


BOC


Low velocity air diffuser with heating function



QUICK FACTS

- For facilities with both heating and cooling needs
- Switching of heating / cooling with manual control or motor control
- For big facilities, such as factories, big shops, sport arenas
- More free floor area
- Standard colour Grey RAL 7037
 - 5 alternative standard colours
 - Other colours upon request

AIR FLOW - SOUND PRESSURE ROOM (Lp10A) *)						
 Cooling (Open damper) / Displacement - 4 V						
BOC Size	30 dB(A)		35 dB(A)		40 dB(A)	
	l/s	m ³ /h	l/s	m ³ /h	l/s	m ³ /h
200	125	450	150	540	175	630
250	180	648	210	756	245	882
315	265	954	310	1116	360	1296
400	405	1458	475	1710	550	1980
500	640	2304	745	2682	875	3150
630	940	3384	1100	3960	1275	4590

AIR FLOW - SOUND PRESSURE ROOM (Lp10A) *)						
 Heating (Closed damper) / Vertical V						
BOC Size	30 dB(A)		35 dB(A)		40 dB(A)	
	l/s	m ³ /h	l/s	m ³ /h	l/s	m ³ /h
200	125	450	145	522	170	612
250	155	558	180	648	210	756
315	210	756	245	882	290	1044
400	340	1224	400	1440	470	1692
500	515	1854	605	2178	705	2538
630	770	2772	900	3240	1040	3744

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

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Technical description

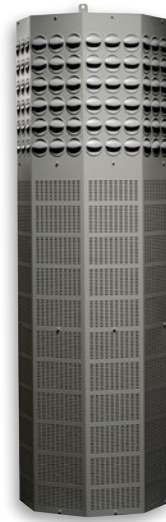
Design

BOC is designed for rooms with high ceilings such as industrial premises, large shops, sports halls etc. It features an octagonal shape, where the top section is fitted with Swegon's nozzles. The top section is used to supply hot air.

The lower section has a perforated, removable front cover. Inside this there is a distribution plate which is equipped with flexible distribution system, Varizon®.

The nozzle section and the perforated section are separated by a damper function. This is controlled by means of an electric motor (1) or manual control (2), see figure 1.

BOC is mounted to a wall or pillar using the brackets supplied with the terminal.



Materials and surface treatment

BOC is manufactured in galvanized sheet steel. The air diffuser's nozzles and VARIZON distribution discs are made of plastic (PP Polypropylene). The whole terminal unit is powder painted.

- Standard colour:
 - Grey semi-gloss, lustre 30, RAL 7037
- Alternative standard colours:
 - Silver gloss, lustre 80, RAL 9006
 - Grey aluminium gloss, lustre 80, RAL 9007
 - Blanc semi-brillant, lustre 40, RAL 9010
 - Black semi-gloss, lustre 35, RAL 9005
 - White semi-gloss, lustre 40, RAL 9003/NCS S 0500-N
- Non-painted finish and other colours available on request.

Adaptation

Besides the standard range, it is possible to adapt the product to customer specifications. Please contact your nearest sales office for more information.

Accessories

Commissioning damper

CRM1. Commissioning damper (4) with measuring unit for commissioning the air volume. See figure 1.

Clamp

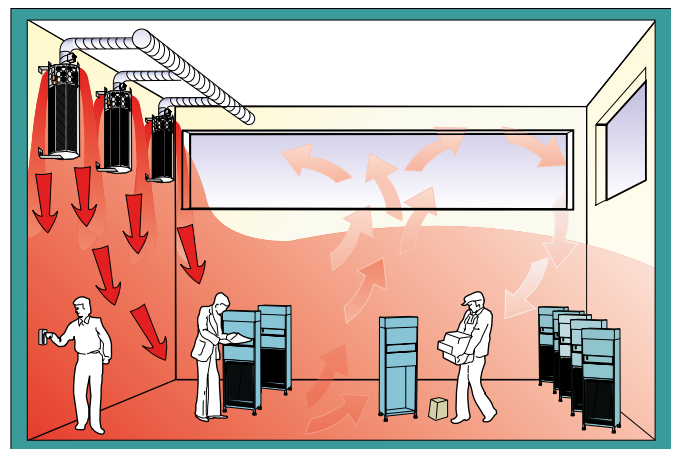
FSR (5). Clamp used for facilitating installation and removal of units. See figure 1.

Control unit:

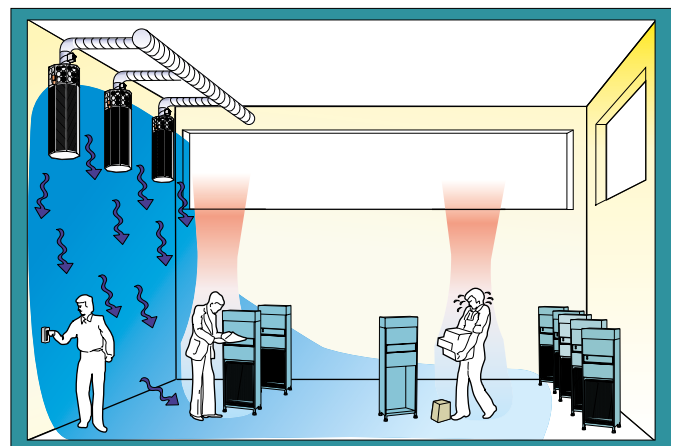
VHC control unit (1) resets motor controlled diffusers intended both for cooling and heating with supply air. The controlling parameter is the temperature difference between supply air and room air. See figure 2.

