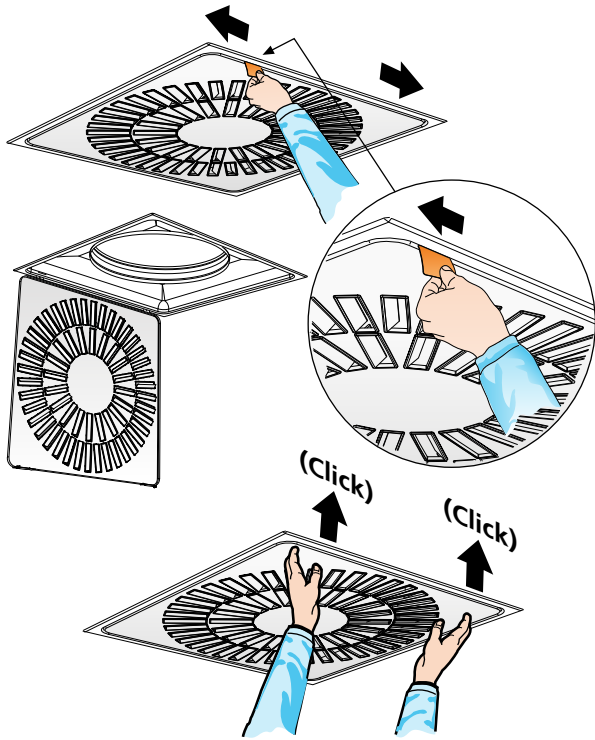


Figure 1. Quick Access.

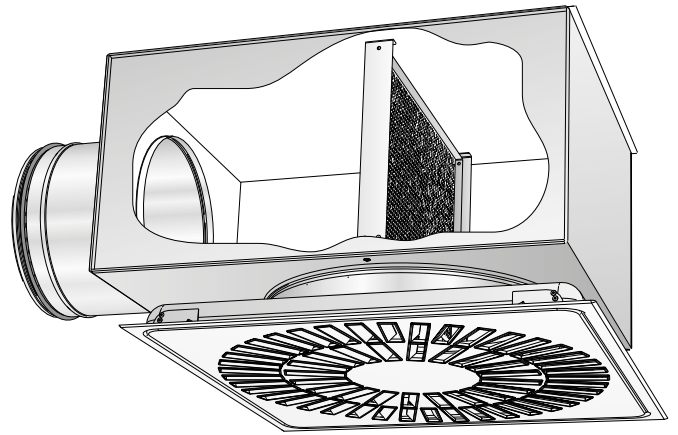


Figure 3. VIREO C with ALX, without damper.

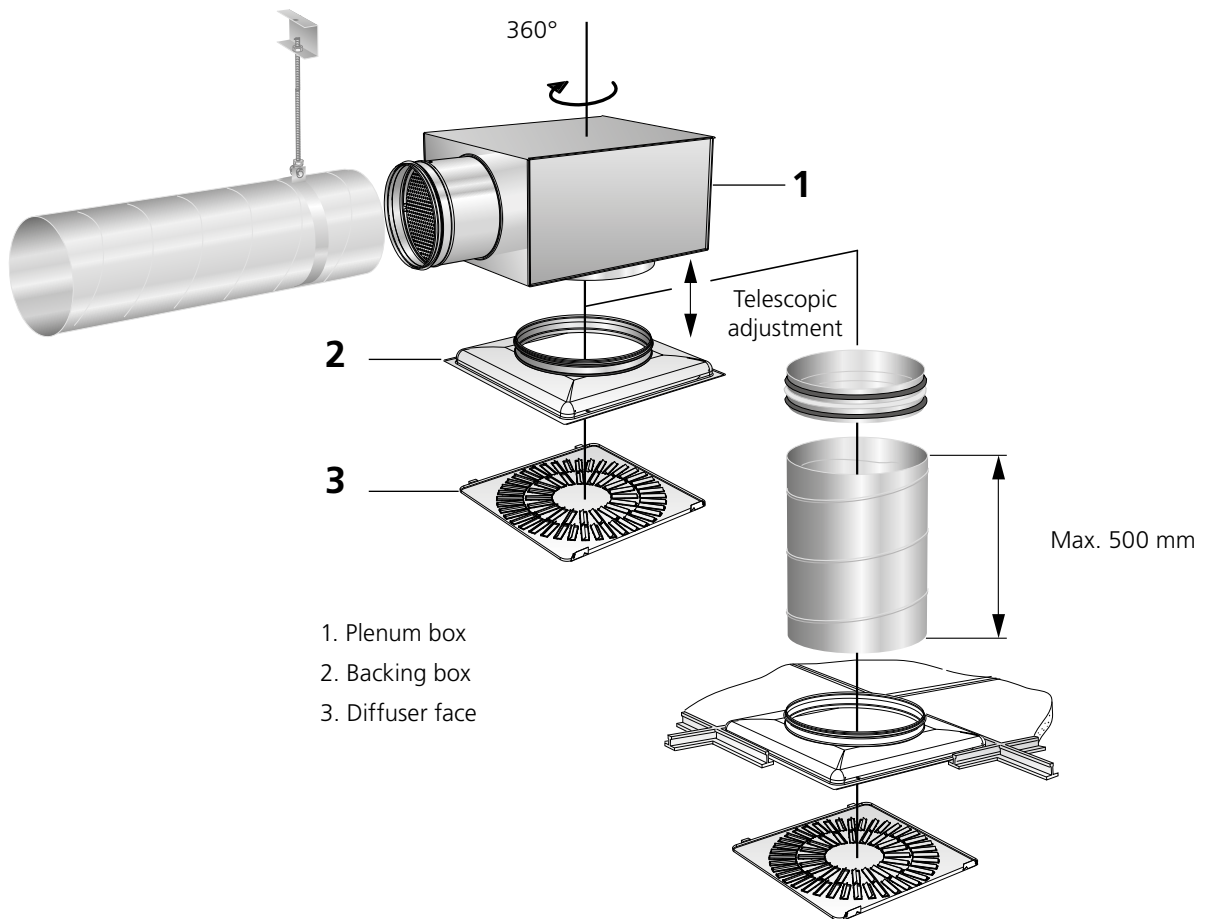


Figure 2. Installation alternatives.

Sizing

Sound data - explanation

The sound pressure level is given in dB(A) for products in rooms and applies to rooms with 10 m² equivalent sound absorption area. Any exceptions are given in the product description.

Measurement of air diffusers according to ISO 5135 and ISO 3471, which is intended for broad-band sound of a stable nature is performed according to the so-called "Comparison method", which means that the measured effective sound power level is compared with the sound pressure level for a calibrated sound source with a known sound power (method II and ASHRAE 36-72).

L_w = Sound power level in the octave band in dB over 1 pW. (10⁻¹² W)

L_{p10A} = Sound pressure level in dB(A) according to normalised frequency weighting A. All sound levels are related to an equivalent absorption area of 10 m² (acoustic absorption of 4 dB)

ΔL = Sound attenuation in the octave band (dB)

K_{OK} = Correction for producing the LW value in the octave band

Sound level L_{p10A} dB(A) or L_{Wtot} dB can be divided into octave bands using the correction factor K_{OK} . This is given in table form for each product.

Formula: $L_w = L_{p10A} + K_{OK}$

The sound data divided into octave bands is also given in table form. For products with a sound level reported in dB(A) the opening attenuation is included in the sound attenuation data.

Calculation software

Refer to Swegon's calculation software ProSelect for data regarding sound in the octave band and sound attenuation in the octave band.

Airflow

The airflow is given in l/s and m³/h, and is listed in the engineering diagram for each product.

Throw length

Testing method according to EN 12238.

The throw ($l_{0,2}$) is the longest distance from the centre of a supply air diffuser to the isovel 0,2 m/s at isothermal air supply. A throw of $l_{0,2}$ is provided for all Swegon's air diffusers.

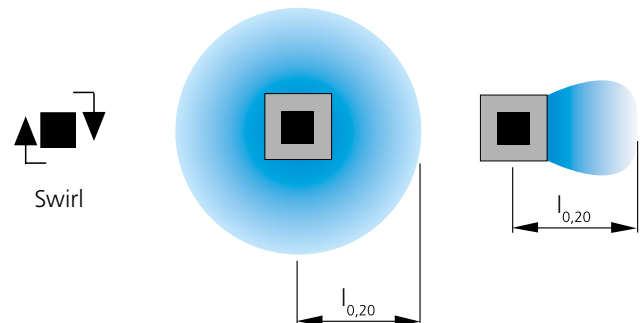
The values given in the engineering graph apply to isothermal supply air.

