

# BOR-R

## Residential supply air diffuser



### Ordering Code



NOTE: \* If no color defined in ordering code, BOR-R is delivered with RAL9010, gloss 30 as standard.

Diffuser	Connection (mm)	Total A-weighted sound power level $L_{WA}$					
		25 dB		30 dB		35 dB	
		(l/s)	(m <sup>3</sup> /h)	(l/s)	(m <sup>3</sup> /h)	(l/s)	(m <sup>3</sup> /h)
BOR-R-100	100	15	53	18	63	21	76
BOR-R-125	125	18	66	24	86	31	113

Tab. 1: Quick selection

### Function

BOR-R has been especially developed for providing a draught-free and low acoustic noise air supply from the rear walls of offices, hotel and residential rooms etc. The flow pattern prevents the air stream from falling into the occupied zone before it has reached an acceptable temperature. Max. temperature difference  $\Delta T$  10K is permissible.

BOR-R is also suitable for VAV systems, as the distribution pattern is maintained across the entire flow area. The product is equipped for air flow adjustment and commissioning measurement.

### Dimensions

BOR-R is available in connection sizes  $\varnothing DN$  100 and  $\varnothing DN$  125.

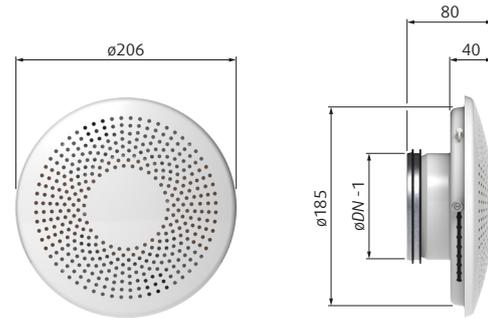


Fig. 1: BOR-R dimensions

NOTES: BOR-R-100:  $\varnothing = 99$  mm; BOR-R-125:  $\varnothing = 124$  mm

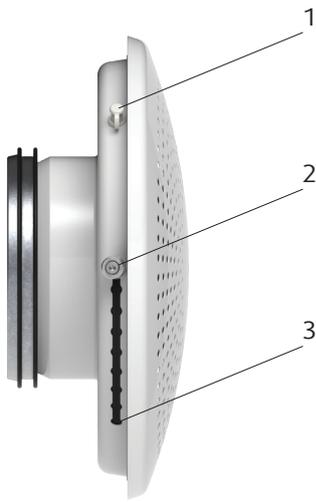
### Design

The body of BOR-R is manufactured from galvanized steel with a convex, circular shaped front plate with perforation. The front plate is finished in the standard white powder-coating (RAL 9010, Gloss 30). Inside the body a flat adjustable blind is attached.

### Technical details

The diffuser is equipped by an adjustable blind that changes the effective air flow aperture and so tunes the air flow volume. The mechanism is movable from outside by a miniature knob sliding in groove on the sidewall of the product. The movement has 9 fixed positions along the path defined by the notches in the groove. For adjustment only these positions provide desired noise parameters. The intermediate positions shall be avoided. The tables 1 and 2 show the k-factors of the product in each of the 9 fixed positions. Using the corresponding K-factor for the chosen adjustment along with the  $\Delta P$  measured on the measurement pin (sidewall) of the product provides data for an easy actual flow calculation at commissioning.

After commissioning the measurement pin shall be closed. For aesthetic reasons it can be replaced by the smooth plug which is packed in the product box.



**Parts of the product:**

1.  $\Delta P$  measurement pin
2. Adjustment knob parked in position 1.  
To move the knob pull it radially out of the body and slide pulled into other position, then release to park it.
3. Adjustment position 9

Fig. 2: BOR-R adjustment and commissioning parts

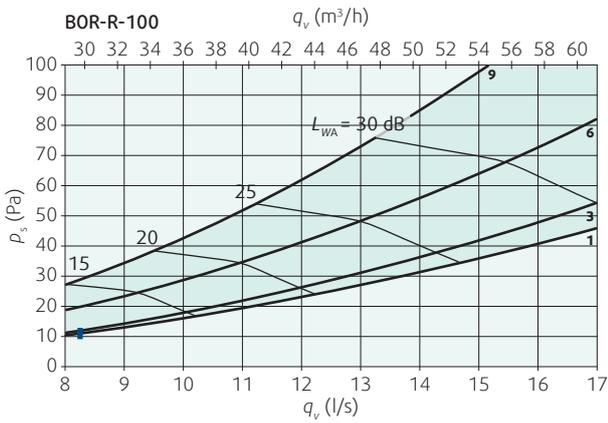


Diagram 1: Flow dependent pressure drop and A-weighted sound power level (BOR-R-100)

NOTES for Diagram 1 and 2:

The position 9 is the most left adjustment position seen from the front side of the diffuser. Smallest free area.  
The position 1 is the most right adjustment position seen from the front side of the diffuser. Largest free area.

