

Regulation and shut-off damper SPB and SPC

SPB / SPC-type multi leaf damper is a robust and reliable regulation and shut-off device to be used for different purposes in air handling systems.



Area of application

Multi leaf dampers are used as regulation, shut-off and mixing dampers in air handling systems and units.

Properties

- SPB-1 regulation damper for balancing air flows
 - leakage class: 1 (CEN)
 - leakage class of casing: B
- SPB-3 regulation and shut-off damper to be used where low leakage is required
 - leakage class: 3 (CEN)
 - leakage class of casing: C
- SPB-3L shut-off damper to be used where low leakage and effective thermal insulation are required
 - leakage class: 3 (CEN)
 - leakage class of casing: C
- SPB-3LE shut-off damper to be used where low leakage and effective thermal insulation are required also through the casing (dimensions B+160, H+60)
 - leakage class: 3 (CEN)
 - leakage class of casing: C
- SPB-4L shut-off damper to be used where low leakage and effective thermal insulation are of great importance
 - leakage class: 4 (CEN)
 - leakage class of casing: C
- SPB-4LE like 3LE, to be used where low leakage is of great importance
 - leakage class: 4 (CEN)
 - leakage class of casing: C

Installation

The multi leaf dampers are mounted to air handling units and rectangular ducts by means of a slip joint or a flange joint, and to circular ducts with sealed spigots. The drive shaft is the third shaft from the bottom; in two-blade dampers the upper shaft is the driving one.

If the face surface is larger than 5 m², the multi leaf damper is put together of two or more units with each having its own actuator.

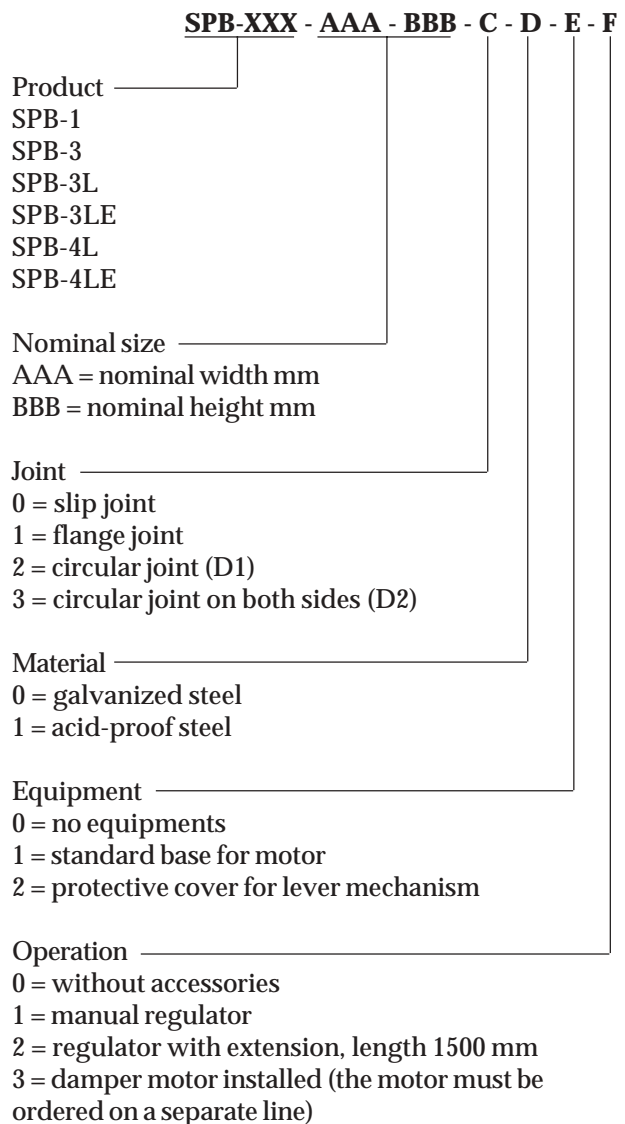
Construction

The casing and blades of a multi leaf damper are made of hot-galvanized steel sheet. The width of the SPB body is 220 mm. The blades are profiled and mechanically jointed and they are linked with a lever mechanism to achieve opposite actions. The bearings and edges of the blades are made of polyamide, the seals are profiled PVC and EPDM. The material used for thermal insulation is mineral wool. Multi leaf dampers are equipped with a base for motor and an external position indicator.