For air diffusers, the throw is given for mounting facing the ceiling. Some supply air diffusers can be mounted free hanging or suspended from the ceiling, in which case the throw is reduced by approximately 20%. "Free-hanging" means that the diffuser outlet is at least 400 mm from the ceiling.

For calculating the width of the air stream, air velocities

in the occupied zone or sound levels in rooms with other dimensions, please refer to our ProAir web calculation software available for download at www.swegon.com.

Illustration of the spread direction:



Engineering graphs - explanation

General

Unless stated otherwise, the engineering graph for each product provides the following information:

- Data for isothermal conditions
- Throw with an end velocity of 0,2 m/s
- Sound level L_{p10A} dB(A) 10 m² equivalent sound absorption
- Pressure drop p_t , Pa
- Air flow q l/s and m³/h

Pressure drop

In the engineering graph for air terminals the pressure drop is given as the total pressure drop (p_t). The total pressure drop (p_t) is the sum of the static pressure drop (p_s) and the dynamic pressure (p_d) over the air terminal.

Supply air: $p_t = p_s + p_d$

For a supply air terminal the total pressure drop is the sum of two positive pressures and therefore has a larger numerical value than the static pressure drop. For extract air terminals the static pressure drop is negative and the total pressure drop is therefore a numerically smaller value than the static pressure drop.

Extract air: $p_t = (-p_s) + p_d$

The dynamic pressure is calculated as follows:

$$P_d = \frac{v^2}{2} \rho \quad \text{Pa}$$

where v is the inlet velocity in m/s
 ρ is the air density in kg/m³

Sizing example

Room area: 20x10 m with projected air flow = 5000 m³/h.

Sound requirement for supply air diffuser: L_{WA} = 40 dB(A) and 8 dB room attenuation.

Air velocities in the occupied zone should be lower than 0,2 m/s.

Supply air temperature = 18°C.

Room temperature = 24°C.

Gives dT= - 6 K.

Calculate numbers of air diffusers

Distance to wall has to be at least 2 m, which gives 2 rows with air diffusers = 10 air diffusers with 500 m³/h per air diffuser, with 4 m between the air diffusers.

From graph:

Open damper 90°, with q= 500 m³/h gives:

- L_{pA} = 26 dB(A) and acoustic absorption of 4 dB.

- 15 Pa total pressure drop.

- l_{0,2} = 3,8 m throw with standard swirl spread (isothermal conditions, end velocity of 0,2 m/s).

Control of requirements

Sound L_{WA}

Conversion to sound effect

L_{WA} = L_{pA} + 4 dB = 26+4 = 30 dB(A) for each air diffuser.

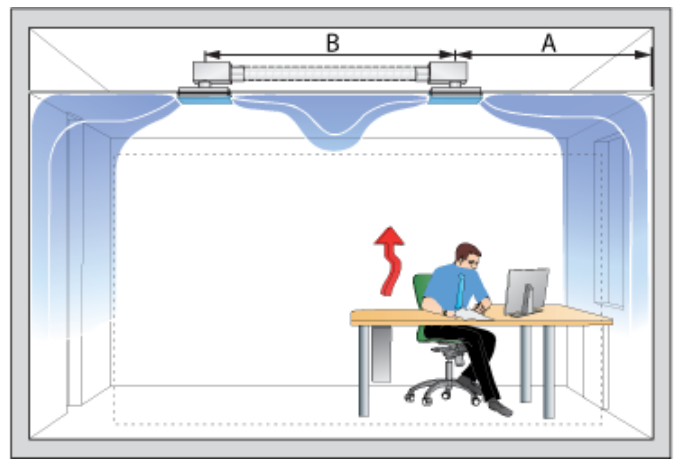
10 air diffusers á 30 dB(A) gives with logarithmic addition L_{WA} = 30 +10 = 40 dB(A).

We get total sound pressure for the room L_{pA} = 40-8 = 32 dB(A), (acoustic absorption of 8 dB).

Velocities in the occupied zone

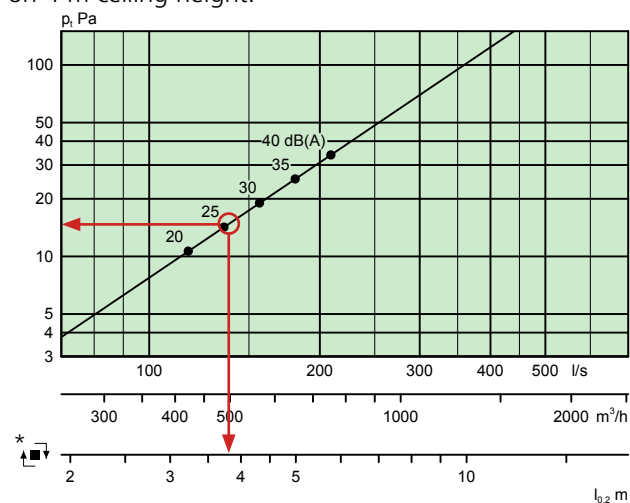
Smallest recommended distance between air diffuser and wall is calculated in ProSelect (www.swegon.com).

ProSelect gives: when dT = - 6 K, B = 3,6 m, shortest distance to wall = 0,25 m when the air diffuser is placed on 4 m ceiling height.



A = Distance wall to wall in the occupied zone (0,20 m/s).

B = Distance between air diffusers in the occupied zone (0,20 m/s).



*Swirl spread

Isothermal throw = 3,8 m

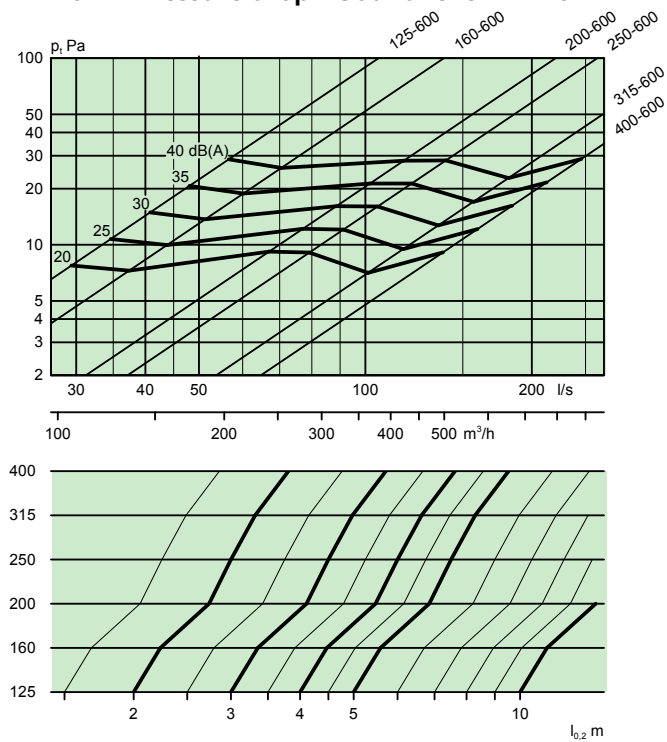
L_{pA} = 26dB(A)

VIREO C and VIREO C with ALX

- The dB(A) values are applicable to rooms with normal acoustic absorption of 4 dB.
- Throw $l_{0,2}$ is measured under isothermal conditions.
- Graph for supply air shows standard swirl spread
- Recommended max. permissible temperatures below/over room temperature is $\pm 10K$.
- Recommended Ceiling height is 2.5-4 m.