Installation

Mounting brackets (3) are supplied. These are fastened to the wall and then to BOC. See figure 1.



Heating principles.



Cooling principle.

Planning

BOC is designed to be mounted in height 2.5 - 5 m from the floor to the lower edge of the device. The height is relative to the size of the diffuser, air flow and temperature drop, see technical data. The easiest way to control the adjustment damper is via the VHC control unit (accessory). An open damper gives cooling and displacement function. A closed damper gives vertical air discharge through the nozzles in the upper section. Extra consideration must be given to how the diffuser is connected to the duct without generating additional sound, see figure 4, page 6.

Commissioning

The airflow is commissioned using the adjustable measuring unit (4) which is placed in the duct before the BOC unit. See figure 1.

Maintenance

BOC is cleaned when necessary using lukewarm water with detergent added. Access to the inner parts is possible via the removable perforated front plates.

Environment

The Declaration of construction materials is available at www.swegon.com.

Connection with VHC

VHC is connected to a 24 AC power supply according to wiring diagrams, Figure 2 and figure 3.

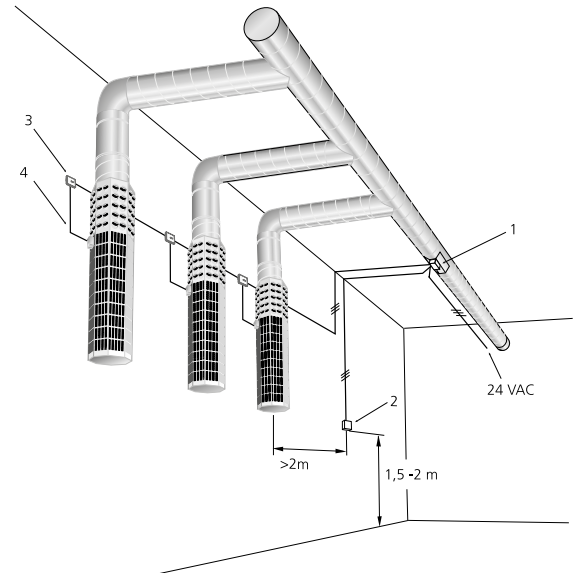


Figure 2. BOC with VHC.

Key to Figure 2:

- 1 = VHC control unit with duct temperature sensor.
- 2 = Room temperature sensor.
- 3 = Connection box.
- 4 = Fixed actuator cable 0,4 m.

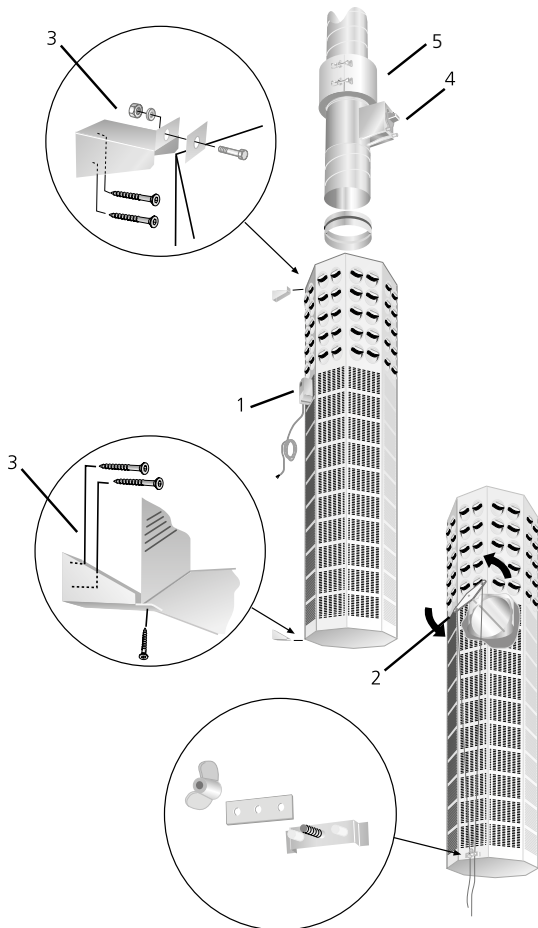


Figure 1. Installation.

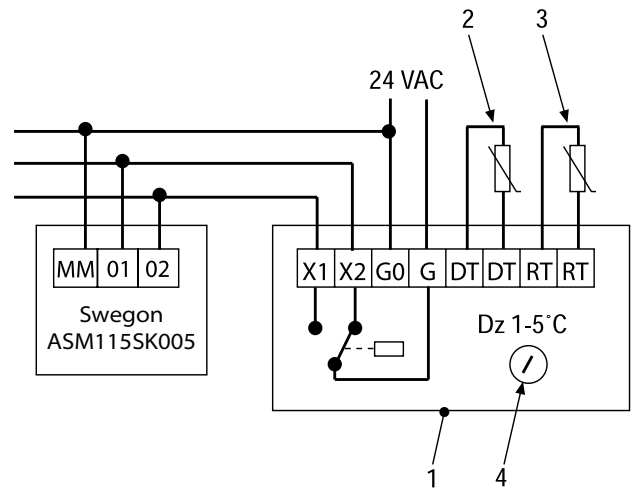


Figure 3. The wiring diagram shows the supply terminal connections for a Sauter damper actuator fitted to the BOC.