LEGEND	
1, 3, 6 and 9	Flow adjustment position
<span style="color: blue;">■</span>	Lower limit for commissioning $\Delta P$ measurement

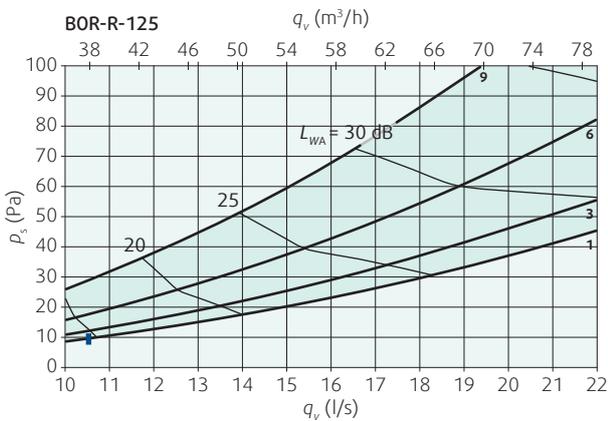


Diagram 2: Flow dependent pressure drop and A-weighted sound power level (BOR-R-125)

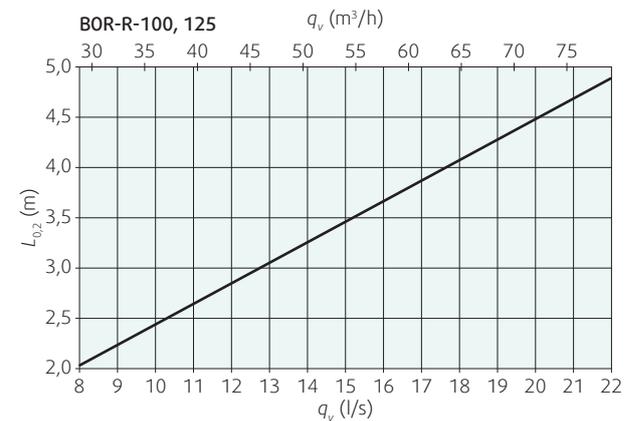


Diagram 3: Flow dependent throw length

BOR-R-100	$q_v$		sound power levels $L_w$ (dB)								
	Position	(l/s)	(m <sup>3</sup> /h)	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
1	10	36	11	8	8	8	8	8	7	7	9
	12	43	20	14	14	14	14	12	10	12	16
	14	50	27	18	19	18	18	16	13	15	21
	16	58	33	22	22	21	21	18	15	18	26
3	10	36	10	8	9	8	8	8	7	7	9
	12	43	19	15	15	14	14	13	11	12	16
	14	50	26	20	20	19	19	17	14	15	21
	16	58	32	25	24	23	23	20	16	18	26
6	10	36	15	11	11	11	11	10	9	10	13
	12	43	25	17	17	17	17	15	12	14	20
	14	50	32	22	22	21	21	18	15	17	25
	16	58	38	26	26	24	24	21	17	20	30
9	10	36	23	16	16	16	16	14	12	13	18
	12	43	32	22	22	21	21	18	15	17	25
	14	50	39	26	27	25	25	21	17	21	30
	16	58	45	30	30	28	28	24	20	23	35

Tab. 2: Linear (non-weighted) sound power levels  $L_w$  at octave-band frequencies (dB)

NOTES: The position 9 is the most left adjustment position seen from the front side of the diffuser. Smallest free area.  
The position 1 is the most right adjustment position seen from the front side of the diffuser. Largest free area.

Octave band	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
Correction values for A-weighted filter (dB)	-26,2	-16,1	-8,6	-3,2	0,0	1,2	1,0	-1,1

Tab. 3: Correction table for calculation of A-weighted filter octave band sound values from non-weighted values

NOTE: Adding the correction value to unweighted values for certain frequency band results in A-weighted sound power level.