The normal operating temperature of multi leaf dampers of standard construction varies between -40 °C and +80 °C.

All multi leaf damper types are also available in stainless or acid-proof steel or with joint flange.

Product code



Example

SPB - 3L - 1400 - 1800 - 0 - 0 - 1 - 3

Damper with slip joint, nominal size 1400x1800, hot-galvanized, tightness class CEN 3 (blades thermally insulated), motor base of standard type, damper motor mounted

SPB - 1 - 800 - 1500 - 1 - 1 - 2 - 1

Damper with flange joint, nominal size 800x1500, acid-proof steel, tightness class CEN 1, with control lever casing and manual regulator

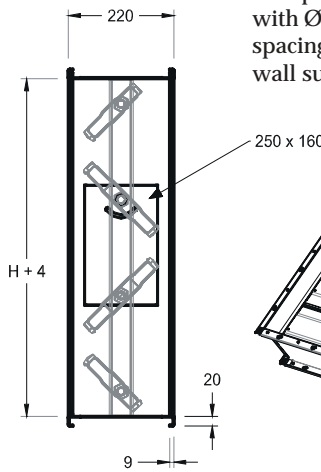
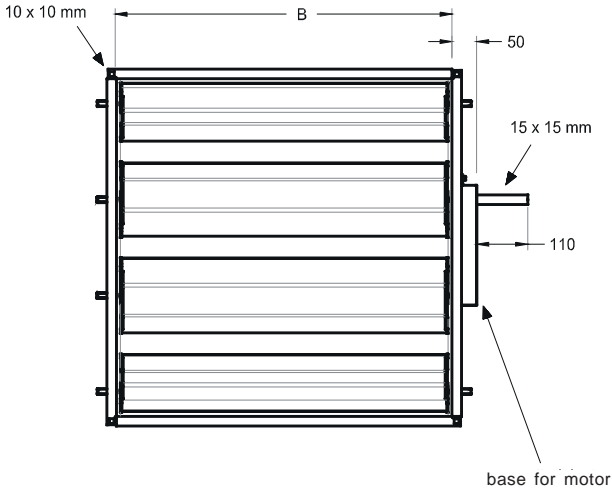
Dimensions

Width B 200 - 2500 mm
 Height H 200 - 2600 mm
 B x H max 5 m²

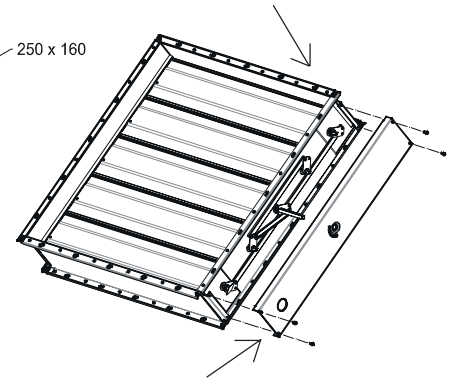
The difference between widths and heights of available damper sizes is 10 mm.

If the face surface is larger than 5 m², the damper is put together of two or more units. Construction and dimensions are agreed on separately.