Key to Figure 3:

- 1 = VHC control unit.
- 2 = Duct temperature sensor, included (DT).
- 3 = Room temperature sensor, included (RT).
- 4 = Setting the switch over temperature.

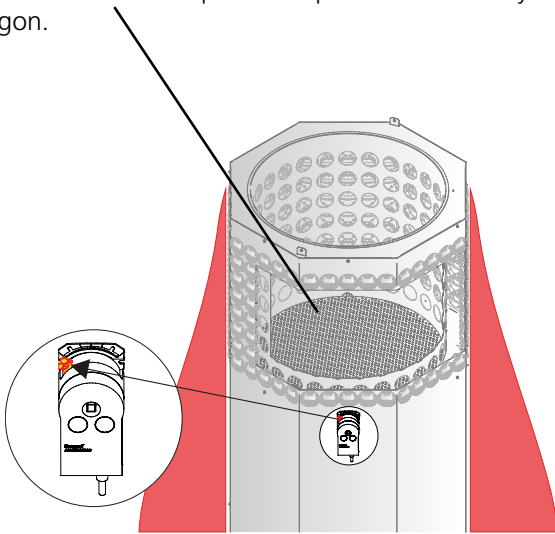
Connection 2-point regulation

BOCa aaa 1

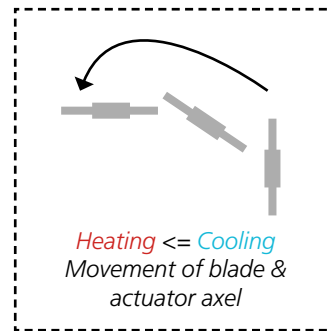
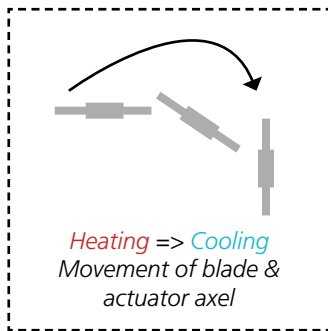
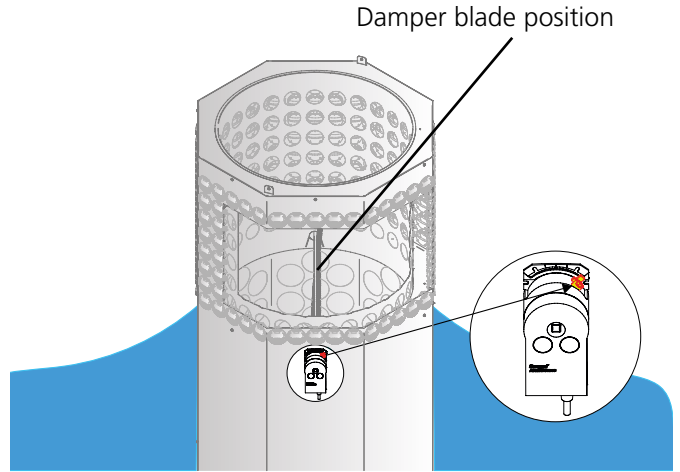
(aaa=duct connection Ø200 to Ø630, 1=motor controller)

Heating

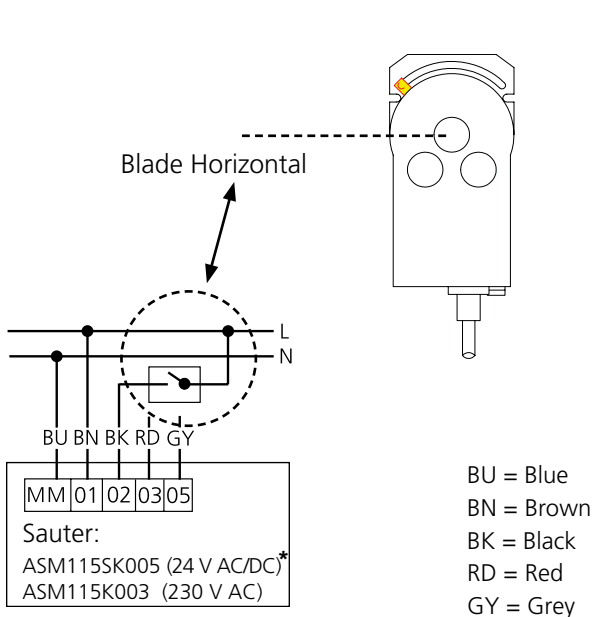
NOTE! This is the damper blade position at delivery from Swegon.