BOR-R-125	$q_v$		sound power levels $L_w$ (dB)							
Position	(l/s)	(m <sup>3</sup> /h)	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
1	12	43	14	11	11	12	11	10	9	10
	14	50	19	15	15	15	14	13	11	13
	16	58	23	17	18	18	16	15	12	15
	18	65	27	20	20	21	19	17	14	17
	20	72	30	22	23	23	21	19	15	19
3	12	43	15	12	12	12	11	11	9	10
	14	50	20	15	16	16	15	14	11	13
	16	58	25	19	19	19	17	16	13	16
	18	65	29	21	22	22	20	18	15	18
	20	72	32	24	24	25	22	20	16	20
6	12	43	17	13	14	14	13	12	10	12
	14	50	24	18	18	18	17	15	13	15
	16	58	29	21	22	22	20	19	15	18
	18	65	34	25	25	26	23	21	17	21
	20	72	38	28	28	28	26	24	18	23
9	12	43	20	15	16	16	14	13	11	13
	14	50	28	20	21	21	19	18	14	17
	16	58	34	25	25	26	23	21	17	21
	18	65	39	29	29	30	27	25	19	24
	20	72	44	32	33	33	30	27	21	27

Tab. 4: Linear (non-weighted) sound power levels  $L_w$  at octave-band frequencies (dB)

NOTES: The position 9 is the most left adjustment position seen from the front side of the diffuser. Smallest free area.  
The position 1 is the most right adjustment position seen from the front side of the diffuser. Largest free area.

k-factor (l/s)	BOR-R-100	BOR-R-125
Position 1	2,61	3,33
Position 2	2,48	3,16
Position 3	2,35	3,00
Position 4	2,21	2,83
Position 5	2,08	2,66
Position 6	1,95	2,49
Position 7	1,81	2,32
Position 8	1,68	2,15
Position 9	1,55	1,99

$$Q \text{ (l/s)} = k \cdot \sqrt{\Delta p}$$

Tab. 5: k-factors for flow in l/s

NOTES: The position 9 is the most left adjustment position seen from the front side of the diffuser. Smallest free area.

The position 1 is the most right adjustment position seen from the front side of the diffuser. Largest free area.

k-factor (m <sup>3</sup> /h)	BOR-R-100	BOR-R-125
Position 1	9,40	12,00
Position 2	8,93	11,39
Position 3	8,45	10,79
Position 4	7,97	10,18
Position 5	7,49	9,57
Position 6	7,01	8,97
Position 7	6,53	8,36
Position 8	6,06	7,76
Position 9	5,58	7,15

$$Q \text{ (m}^3\text{/h)} = k \cdot \sqrt{\Delta p}$$

Tab. 6: k-factors for flow in m<sup>3</sup>/h

NOTES: The position 9 is the most left adjustment position seen from the front side of the diffuser. Smallest free area.

The position 1 is the most right adjustment position seen from the front side of the diffuser. Largest free area.

## Example for flow volume calculation using $\Delta p$ and k-factor

### Assume:

BOR-R-100 in adjustment position 5. The k-factor for unit l/s has the value 2,08 (find in the table). The measured  $\Delta p$  value is 46 Pa.