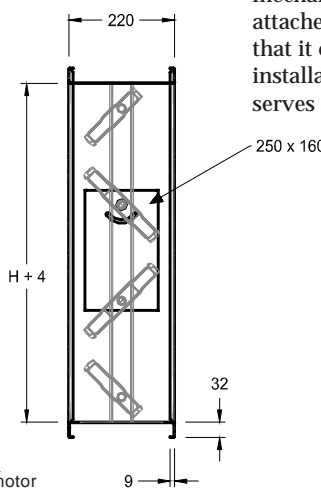
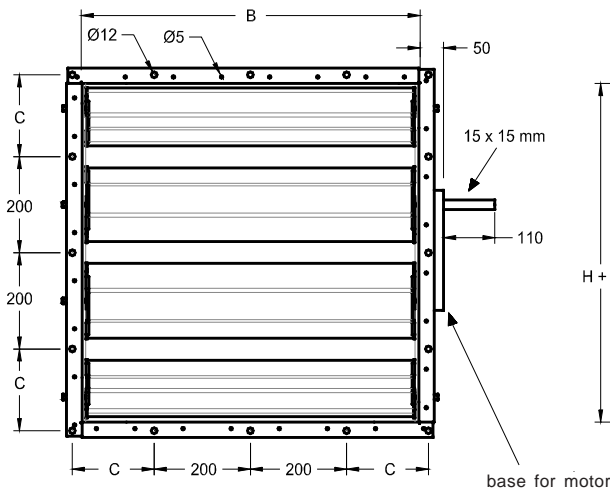
Slip joint



Dampers with flange joints are equipped with Ø5 mm screw holes with 100 mm spacing to enable the mounting e.g. to wall surface without a counterflange.



Flange joint

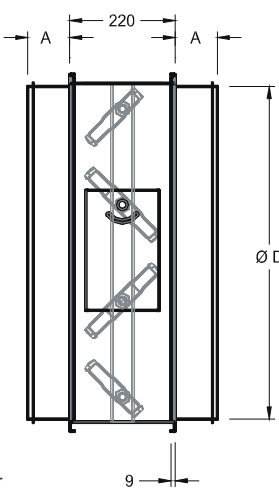
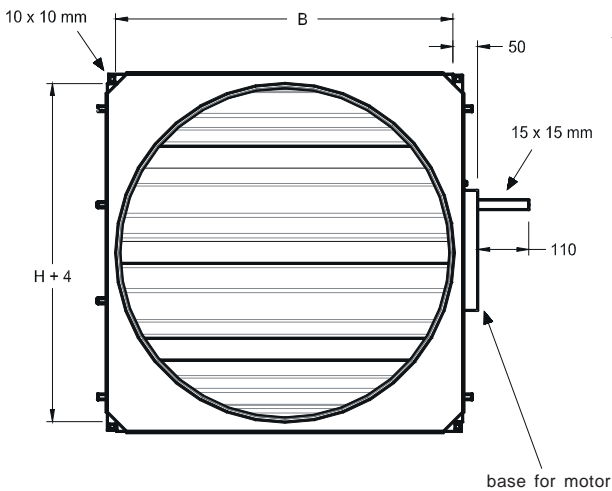


The multi leaf damper is also available with a protective cover for the lever mechanism. The protective cover is attached to the damper with screws, so that it can easily be detached e.g. for installation. The protective cover also serves as base for motor.

C = 120 when H = 200, 400, etc.
 C = 170 when H = 300, 500, etc.

Circular joints

Joints to ducts in accordance with SFS 3282.