Cooling

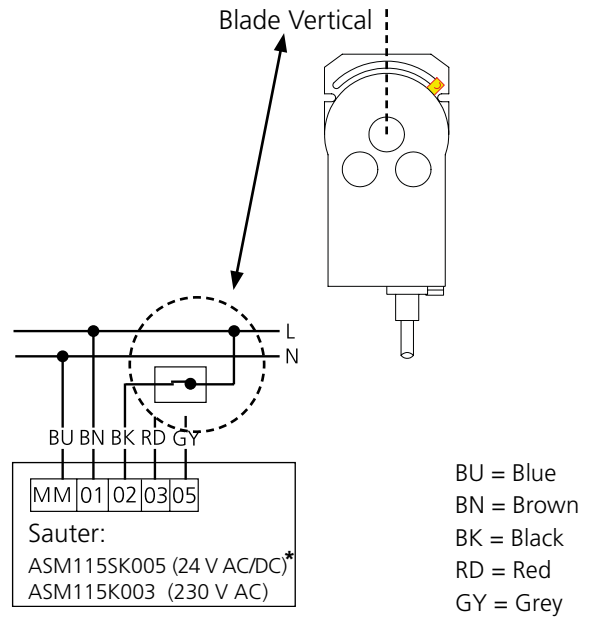


Actuator positioned to the left



* Delivered from factory as standard, 24VAC

Actuator positioned to the right



* Delivered from factory as standard, 24VAC

Sizing

- Sound pressure level dB(A) applies to rooms with **10 m² absorption area** and measured 2 m from the displacement unit and with at a straight section without disturbance on straight duct section.
- Sound attenuation (ΔL) below is shown in the octave band. Orifice attenuation is included in the values.
- Data for electric actuator Sauter ASM115 SK005
 Supply voltage AC 24 V $\pm 20\%$, 50..60 Hz
 DC 24 V $\pm 20\%$
 Power consumption 4,8 W 8,7 VA
 Operating time 60/120 sek (50 Hz)

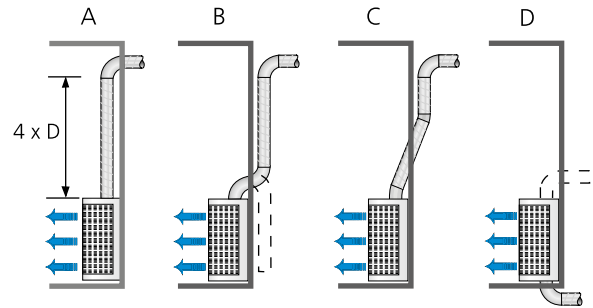


Figure 4. E.g. of how different duct connections affect the sound level of the terminal. See also the Technical chapter under Acoustics - Planning Tips.

L_w = Sound power level

L_{p10A} = Sound pressure level dB (A)

K_{ok} = Correction for producing the L_w value in the octave band

$L_w = L_{p10A} + K_{OK}$ gives the frequency divided octave band

Table duct connections.

m/s	Duct connections			
	A	B	C	D
4-5 m/s	+ 2	+ 6	+ 3	+ 3
6-8 m/s	+ 4	+ 10	+ 6	+ 6

Effects on sound levels (dB) for different duct connections and different equivalent sound absorption areas, 150 and 10m.

Sound data - BOC

Sound power level L_w (dB)

Table K_{OK}

Size	Mid-frequency (octave band) Hz							
	BOC	63	125	250	500	1000	2000	4000
200	5	3	4	3	0	-10	-24	-26
250	6	6	5	4	-1	-12	-24	-28
315	3	5	6	4	-2	-14	-25	-22
400	6	6	7	4	-3	-15	-26	-24
500	6	5	6	4	-2	-14	-25	-23
630	7	8	7	4	-4	-15	-23	-19
Tol. \pm	2	2	2	2	2	2	2	2

Sound attenuation ΔL (dB)

Table ΔL

Size	Mid-frequency (octave band) Hz							
	BOC	63	125	250	500	1000	2000	4000
200	16	12	6	2	2	3	5	4
250	15	10	5	2	2	3	4	5
315	14	9	4	1	0	1	2	2
400	10	6	4	1	1	1	1	1
500	8	4	3	1	1	1	1	1
630	6	3	2	1	1	1	0	0
Tol. \pm	2	2	2	2	2	2	2	2

Dimensioning graphs

BOC - Supply air - Vertical V

Airflow - Throw - Over temperatures

- The graphs must not be used for commissioning.
- The graphs show the airstream penetration depth in the room measured from the lower edge of the terminal.

Example:

At an airflow of 660 l/s from a BOC 400, a downward penetration depth of 3.0 m is obtained at +5 K over-temperature. If +10 K over-temperature is desired, the penetration depth decreases by a factor of 0.66, i.e. 3.0 m x 0.66 = 1.98 m.

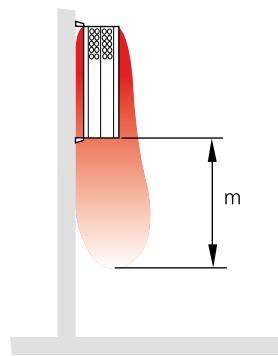


Diagram 1. Penetration depth (m) at +5 K over temperature.