### Calculation:

The flow volume  $q$  is calculated by formula

$$q = k \cdot \sqrt{\Delta p}$$

$$q = 2,08 \cdot \sqrt{46}$$

$$q = 2,08 \cdot 6,78$$

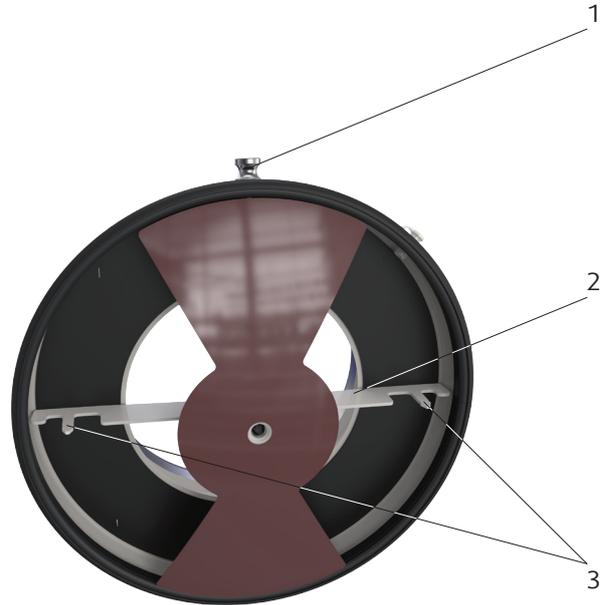
$$q = 14,1 \text{ l/s}$$

## Mounting

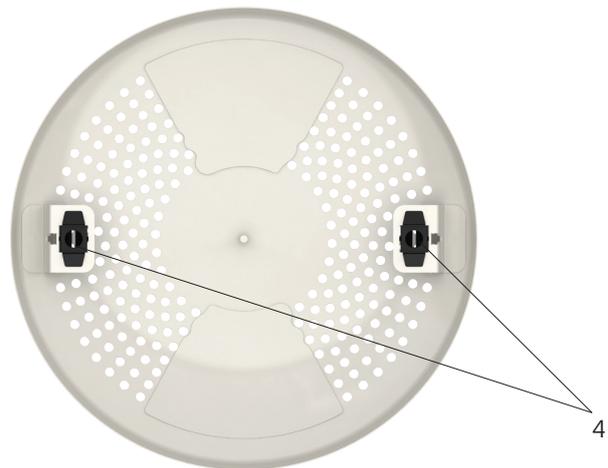
The diffuser is installed directly at the end of the spiral duct sliding in the connection spigot with gasket. The unit can be fixed on the wall by screws through holes in the bottom of the body. For this the diffuser front plate must be removed by pulling it away from the diffuser body.



The installation position is defined by the horizontal orientation of the adjustment mechanism bridge. The upside orientation adjustment knob is recommended - so it is better hidden behind the diffuser plate if installed in higher position of the wall in room.



After diffuser body installation the plate can be attached by fitting the two fixing pins into the fixing springs in the plate and pushing the plate towards the body they touch and remain fixed together.

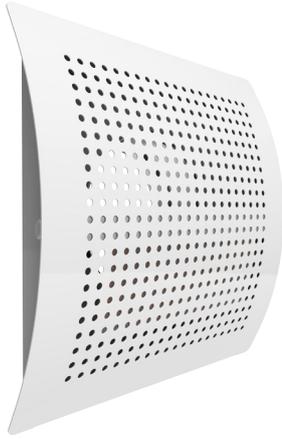


### Parts of the product:

1. Adjustment knob (upside orientation recommended)
2. Adjustment mechanism bridge (horizontal orientation obligatory)
3. Front plate fixing pin on the bridge.
4. fixing springs in the front plate

# BOR-S

## Residential supply air diffuser



## Dimensions

BOR-S is available in connection sizes  $\varnothing DN$  100 and  $\varnothing DN$  125.

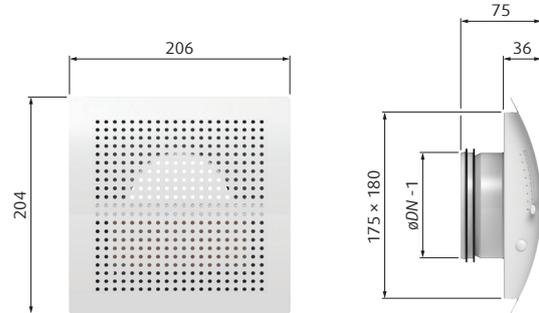


Fig. 3: BOR-S dimensions

### NOTES:

BOR-S-100:  $\varnothing = 99$  mm

BOR-S-125:  $\varnothing = 124$  mm

## Ordering Code



NOTE: \* If no color defined in ordering code, BOR-S is delivered with RAL9010, gloss 30 as standard.

## Design

The body of BOR-S is manufactured from galvanized steel with a convex, rectangular shaped front plate with perforation. The front plate is finished in the standard white powder-coating (RAL 9010, Gloss 30). Inside the body a flat adjustable blind is attached.