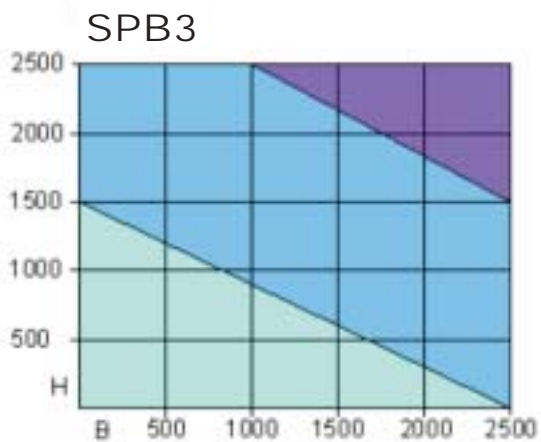
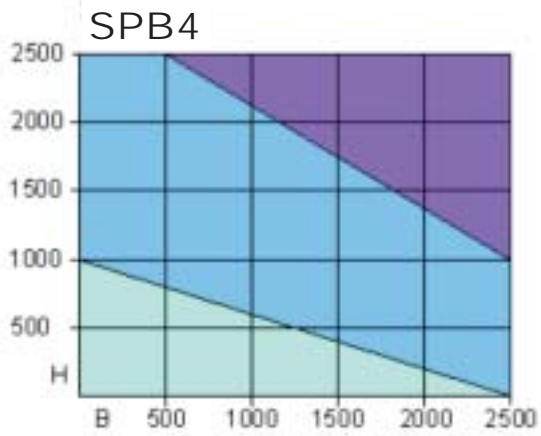


øD	B x H	A
160	200 x 200	35
200	200 x 200	35
250	300 x 300	45
315	400 x 400	45
400	400 x 400	85
500	500 x 500	70
630	630 x 630	80
800	800 x 800	140
1000	1000 x 1000	140
1250	1250 x 1250	140

Motor torque

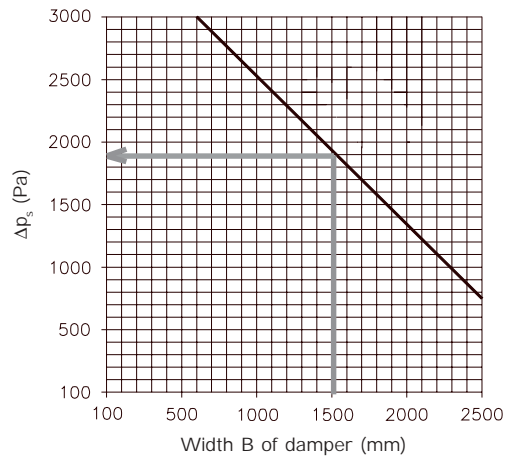
The torque used depends e.g. on the type, width and length of the multi leaf damper, the total length of the sealing surfaces and the mounting method.

The motor torque required for the shut-off function of SPB-3 and SPB-4 and the recommended motor type are shown in the tables below.

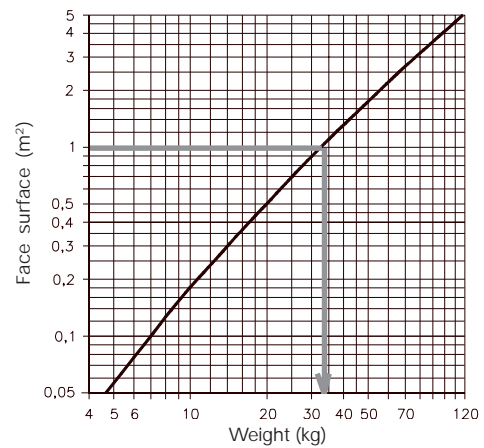


- 10 Nm ACTUATOR
- 20 Nm ACTUATOR
- 30 Nm ACTUATOR

Max. allowable pressure difference



Damper weight



Sound power level L_w

SPB	CORRECTION K_{oct} (dB)							
	Medium frequency of octave band (Hz)							
	63	125	250	500	1000	2000	4000	8000
	9	4	1	2	-1	-3	-8	-12
Toler.±	5	5	5	4	4	4	4	4

CORRECTION K_A (dB)									
Face surface area of damper (m ²)									
0,1	0,15	0,25	0,4	0,6	1,0	1,6	2,5	4,0	
-10	-8	-6	-4	-2	0	2	4	6	