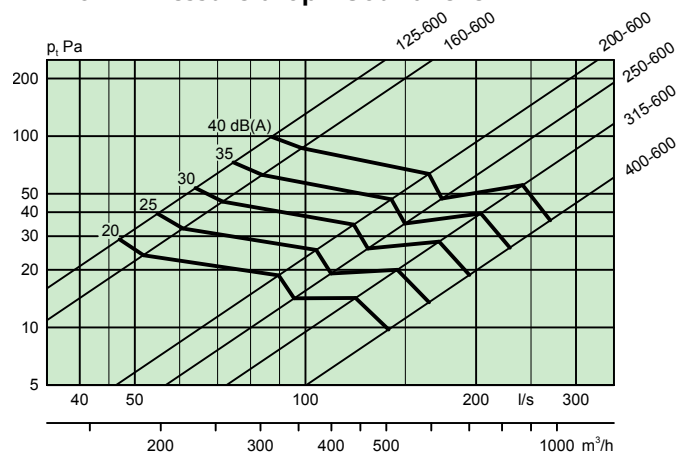
VIREO C - Supply air, Air diffuser only with backing box

Air flow – Pressure drop – Sound level – Throw



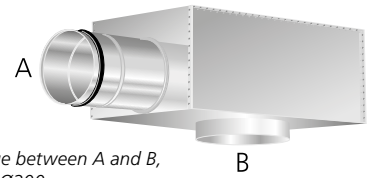
VIREO C - Extract air, Air diffuser only with backing box

Air flow – Pressure drop – Sound level



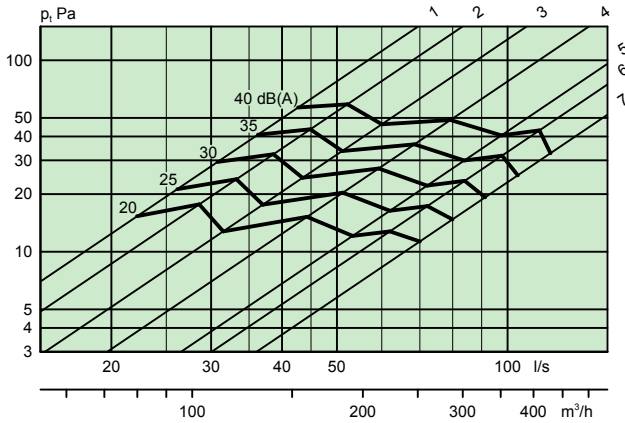
VIREO C + ALX, without damper - Supply air, Air diffuser with plenum box

Air flow – Pressure drop – Sound level – Throw

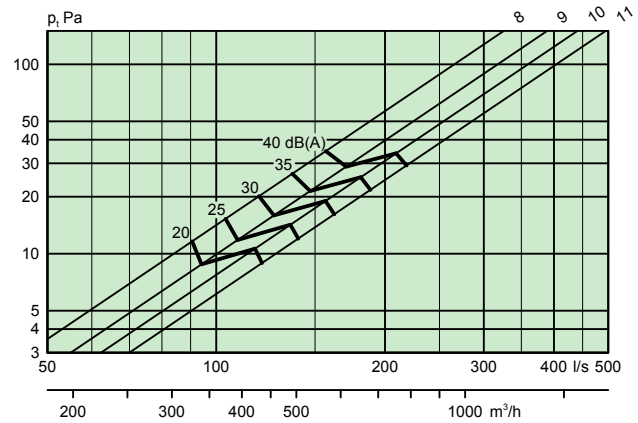


Explanation of the step model:

- One step = One dimensional change between A and B, for example, A = Ø160 mm and B = Ø200 mm.
- Two steps = Two dimensional changes between A and B, for example, A = Ø160 mm and B = Ø250 mm.



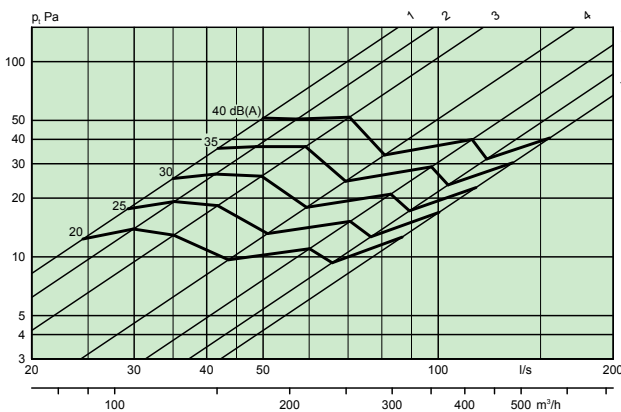
1. VIREO C 125-600+ALX 100-125, 1-step duct connection Ø100
2. VIREO C 160-600+ALX 100-160, 2-step, duct connection Ø100
3. VIREO C 160-600+ALX 125-160, 1-step, duct connection Ø125
4. VIREO C 200-600+ALX 125-200, 2-step, duct connection Ø125
5. VIREO C 200-600+ALX 160-200, 1-step, duct connection Ø160
6. VIREO C 250-600+ALX 160-250, 2-step, duct connection Ø160
7. VIREO C 250-600+ALX 200-250, 1-step, duct connection Ø200



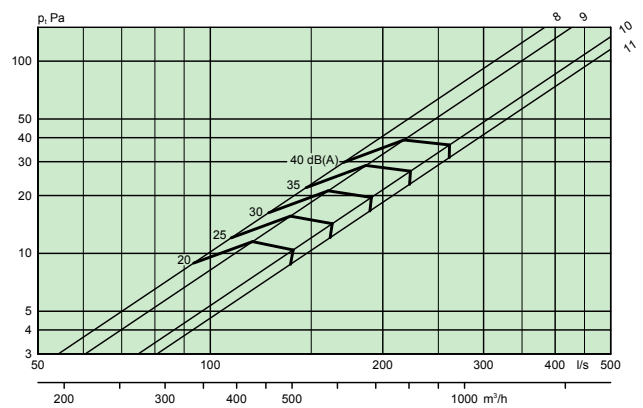
8. VIREO C 315-600+ALX 200-315, 2-step duct connection Ø200
9. VIREO C 315-600+ALX 250-315, 1-step duct connection Ø250
10. VIREO C 400-600+ALX 250-400, 2-step duct connection Ø250
11. VIREO C 400-600+ALX 315-400, 1-step duct connection Ø315

VIREO C + ALX, without damper - Extract air Air diffuser with plenum box

Air flow – Pressure drop – Sound level



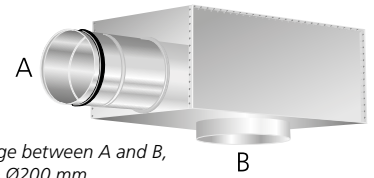
1. VIREO C 125-600+ALX 100-125, 1-step duct connection Ø100
2. VIREO C 160-600+ALX 100-160, 2-step, duct connection Ø100
3. VIREO C 160-600+ALX 125-160, 1-step, duct connection Ø125
4. VIREO C 200-600+ALX 125-200, 2-step, duct connection Ø125
5. VIREO C 200-600+ALX 160-200, 1-step, duct connection Ø160
6. VIREO C 250-600+ALX 160-250, 2-step, duct connection Ø160
7. VIREO C 250-600+ALX 200-250, 1-step, duct connection Ø200



8. VIREO C 315-600+ALX 200-315, 2-step duct connection Ø200
9. VIREO C 315-600+ALX 250-315, 1-step duct connection Ø250
10. VIREO C 400-600+ALX 250-400, 2-step duct connection Ø250
11. VIREO C 400-600+ALX 315-400, 1-step duct connection Ø315

**VIREO C + ALX, with damper - Supply air,
Air diffuser with plenum box**

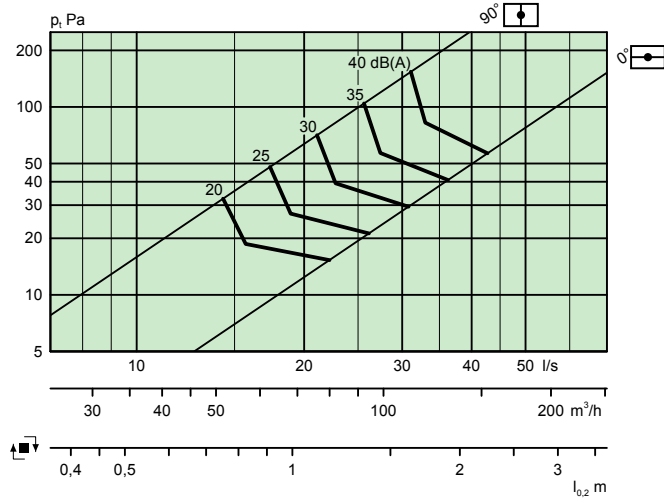
Air flow – Pressure drop – Sound level – Throw



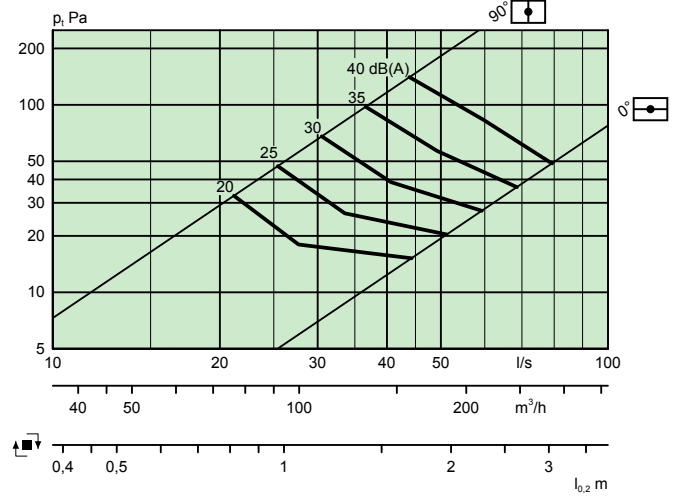
Explanation of the step model:

- One step = One dimensional change between A and B, for example, A = Ø160 mm and B = Ø200 mm.
- Two steps = Two dimensional changes between A and B, for example, A = Ø160 mm and B = Ø250 mm.