Diffuser	Connection	Total A-weighted sound power level $L_{WA}$					
		25 dB		30 dB		35 dB	
	(mm)	(l/s)	(m <sup>3</sup> /h)	(l/s)	(m <sup>3</sup> /h)	(l/s)	(m <sup>3</sup> /h)
BOR-S-100	100	11	38	15	55	22	80
BOR-S-125	125	15	54	21	75	29	105

Tab. 7: Quick selection

## Function

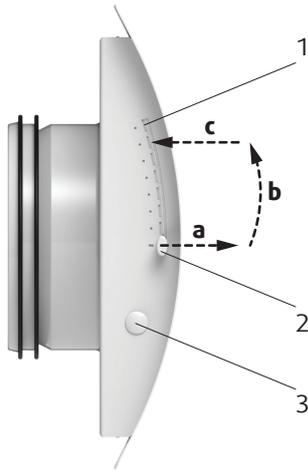
BOR-S has been especially developed for providing a draught-free and low acoustic noise air supply from the rear walls of offices, hotel and residential rooms etc. The flow pattern prevents the air stream from falling into the occupied zone before it has reached an acceptable temperature. Max. temperature difference  $\Delta T$  10K is permissible.

BOR-S is also suitable for VAV systems, as the distribution pattern is maintained across the entire flow area. The product is equipped for air flow adjustment and commissioning measurement.

## Technical details

The diffuser is equipped by an adjustable blind that changes the effective air flow aperture and so tunes the air flow volume. The mechanism is movable from outside by two miniature ears sliding in grooves on the sidewalls of the product. The movement has 8 fixed positions along the path defined by the notches in the groove. For adjustment only these positions provide desired noise parameters. The intermediate positions shall be avoided. The tables 1 and 2 show the k-factors of the product in each of the 8 fixed positions. Using the corresponding K-factor for the chosen adjustment along with the  $\Delta P$  measured on the measurement pin (sidewall) of the product provides data for an easy actual flow calculation at commissioning.

After commissioning the measurement pin shall be closed. For aesthetic reasons it can be replaced by the smooth plug which is packed in the product box.



**Parts of the product:**

1. Adjustment position 8
2. Adjustment mechanism parked in position 1.  
To move the mechanism pull the ears on both sides of the diffuser with fingers towards the plate (a). Slide along the groove to the desired position (b). Release the ears so they remain fixed in the desired position (c).
3. ΔP measurement pin

Fig. 4: BOR-S adjustment and commissioning parts

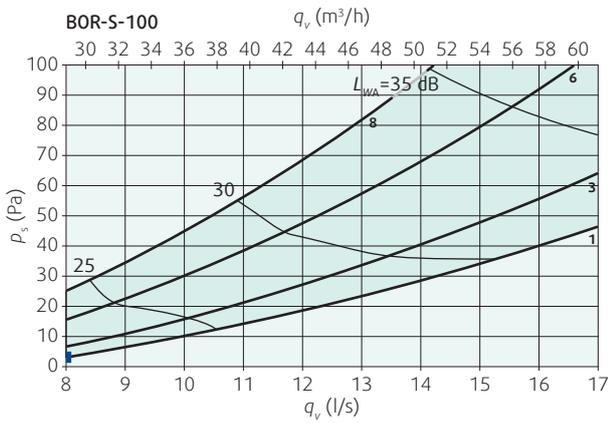


Diagram 4: Flow dependent pressure drop and A-weighted sound power level (BOR-S-100)

NOTES for Diagram 4 and 5:  
The position 8 is the adjustment position farthest from the middle of the diffuser body. Smallest free area.  
The position 1 is the adjustment position nearest to the middle of the diffuser body. Largest free area.

LEGEND	
1, 3, 6 and 8	Flow adjustment position
	Lower limit for commissioning ΔP measurement

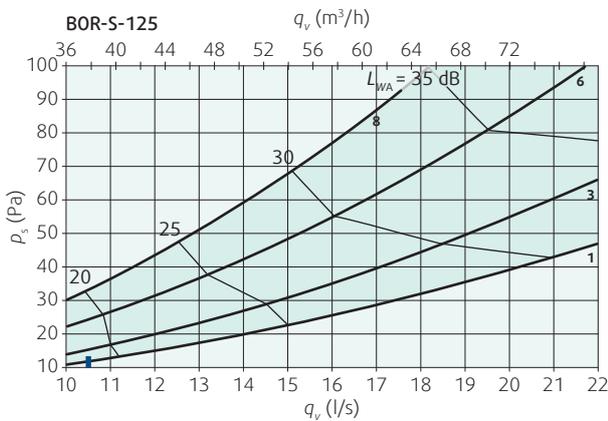


Diagram 5: Flow dependent pressure drop and A-weighted sound power level (BOR-S-125)