The sound power levels of the duct for every octave band are obtained by adding the corrections K_{oct} of octave bands and K_A of the face surface (see tables above) to the total sound pressure level L_{p10A} , dB(A), according to the following formula:

$$L_{w_{oct}} = L_{p10A} + K_{oct} + K_A$$

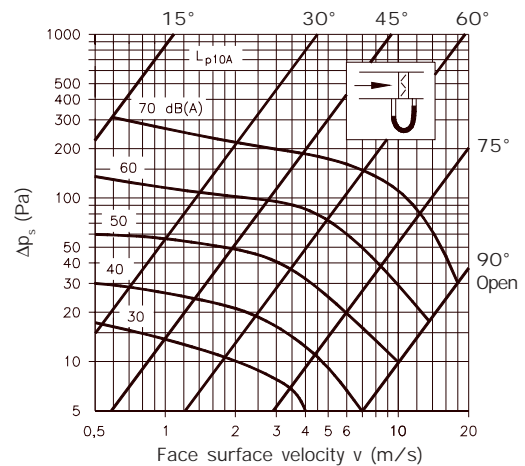
Correction K_{oct} is the average in the area of application of SPB.

Sound power level L_w in duct when damper closed

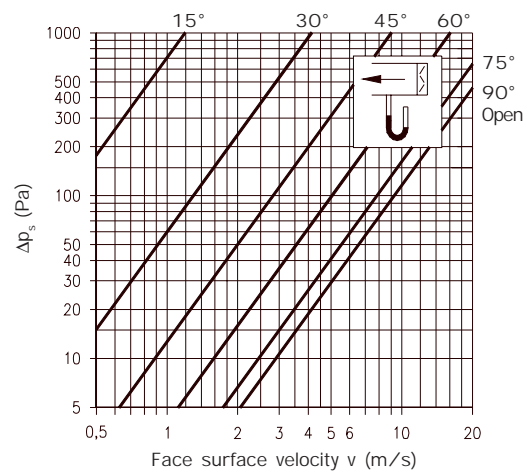
(SPB-3, SPB-3L, SPB-3LE)

Δp (Pa)	L_w (A = 1 m ²)							
	Medium frequency of octave band (Hz)							
	63	125	250	500	1000	2000	4000	8000
500	43	38	43	47	50	53	62	69
1000	43	41	48	52	56	60	67	70

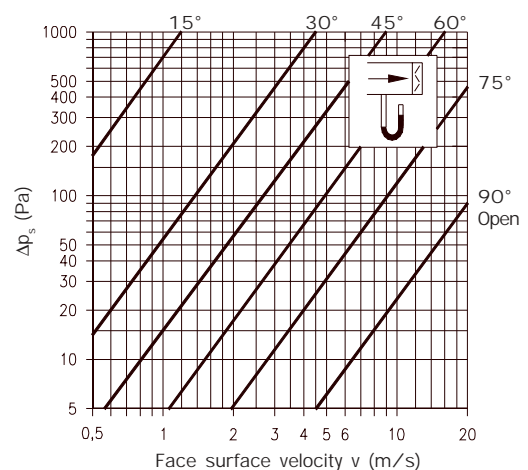
In duct



Duct end, extract



Duct end, supply



Ominaisuudet

Properties

SPC-3

- leakage class: 3 (CEN)
- leakage class of casing: B
- no thermal insulation

SPC-3L

- leakage class: 3 (CEN)
- leakage class of casing: B
- blades thermally insulated with mineral wool

SPC-3LE

- leakage class: 3 (CEN)
- leakage class of casing: B
- blades and casing thermally insulated with mineral wool (outer dimensions B+120, H+60)

SPC-4

- leakage class: 4 (CEN)
- leakage class of casing: B
- no thermal insulation

SPC-4L

- leakage class: 4 (CEN)
- leakage class of casing: B
- blades thermally insulated with mineral wool

SPC-4LE

- leakage class: 4 (CEN)
- leakage class of casing: B
- blades and casing thermally insulated with mineral wool (outer dimensions B+120, H+60)

Dimension

Width B 200 - 1400 mm in steps of 10 mm

Height H 200 - 1000 mm in steps of 10 mm

Area of application

Due to its moderate need for space and its excellent mixing performance, SPC is very well suited e.g. for the mixing damper of an air handling unit.