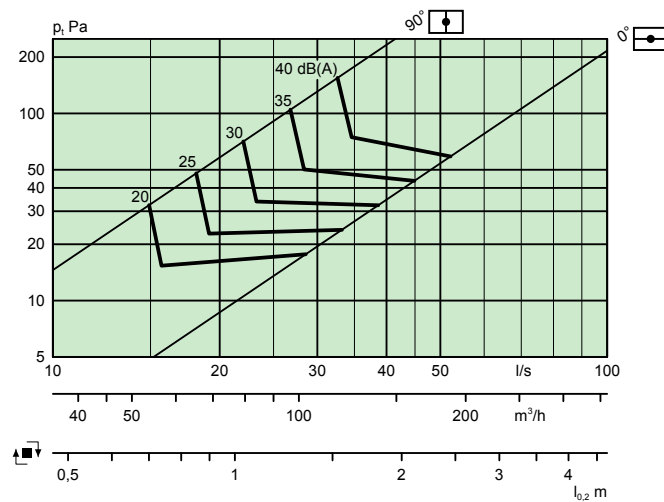
VIREO C 125-600 + ALX 100-125 incl. damper - One step



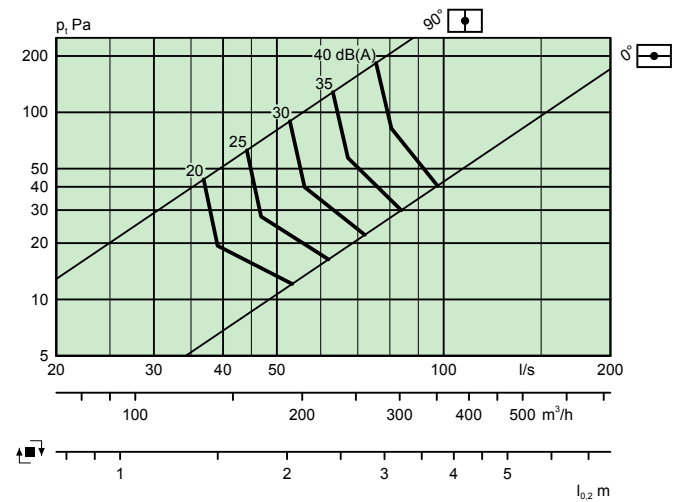
VIREO C 200 -600 + ALX 125-200 incl. damper - Two steps



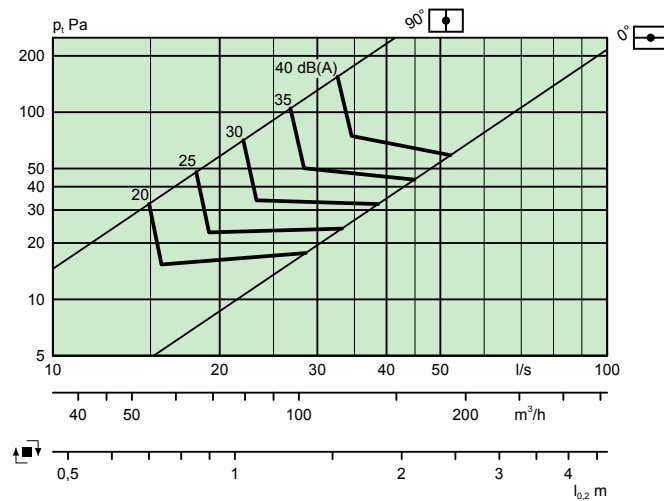
VIREO C 160 -600 + ALX 100-160 incl. damper - Two steps



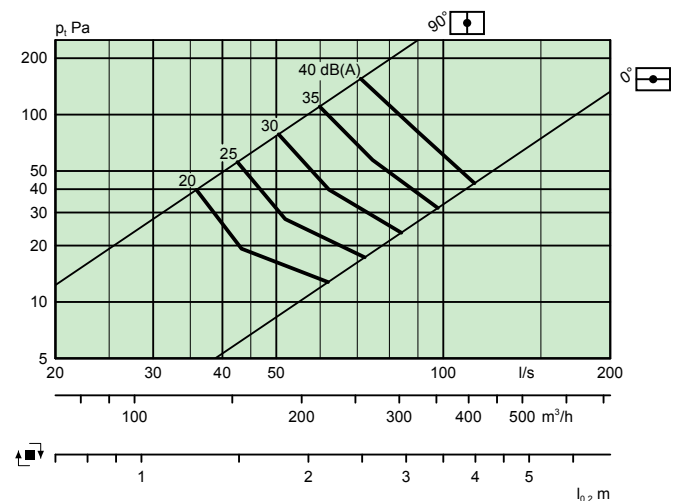
VIREO C 200 -600 + ALX 160-200 incl. damper - One step



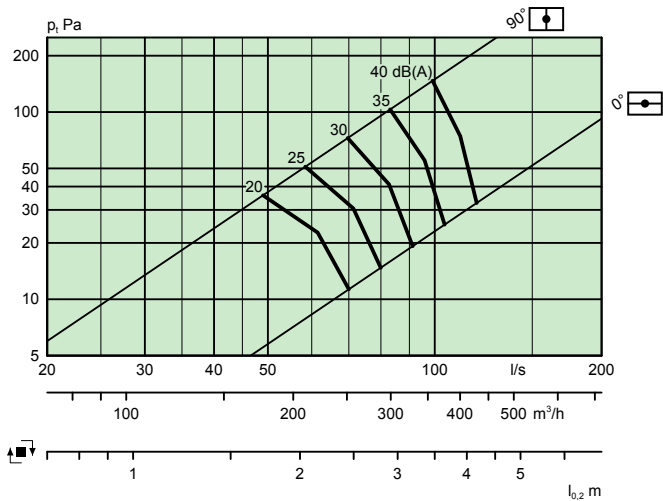
VIREO C 160 -600 + ALX 125-160 incl. damper - One step



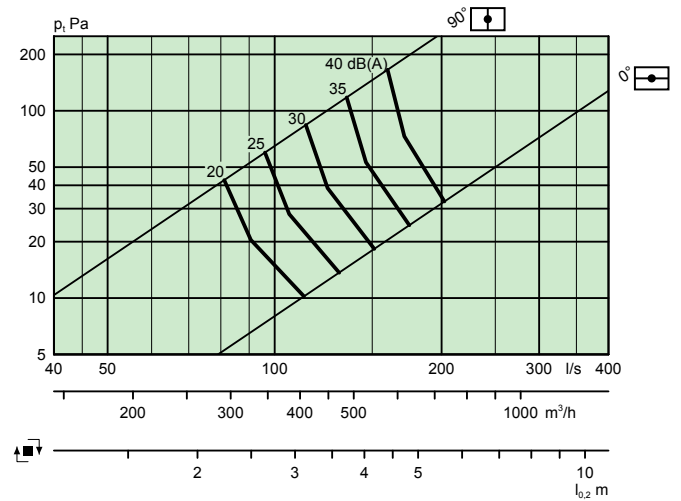
VIREO C 250 -600 + ALX 160-250 incl. damper - Two steps



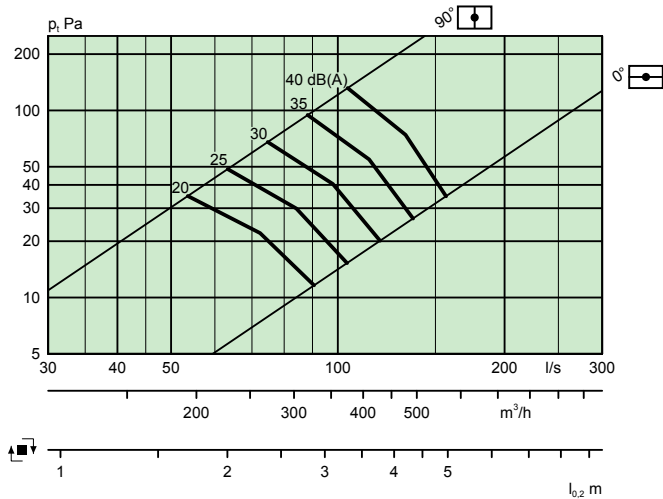
VIREO C 250 -600 + ALX 200-250 incl. damper - One step