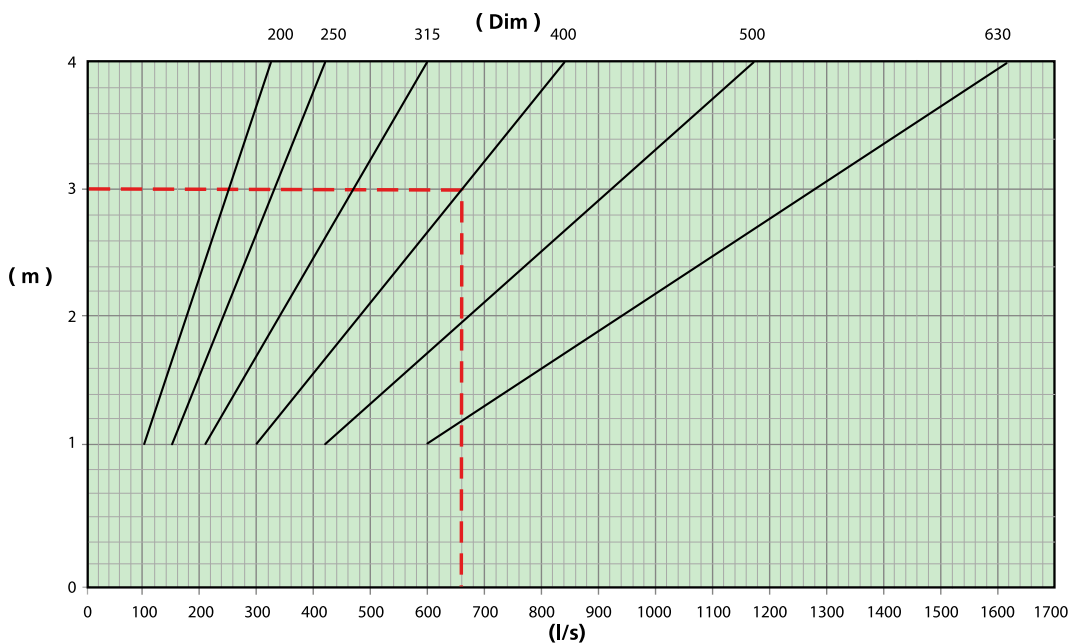
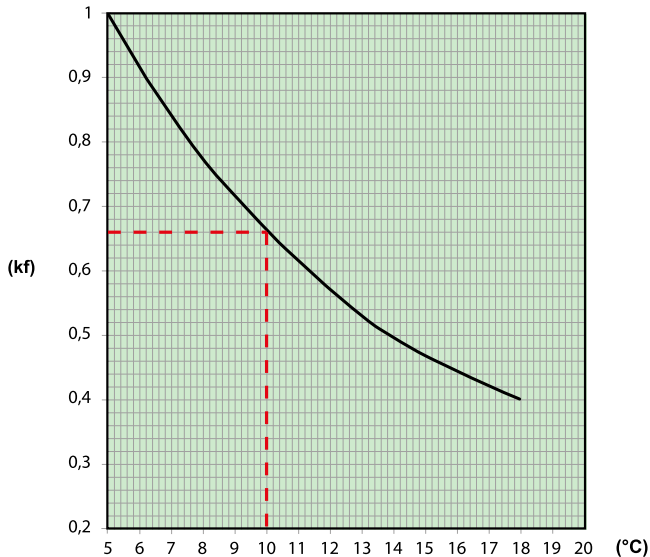


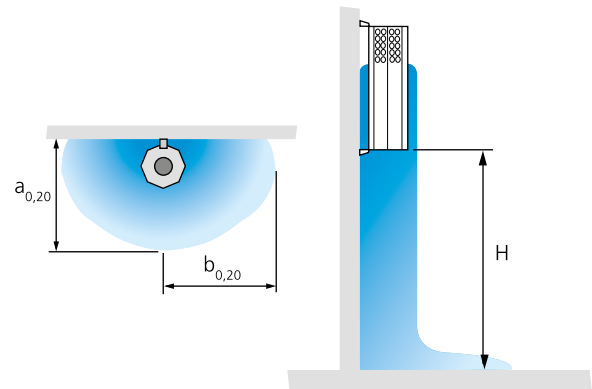
Diagram 2. Correction factor for other over temperatures (kf)



BOC - Supply air - Wall mounted - Displacement (4-way)

Airflow - Affected zone - Under temperature

- The graphs must not be used for commissioning.
- The graphs illustrate the affected zone $a_{0,20}$ and $b_{0,20}$ for the selected size, airflow and mounting height. The affected zone refers to the distance to the isovel limit 0.2 m/s at a given Δt . In this case Δt designates the difference between the room air temperature measured 1.2 m above the floor and the supply air temperature. N.B. not the difference between supply and exhaust air temperature.
- Example:
Decide mounting height and terminal size.
BOC 315 with a mounting height of 3.2 m has a $a_{0,2}$ & $b_{0,2}$ gives a 4 m affected zone at an airflow of l/s 240
 $a_{0,2}$ & $b_{0,2}$ gives a 6 m affected zone at an airflow of l/s 360
- If other affected zones are required, the following formula may be used:



$$\frac{q_x}{a_{0,2x}} = \frac{q_{a0,2x}}{a_{0,2x}} \quad \text{alt.} \quad \frac{q_x}{b_{0,2x}} = \frac{q_{b0,2x}}{b_{0,2x}}$$