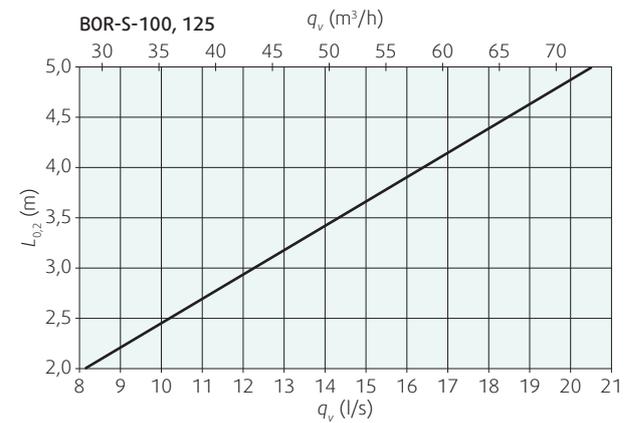


Diagram 6: Flow dependent throw length

BOR-S-100	$q_v$		sound power levels $L_w$ (dB)								
	Position	(l/s)	(m <sup>3</sup> /h)	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
1	8	29	31	18	9	8	8	8	9	14	20
	10	36	37	23	15	14	13	13	14	16	22
	12	43	43	27	20	18	17	17	19	18	23
	14	50	47	30	23	22	20	20	21	18	23
	16	58	50	33	26	24	22	22	24	18	22
3	8	29	34	21	10	7	8	8	8	14	20
	10	36	41	24	16	14	14	14	14	17	22
	12	43	46	26	21	20	19	19	20	18	23
	14	50	50	28	25	25	23	23	23	19	23
	16	58	53	29	29	28	25	25	26	19	23
6	8	29	35	21	12	15	15	15	14	15	21
	10	36	36	22	16	19	19	20	20	19	22
	12	43	37	23	19	22	24	24	24	22	23
	14	50	37	24	22	25	27	27	28	25	23
	16	58	38	24	24	27	30	30	31	27	24
8	8	29	39	21	13	14	16	16	16	15	21
	10	36	40	23	18	19	21	21	22	20	23
	12	43	41	24	21	23	25	25	26	23	25
	14	50	42	26	24	25	28	28	30	26	26
	16	58	43	27	26	28	30	30	33	28	27

Tab. 8: Linear (non-weighted) sound power levels  $L_w$  at octave-band frequencies (dB)

NOTES: The position 8 is the adjustment position farthest from the middle of the diffuser body. Smallest free area.

The position 1 is the adjustment position nearest to the middle of the diffuser body. Largest free area.

Octave band	63 Hz	125 Hz	250 Kz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
Correction values for A-weighted filter (dB)	-26,2	-16,1	-8,6	-3,2	0,0	1,2	1,0	-1,1

Tab. 9: Correction table for calculation of A-weighted filter octave band sound values from non-weighted values

NOTE: Adding the correction values to unweighted values results in A-weighted sound power levels.

BOR-S-125	$q_v$		sound power levels $L_w$ (dB)							
Position	(l/s)	(m <sup>3</sup> /h)	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
1	12	43	36	19	8	7	8	9	14	20
	14	50	42	22	12	12	11	12	16	22
	16	58	47	24	16	15	14	13	16	22
	18	65	51	26	20	18	15	14	16	22
	20	72	53	27	22	20	16	15	16	21
3	12	43	34	18	10	8	8	8	13	20
	14	50	39	22	16	14	13	14	16	22
	16	58	43	25	20	19	17	17	17	22
	18	65	47	28	25	24	21	22	19	23
	20	72	50	30	28	28	24	24	19	22
6	12	43	31	19	15	14	13	12	14	20
	14	50	35	21	19	19	19	19	18	22
	16	58	38	23	22	23	23	25	21	22
	18	65	40	25	25	26	26	29	23	22
	20	72	42	26	27	28	28	32	24	22
8	12	43	31	20	16	15	15	16	15	20
	14	50	32	23	21	21	20	22	20	22
	16	58	33	25	24	25	24	26	23	23
	18	65	34	27	27	28	27	30	26	24
	20	72	35	28	30	31	30	33	29	24

Tab. 10: Linear (non-weighted) sound power levels  $L_w$  at octave-band frequencies (dB)