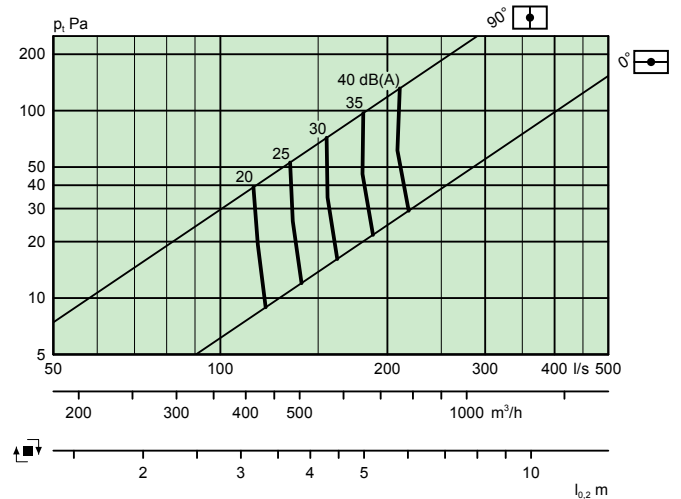
VIREO C 400 -600 + ALX 250-400 incl. damper - Two steps



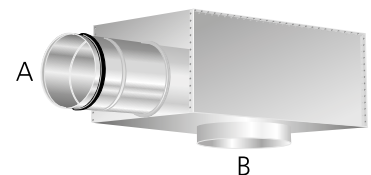
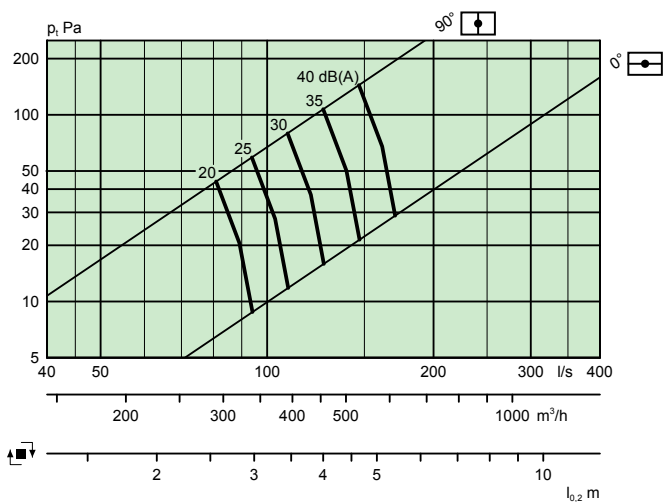
VIREO C 315 -600 + ALX 200-315 incl. damper - Two steps



VIREO C 400 -600 + ALX 315-400 incl. damper - One step



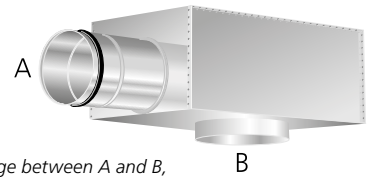
VIREO C 315 -600 + ALX 250-315 incl. damper - One step



Explanation of the step model:

- One step = One dimensional change between A and B, for example, A = Ø160 mm and B = Ø200 mm.
- Two steps = Two dimensional changes between A and B, for example, A = Ø160 mm and B = Ø250 mm.

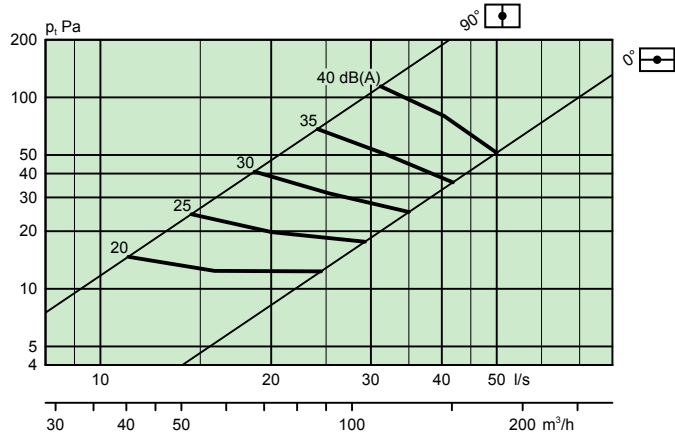
**VIREO C + ALX, with damper - Extract air,
Air diffuser with plenum box
Air flow – Pressure drop – Sound level**



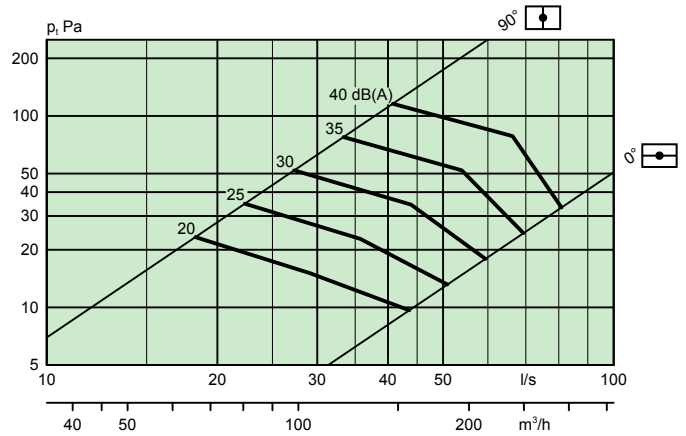
Explanation of the step model:

- One step = One dimensional change between A and B, for example, A = Ø160 mm and B = Ø200 mm.
- Two steps = Two dimensional changes between A and B, for example, A = Ø160 mm and B = Ø250 mm.

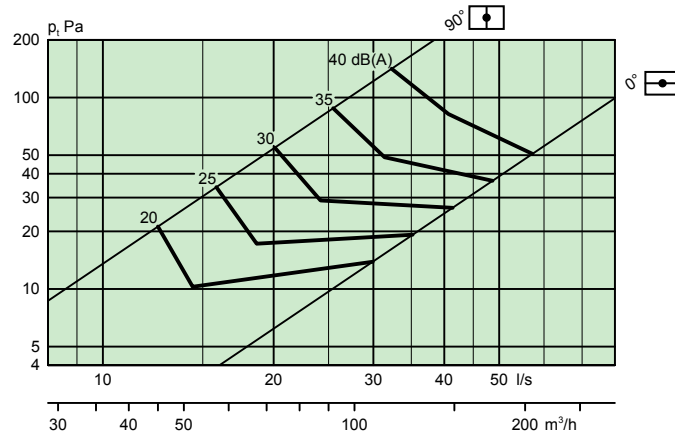
VIREO C 125-600+ALX 100-125 incl. damper - One step



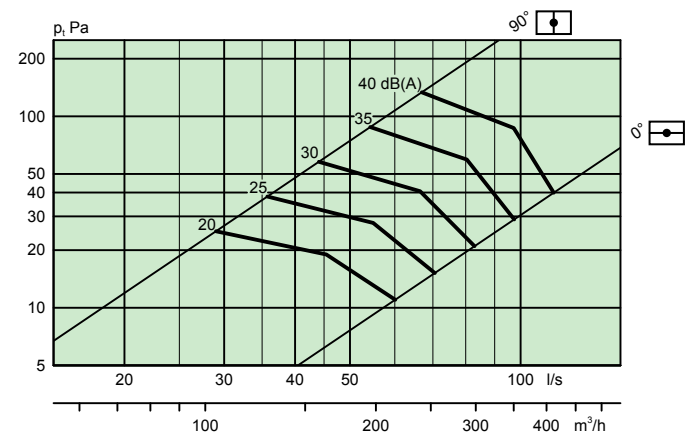
VIREO C 200-600+ALX 125-200 incl. damper - Two steps



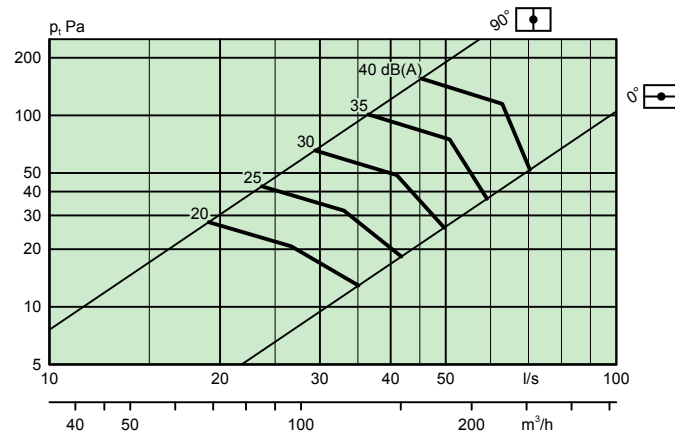
VIREO C 160-600+ALX 100-160 incl. damper - Two steps