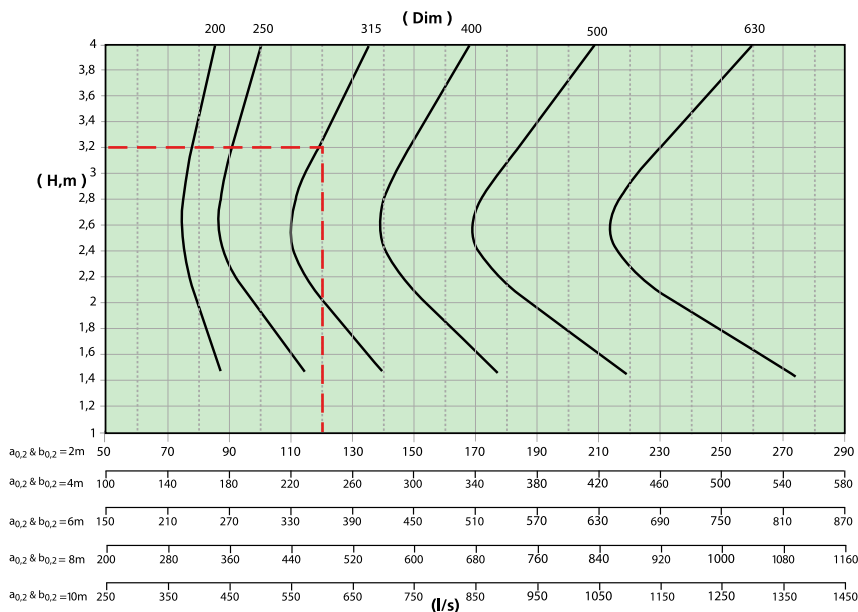
- q_x = required air flow
- $a_{0,2x^*}$ = required affected zone
- q_a = air flow at known affected zone
- $a_{0,2x^*}$ = known affected zone

Example: $\frac{450}{a_{0,2x^*}} = \frac{360}{6} = a_{0,2x^*} = 7,5 \text{ m}$

Data at $\Delta t = 6\text{K}$ are calculated in accordance with:
 $a_{0,2x^*} \Delta t = 3 \text{ K} \cdot 1,25$

$^*) a_{0,2x} = b_{0,2x}$

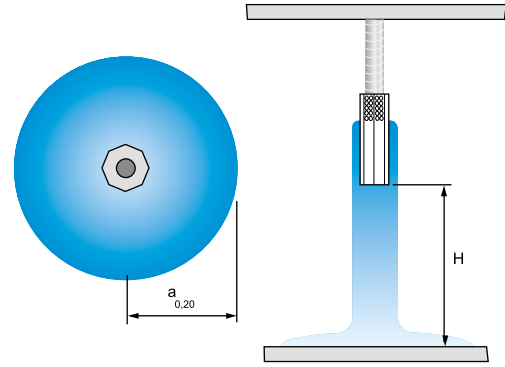
Diagram 3. Affected zone - wall mounting at $\Delta t = 3\text{K}$



BOC - Supply air - Free suspension - Displacement (4-way)

Airflow - Affected zone - Under temperature

- The graphs must not be used for commissioning.
- The graphs illustrate the affected zone $a_{0,20}$ for the selected size, airflow and mounting height. The affected zone refers to the distance to the isovel limit 0.2 m/s at a given Δt . In this case Δt designates the difference between the room air temperature measured 1.2 m above the floor and the supply air temperature. N.B. not the difference between supply and exhaust air temperatures.
- Example:
Decide mounting height and terminal size.
BOC 315 with a mounting height of 3.4 m has a 4 m affected zone $a_{0,2}$ at an airflow of l/s 500
6 m affected zone $a_{0,2}$ at an airflow of l/s 750
- If other affected zones are required, the following formula may be used:



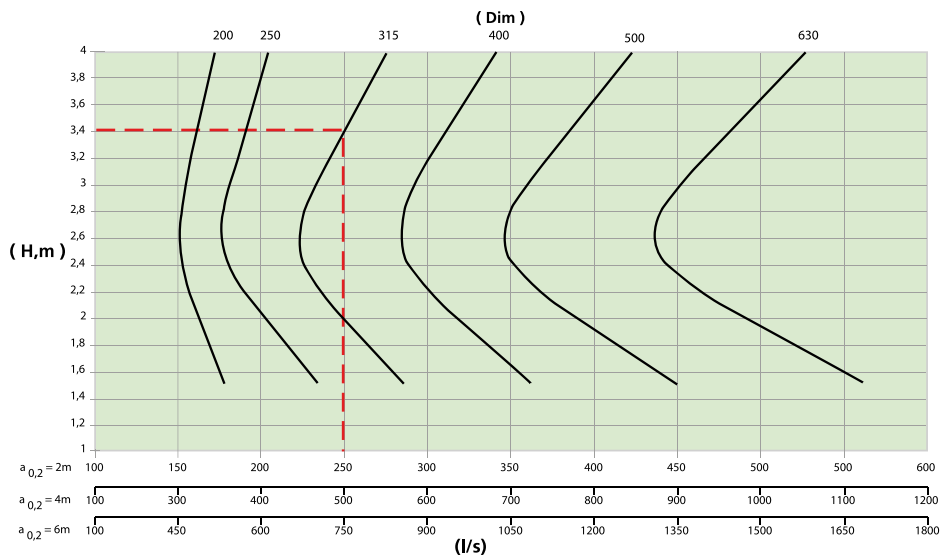
$$\frac{q_x}{a_{0,2x}} = \frac{q_a}{a_{0,2}}$$

- q_x = required air flow
- $a_{0,2x}$ = required affected zone
- q_a = air flow at known affected zone
- $a_{0,2}$ = known affected zone