Installation

The damper is mounted to air handling units and ducts by means of a slip joint or a flange joint. The top shaft is the drive shaft.

Construction

The casing and blades are made of hot-galvanised steel sheet. The width of the SPC body is 120 mm with a slip joint and 130 mm with a flange joint. The blades are profiled and mechanically jointed to achieve high strength and they are linked with a lever mechanism to achieve opposite actions. The bearings and edges of the blades are made of polyamide, the seals are profiled PVC and EPDM. The material used for thermal insulation is mineral wool. The normal operating temperature varies between -40 °C and +80 °C.

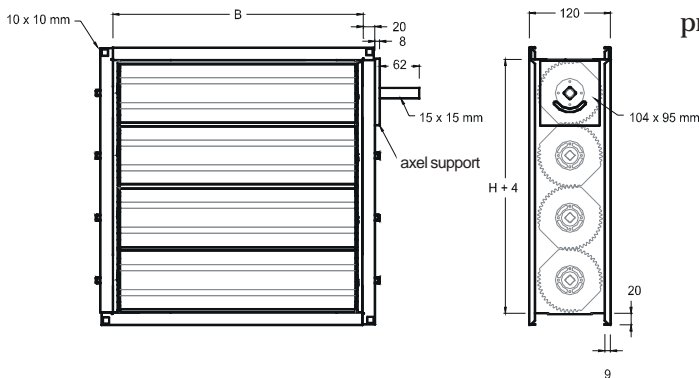
This multi leaf damper type is also available in stainless or acid-proof steel.

The dampers are equipped with a screw-on cover plate that protects and supports the total length of the gear unit.

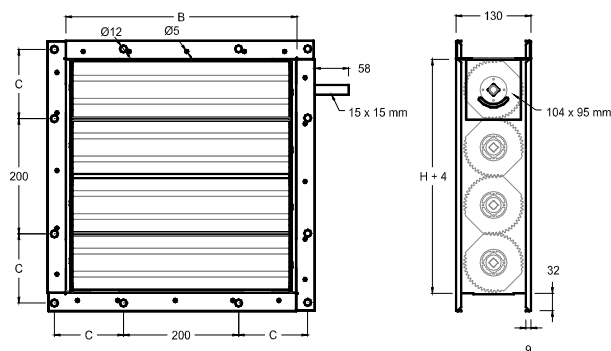
The motor base is fixedly installed on the cover plate.

NOTE! Dampers are never delivered without the protective plate.

Slip joint



Flange joint



C = 120 when H = 200, 400, etc.
C = 170 when H = 300, 500, etc.

Product code

SPC-XXX - AAA - BBB - C - D - E - F

Product

SPC-3
SPC-3L
SPC-3LE
SPC-4
SPC-4L
SPC-4LE

Nominal size

AAA = nominal width mm
BBB = nominal height mm

Joint

0 = slip joint
1 = flange joint
2 = circular joint (D1)
3 = circular joint on both sides (D2)

Material

0 = galvanized steel
1 = acid-proof steel

Equipment

2 = protective cover for gear unit + base for motor

Operation

0 = without accessories
1 = manual regulator
2 = regulator with extension, length 1500 mm
3 = damper motor installed (the motor must be ordered on a separate line)

Example

SPC - 3L - 400 - 800 - 0 - 0 - 2 - 3

damper with slip joint, nominal size 400x800, hot-galvanized, tightness class CEN 3 (blades thermally insulated), protective cover for gear unit and base for motor, damper motor mounted

Note!

SPC dampers are always delivered with protective cover for gear unit. Base for motor is mounted on protective cover.