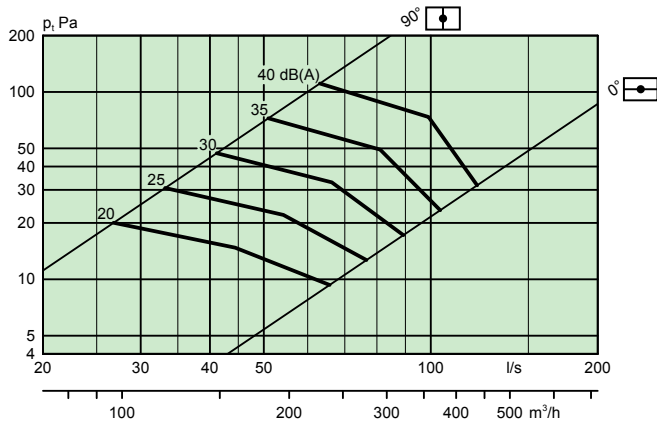
VIREO C 200-600+ALX 160-200 incl. damper - One step



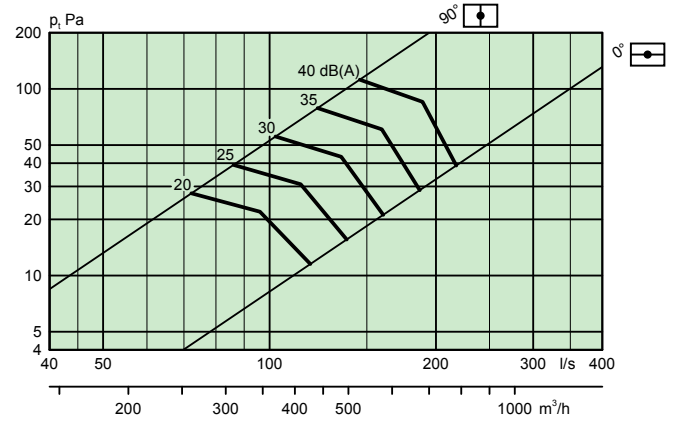
VIREO C 160-600+ALX 125-160 incl. damper - One step



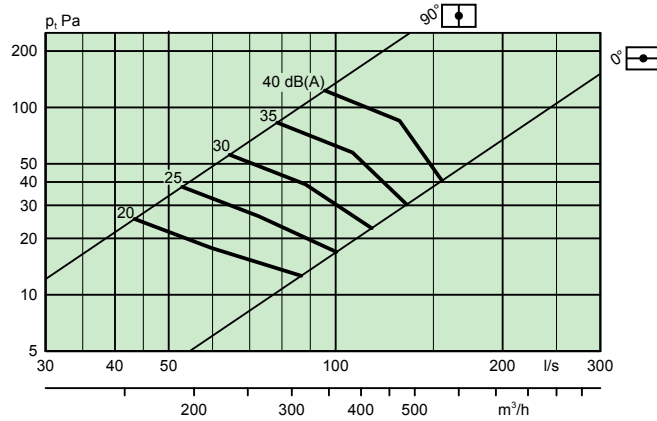
VIREO C 250 -600 + ALX 160-250 incl. damper - Two steps



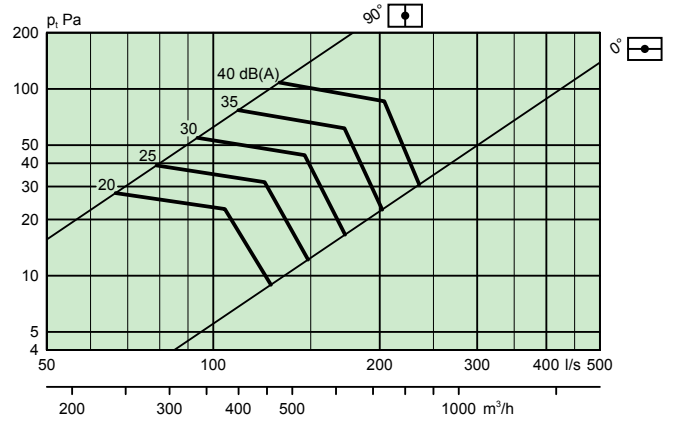
VIREO C 315 -600 + ALX 250-315 incl. damper - One step



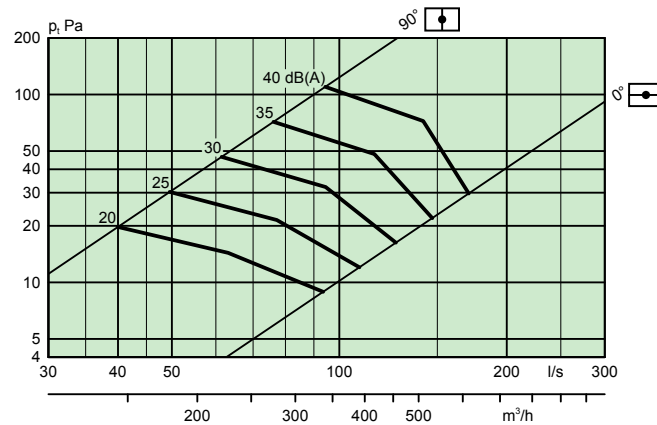
VIREO C 250 -600 + ALX 200-250 incl. damper - One step



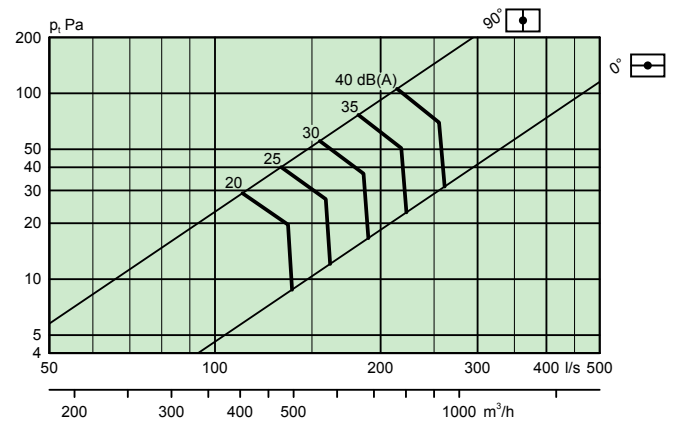
VIREO C 400 -600 + ALX 250-400 incl. damper - Two steps



VIREO C 315 -600 + ALX 200-315 incl. damper - Two steps



VIREO C 400 -600 + ALX 315-400 incl. damper - One step



Dimensions and weights

VIREO C

Size	A	ØD1	I	M	Weight, kg
125-600	595	124	575	70	3,6
160-600	595	159	575	70	3,6
200-600	595	199	575	70	3,5
250-600	595	249	575	70	3,5
315-600	595	314	575	50	3,4
400-600	595	399	575	50	3,2

Dimensions of opening in ceiling = l x l

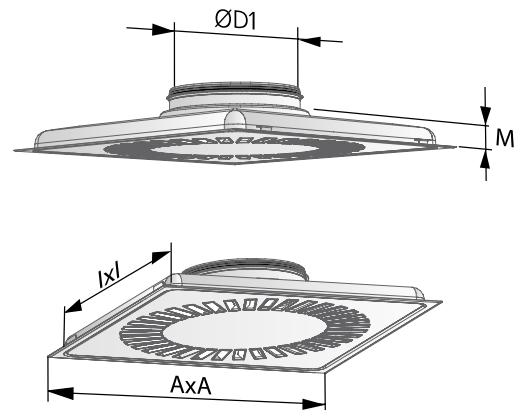


Figure 4. VIREO C.