Example: $\frac{950}{a_{0,2x}} = \frac{750}{6} = a_{0,2x} = 7,6 \text{ m}$

Data at $\Delta t -6 \text{ K}$ are calculated in accordance with:
 $a_{0,20} \Delta t 3^\circ \cdot 1,25$

Diagram 4. Affected zone - free suspension at $\Delta t = 3\text{K}$



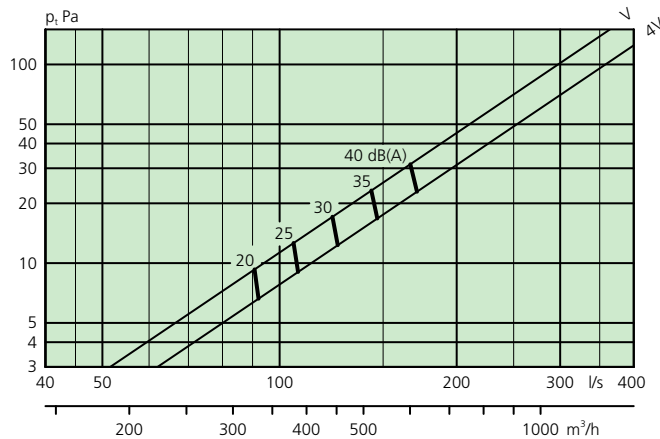
Dimensioning graphs - BOC

Airflow - Pressure drop - Sound levels

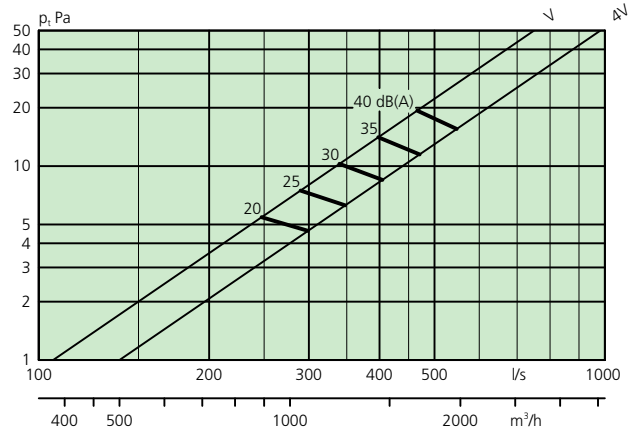
- The graphs must not be used for commissioning.
- The graph shows data for sound levels in a room with an **equivalent absorption area of 10 m²** and measured 2 m from the displacement unit. Note! Straight section without inference on the connecting duct. See page 6 for additional sound for alternative duct connections.
- The dB(C) value is normally 6-9 dB higher than the dB(A) value.

- The diagram for each size shows:
 - Pressure line = 4 V - Displacement 4-way for open booster damper/cooling.
 - Pressure line = V – Vertical distribution for closed booster damper/heating).