Sound power level L_w

SPC	CORRECTION K_{oct} (dB)							
	Medium frequency of octave band (Hz)							
	63	125	250	500	1000	2000	4000	8000
	6	5	3	1	0	-4	-8	-15
Toler.±	5	5	5	4	4	4	4	4

0,04	CORRECTION K_A (dB)							
	Face surface area of damper (m ²)							
	0,06	0,1	0,15	0,25	0,4	0,65	1,0	1,6
	-8	-6	-4	-2	0	2	4	6

The sound power levels of the duct for every octave band are obtained by adding the corrections K_{oct} of octave bands and K_A of the face surface (see tables above) to the total sound pressure level L_{p10A} , dB(A), according to the following formula:

$$L_{W_{oct}} = L_{p10A} + K_{oct} + K_A$$

Correction K_{oct} is the average in the area of application of SPC.

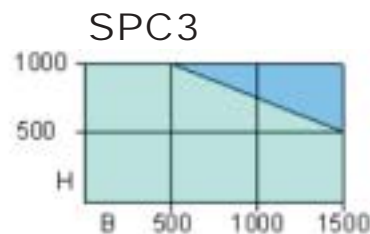
Sound power level L_w in duct when damper closed

Δp (Pa)	L_w (A = 1 m ²)							
	Medium frequency of octave band (Hz)							
	63	125	250	500	1000	2000	4000	8000
500	34	37	41	49	54	56	59	54
1000	43	41	45	53	59	62	65	64

Motor torque

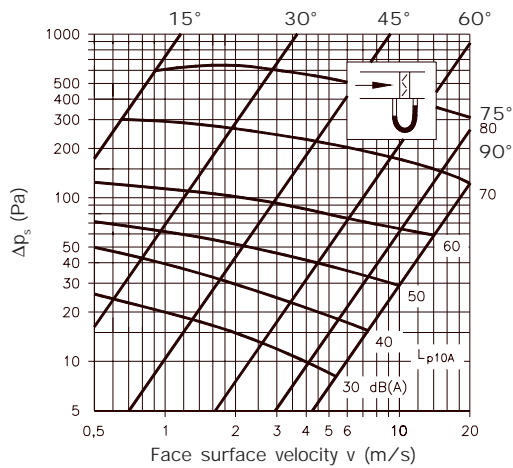
The torque used depends e.g. on the type, width and length of the multi leaf damper, the total length of the sealing surfaces and the mounting method.

The motor torque required for the shut-off function of SPC and the recommended motor type are shown in the table beside.

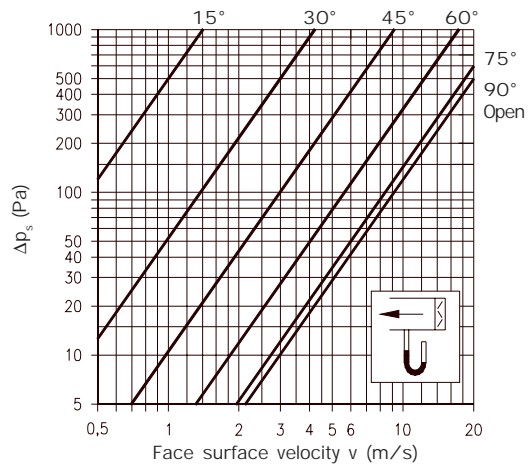


- 10 Nm ACTUATOR
- 20 Nm ACTUATOR

In duct



Duct end, extract



Definitions

q_v	air volume	(l/s)
L_{p10A}	sound pressure level with 4 dB room attenuation (10 m ² sab)	[dB(A)]
L_{woct}	sound power level by octave bands	(dB)
K_{oct}	correction	(dB)
Δp_t	total pressure drop	(Pa)
Δp_s	static pressure drop	(Pa)
v	average velocity	(m/s)
K_A	correction of face area	(dB)

Duct end, supply