VIREO C with ALX 1-step

Size	A	B	C	ØD	Ød	E1	F1	G1	H	K	Weight, kg Without damper	Weight, kg With damper
125-600	595	282	217	99	125	255	113	175	270	80	5,1	5,1
160-600	595	342	252	124	160	279	113	188	315	80	5,6	5,6
200-600	595	404	288	159	200	314	113	205	375	100	6,2	6,3
250-600	595	504	332	199	250	354	113	225	465	115	7,1	7,3
315-600	595	622	388	249	315	395	93	230	575	140	8,7	8,9
400-600	595	767	488	314	400	455	93	262	712	175	12,2	12,6

VIREO C with ALX 2-steps

Size	A	B	C	ØD	Ød	E1	F1	G1	H	K	Weight, kg Without damper	Weight, kg With damper
160-600	595	342	252	99	160	255	113	175	315	80	5,4	5,4
200-600	595	404	288	124	200	279	113	188	355	80	5,8	5,9
250-600	595	504	332	159	250	314	113	205	450	100	6,7	6,8
315-600	595	622	388	199	315	334	93	205	550	115	7,9	8,1
400-600	595	622	488	249	400	400	100	230	535	140	10,1	10,3

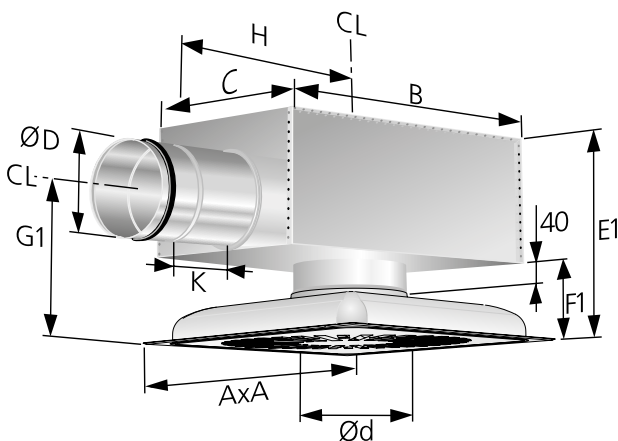


Figure 5. VIREO C with ALX.

Frame – SAR K

Size	Dimensions (mm)		Weight (kg)
	L	N	
600*)	595	75	1,0

*) Position the ALX box so that its branch extends 20 mm below the ceiling surface.

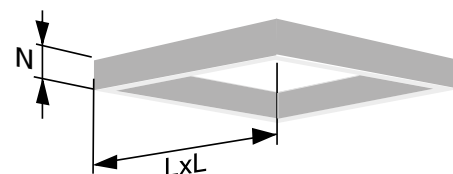
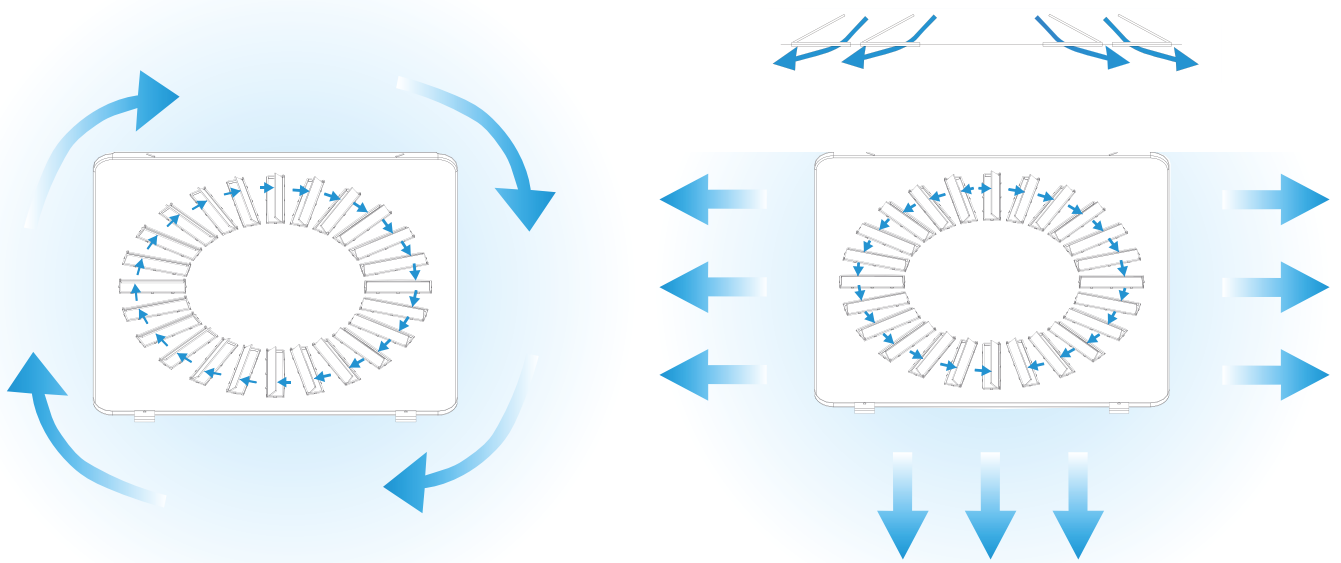


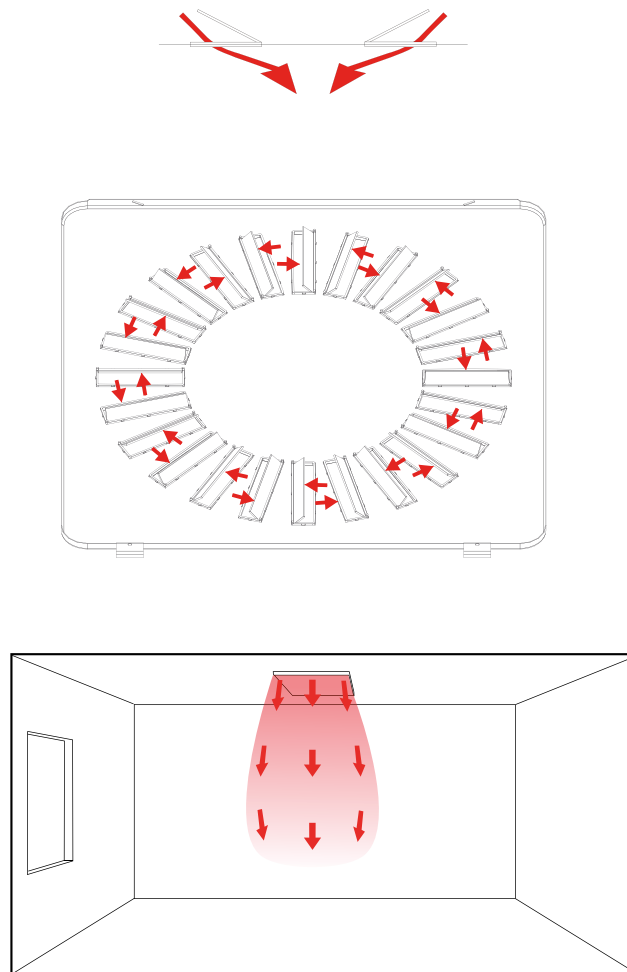
Figure 6. Frame, SAR K.

Nozzle settings, examples - View from above the air diffuser

Size 125-600, 160-600 - 24 nozzles

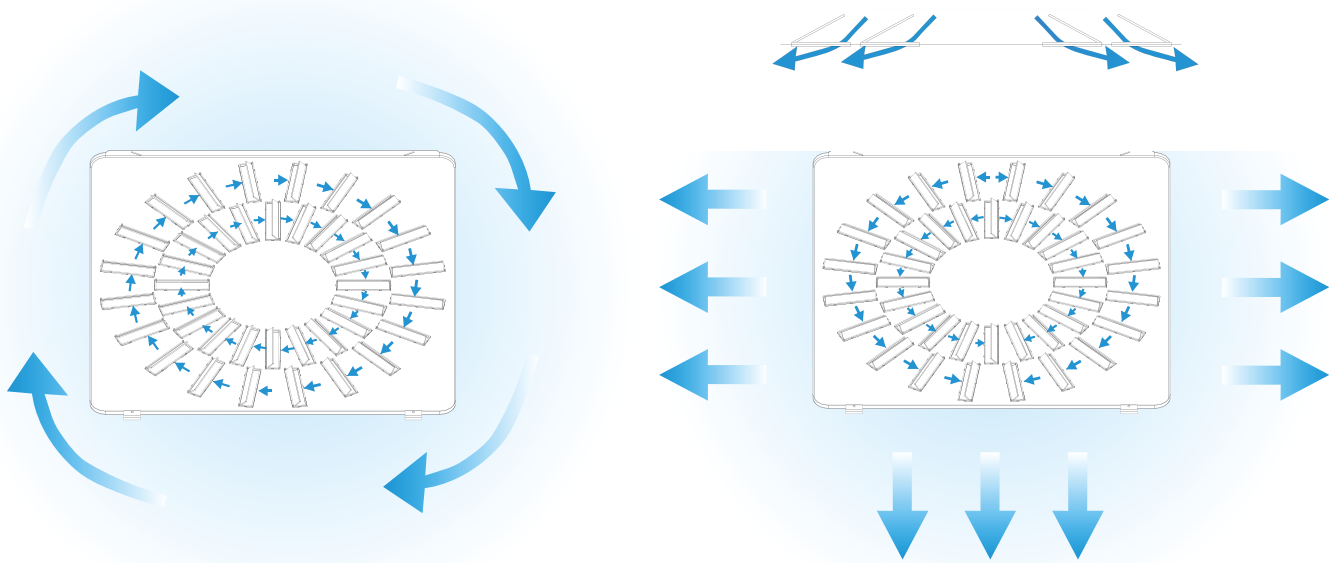


1. Standard rotation pattern, the air comes out counterclockwise when looking at the air diffuser.
2. 3-ways, half of the air comes out counterclockwise, the other half clockwise.