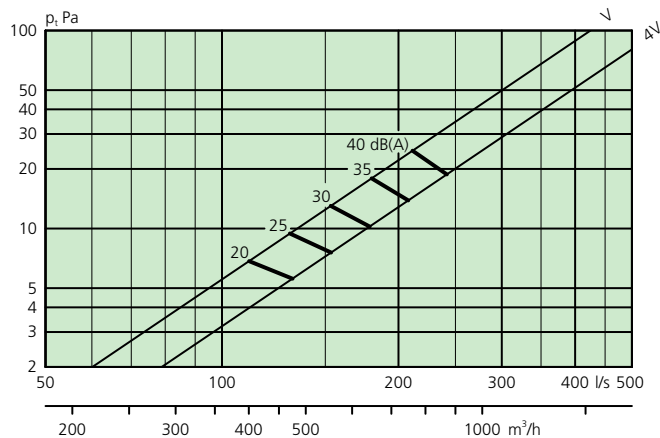
BOC 200



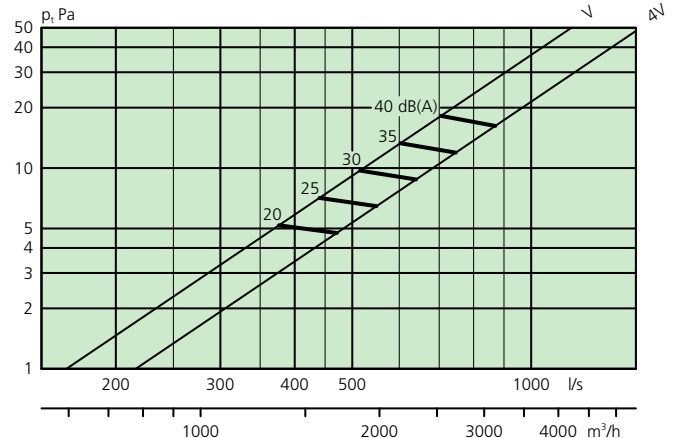
BOC 400



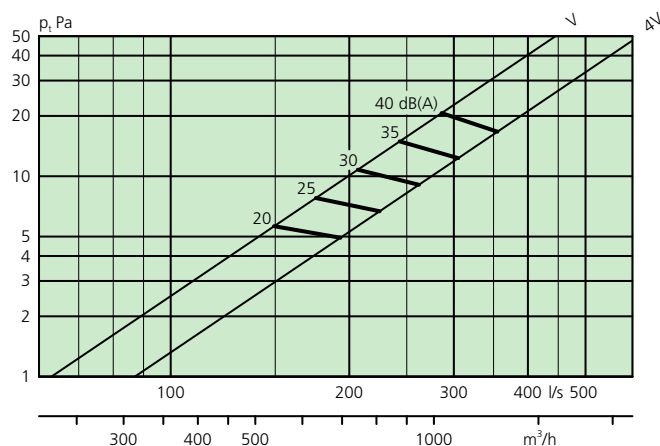
BOC 250



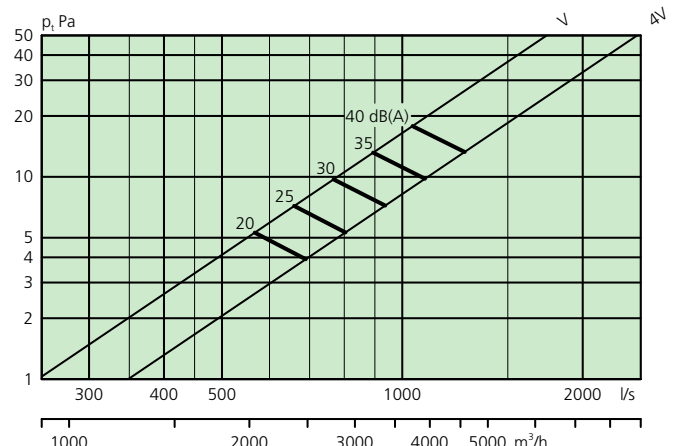
BOC 500



BOC 315



BOC 630



Dimensions and weights

Size	A	B	C	ØD	E	Weight, kg
200	1300	350	17	200	277	18.0
250	1400	385	17	250	295	21.0
315	1500	415	17	315	310	23.0
400	1600	505	17	400	356	29.0
500	1800	665	17	500	435	35.0
630	2000	825	17	630	516	45.0

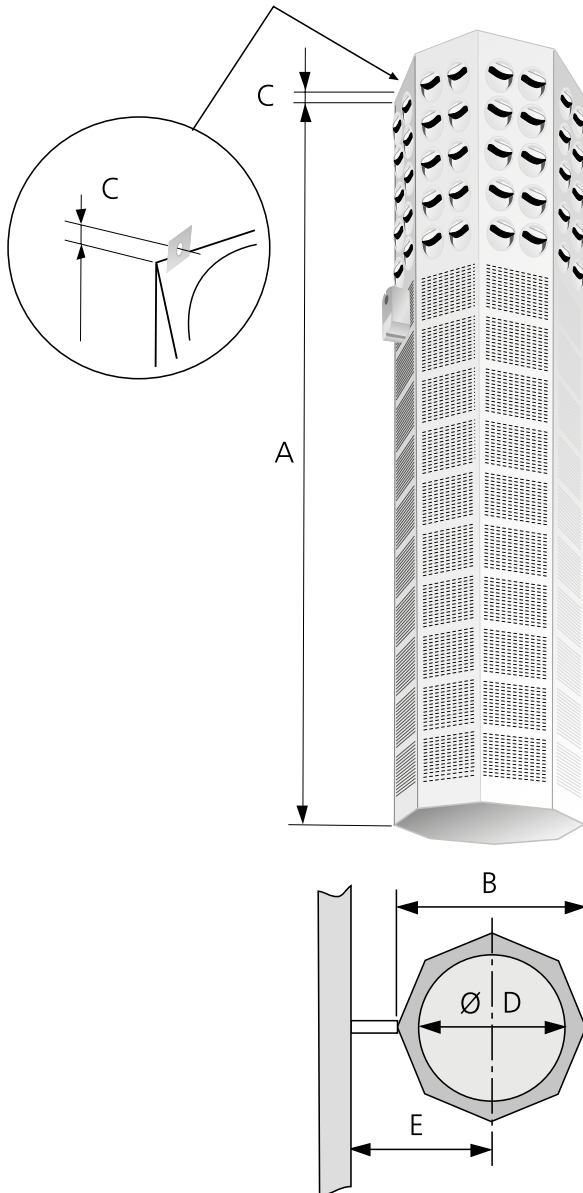


Figure 5. BOC.

Order key

Product

Combination terminal with booster function BOC a -aaa -b

Version:

Size: 200, 250, 315, 400, 500, 630

With electrical actuator mounted: 1 (actuator Sauter ASM115 SK005, 24 V, included)

With mounted manual damper control: 2

Accessories

Commissioning damper with measuring unit CRM c -a -bbb -c

Version

Type: 1

Size: 200, 250, 315, 400, 500, 630

Control: 1 = Manual damper handle

Controller VHC a

Version:

Clamp FSR c -aaa

Version:

Size: 160, 200, 250, 315, 400, 500

Specification example

Swegon's octagonal low velocity terminal with built-in forcing function of type BOC Booster, with the following functions:

- Adjustable spread pattern and near zone
- Non-fouling
- Designed for both under-temperature and over-temperature air
- Mounting brackets included
- Built-in switch-over of air supply method
- Cleanable
- Powder-coated in a dusty grey shade, RAL 7037

Accessories:

Commissioning damper with measuring unit CRMc 1 - aaa - 1 xx items

Size: BOCa aaa - b xx items