NOTES: The position 8 is the adjustment position farthest from the middle of the diffuser body. Smallest free area.  
 The position 1 is the adjustment position nearest to the middle of the diffuser body. Largest free area.

k-factor (l/s)	BOR-S-100	BOR-S-125
Position 1	2,48	3,32
Position 2	2,31	3,06
Position 3	2,12	2,82
Position 4	1,97	2,63
Position 5	1,83	2,44
Position 6	1,69	2,25
Position 7	1,54	2,06
Position 8	1,41	1,87

$$Q \text{ (l/s)} = k \cdot \sqrt{p_d}$$

Tab. 11: k-factors for flow in l/s

NOTES: The position 8 is the adjustment position farthest from the middle of the diffuser body. Smallest free area.  
The position 1 is the adjustment position nearest to the middle of the diffuser body. Largest free area.

k-factor (m <sup>3</sup> /h)	BOR-S-100	BOR-S-125
Position 1	8,94	11,96
Position 2	8,30	11,03
Position 3	7,64	10,14
Position 4	7,08	9,45
Position 5	6,58	8,78
Position 6	6,07	8,10
Position 7	5,56	7,41
Position 8	5,07	6,72

$$Q \text{ (m}^3\text{/h)} = k \cdot \sqrt{p_d}$$

Tab. 12: k-factors for flow in m<sup>3</sup>/h

NOTES: The position 8 is the adjustment position farthest from the middle of the diffuser body. Smallest free area.  
The position 1 is the adjustment position nearest to the middle of the diffuser body. Largest free area.

## Example for flow volume calculation using $\Delta p$ and k-factor

### Assume:

BOR-S-100 in adjustment position 5. The k-factor for unit l/s has the value 1,83 (find in the table).  
The measured  $\Delta p$  value is 57Pa.

### Calculation:

The flow volume  $q$  is calculated by formula

$$q = k \cdot \sqrt{\Delta p}$$

$$q = 1,83 \cdot \sqrt{57}$$

$$q = 1,83 \cdot 7,55$$

$$q = 13,8 \text{ l/s}$$

## Mounting

The diffuser is installed directly at the end of the spiral duct sliding in the connection spigot with gasket. The unit can be fixed on the wall by screws through holes in the edges of the body. For this the diffuser front plate must be removed by pressing the upper edge of the plate down app. 5mm and pulling the upper part of the plate away from the diffuser body (see Fig. 5).

Attaching the diffuser plate back to the body: There are two railings on the plate inside, one with a notch, another one with two notches. These define the orientation of the plate on the body, where one respectively two rivets are fixed at the contact site for the plate railings. The notches fit to the rivets, so the orientation of the plate is correct. Put the railing at the lower end on the body edge, press the upper edge of the plate down by app. 5mm attaching the upper side of the plate to the body (see Fig. 5).

Dismounting of the unit: Turn the unit and pull straight out.

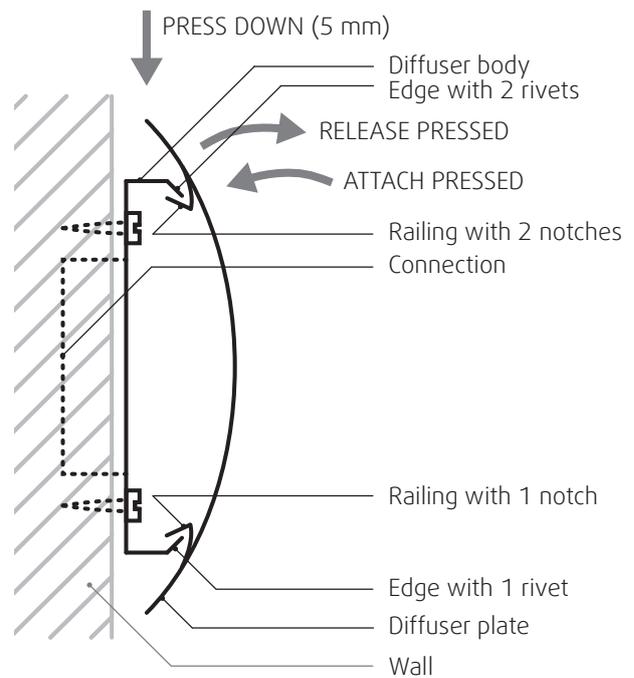


Fig. 5: Mounting and dismounting of BOR