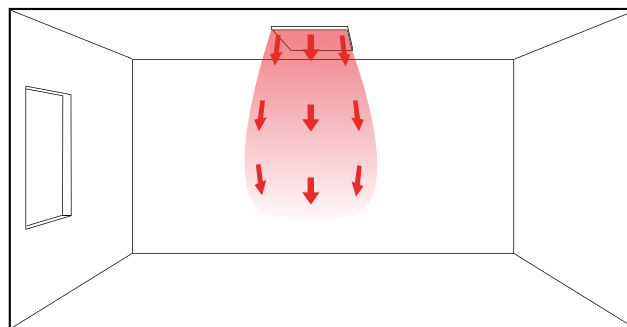
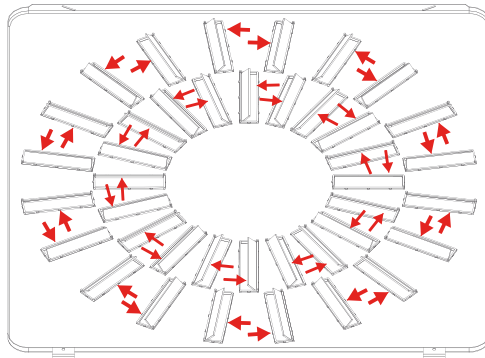


3. Vertical, the nozzles are positioned against each other (two and two). The air streams meet and are directed downwards.

Size 200-600, 250-600 - 40 nozzles

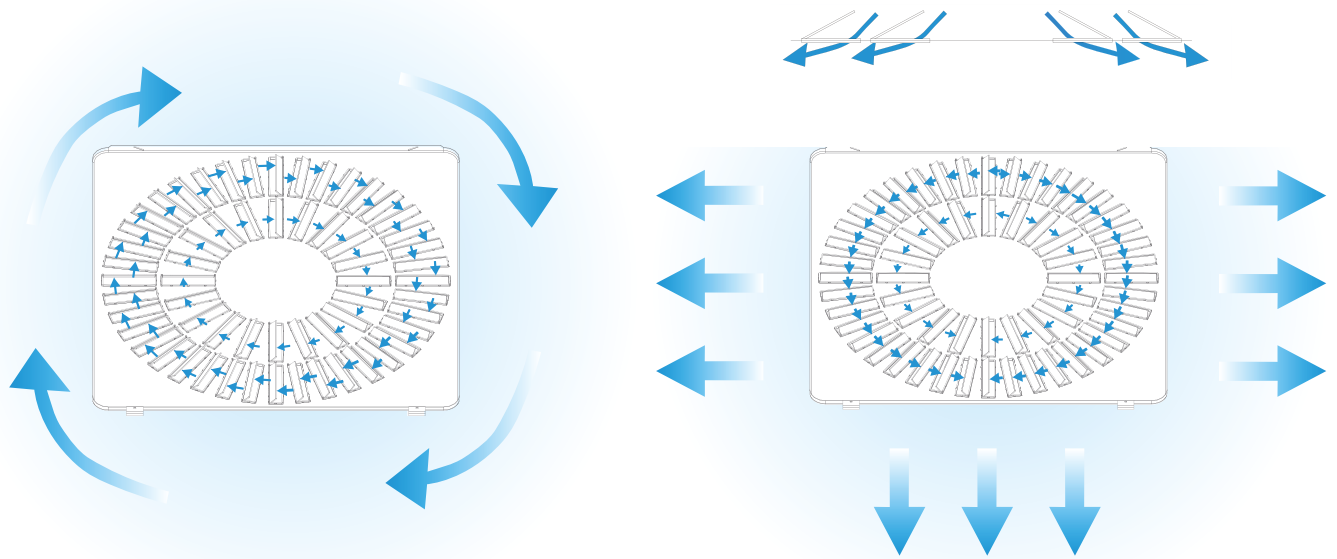


1. Standard rotation pattern, the air comes out counterclockwise when looking at the air diffuser.
2. 3-ways, half of the air comes out counterclockwise, the other half clockwise.



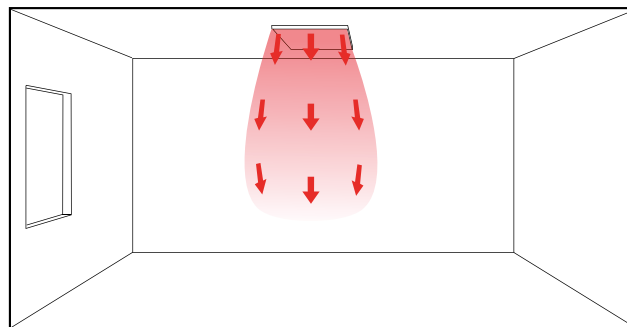
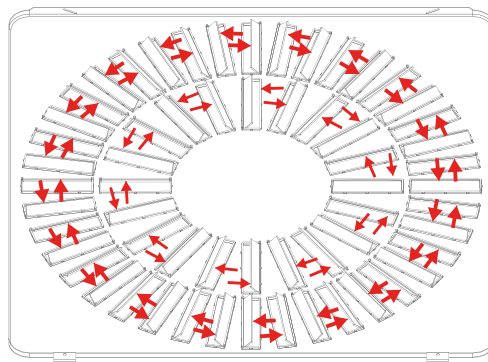
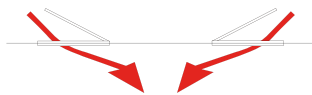
3. Vertical, the nozzles are positioned against each other (two and two). The air streams meet and are directed downwards.

Size 315-600, 400-600 - 60 nozzles



1. Standard rotation pattern, the air comes out counterclockwise when looking at the air diffuser.

2. 3-ways, half of the air comes out counterclockwise, the other half clockwise.



3. Vertical, the nozzles are positioned against each other (two and two). The air streams meet and are directed downwards.

Order key

Product

Square ceiling air diffuser for supply air VIREO C a -aaa -bbb -ccc

Version

Nominal connection size, mm:

125, 160, 200, 250, 315, 400

Nominal square dimension, mm: 600

White nozzles: WhiteNozz

Black nozzles: BlackNozz

Accessories

Plenum box ALX a -aaa - bbb

Version:

For VIREO C: ALX:

125-600	100-125 (NO DAMPER)
125-600	100-125 + DAMPER
160-600	100-160 (NO DAMPER)
160-600	100-160 + DAMPER
160-600	125-160 (NO DAMPER)
160-600	125-160 + DAMPER
200-600	125-200 (NO DAMPER)
200-600	125-200 + DAMPER
200-600	160-200 (NO DAMPER)
200-600	160-200 + DAMPER
250-600	160-250 (NO DAMPER)
250-600	160-250 + DAMPER
250-600	200-250 (NO DAMPER)
250-600	200-250 + DAMPER
315-600	200-315 (NO DAMPER)
315-600	200-315 + DAMPER
315-600	250-315 (NO DAMPER)
315-600	250-315 + DAMPER
400-600	250-400 (NO DAMPER)
400-600	250-400 + DAMPER
400-600	315-400 (NO DAMPER)
400-600	315-400 + DAMPER

Frame SAR b K -aaa

Version:

Square:

Size:

125-600	600
160-600:	600
200-600:	600
250-600:	600
315-600:	600
400-600:	600

Specification text

Swegon's complete square perforated type VIREO C ceiling air diffuser, with ALX plenum box and the following functions:

- Designed for modular suspended ceilings (600 x 600 mm).
- Quick Access for quick access to the plenum box and the duct system.
- White powder paint sprayed and baked finish, RAL 9003/NCS S 0500-N.
- Cleanable ALX plenum box, made of galvanized sheet steel, with factory mounted fixed damper in the inlet duct of the plenum box, adjustable with strings.

Size: VIREO Ca -aaa-bbb-ccc xx items
 ALXa aaa-bbb

Accessory:

Frame: SARb K -aaa xx items