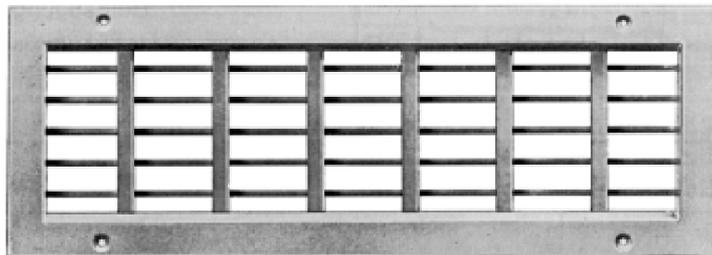
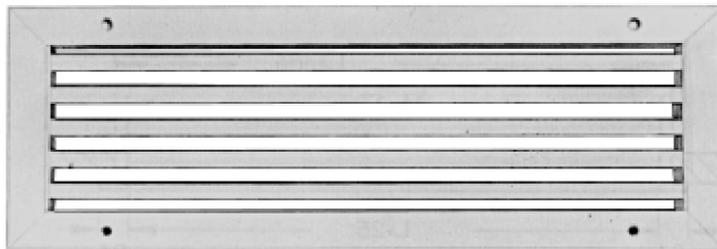




Ball Impact Resistant Grilles

BSG



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Ball-Impact-Resistant Grilles BSG

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Ball-Impact-Resistant Grilles BSG

Description

The ventilation grilles type BSG-N **for supply and return air with facing horizontal fixed profiled rods are suitable for fitting into gymnasiums and sport halls**, due to the fact that they are ball-impact-resistant to DIN 180 32 Part 3. When installed at a height of less than 2 m, the profile spacing must not exceed 8 mm. Please specify, when ordering.

The ventilation grilles type BSG-S **for supply and return air with facing vertical fixed profiled rods and pivoting horizontal air deflection blades are suitable for fitting into gymnasiums and sport halls**, due to the fact that they are ball-impact-resistant to DIN 180 32 Part 3. They have been approved only for installation at a height of more than 2 m.

At an extra charge, a plenum box can be mounted (only available without hit-and-miss damper). The damper in the connection piece of the plenum box (by additional charge) serves for easy air volume regulation.

Construction

Frame and profiled rods

- Sheet steel painted to RAL 9010 (white, SB-9010)
- Natural colour anodised aluminium (E6/EV1) (AL-ELOX)

Model

- BSG-N - with facing horizontal fixed profiled rods (made of sheet steel/aluminium)
- BSG-S - with facing vertical fixed profiled rods (made of sheet steel/aluminium) and horizontal pivoting air deflection blades (made of sheet steel/aluminium)

Accessories

Hit-and-miss damper

- Electrolytically galvanised sheet steel (-SS)

Installation frame (-ER1)

- Electrolytically galvanised sheet steel

Installation frame with wall anchors (-ER2)

- Electrolytically galvanised sheet steel

Plenum box (-AK)

- Electrolytically galvanised sheet steel

Damper (-DK1)

- In plenum box
- Damper made of galvanised sheet steel
- Damper fastening made of plastic

Internal insulation (-li)

- Thermal insulation at the inside of the plenum box

External insulation (-la)

- Thermal insulation at the outside of the plenum box

Rubber lip seal (GD1)

- Special rubber, on plenum box adapter

Fastening

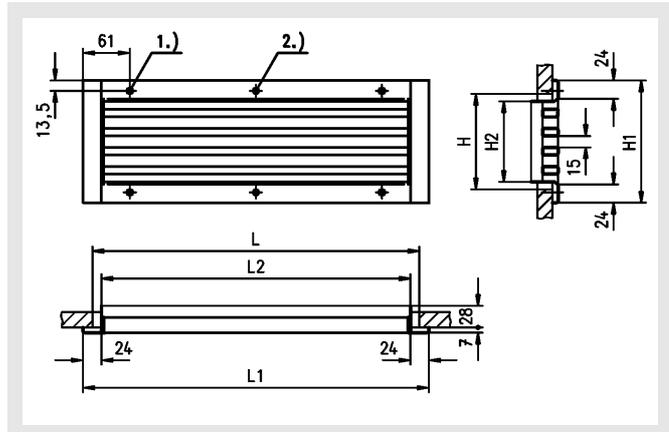
Screw mounting (-SM)

- Standard, screws must be provided on site

Ball-Impact-Resistant Grilles BSG

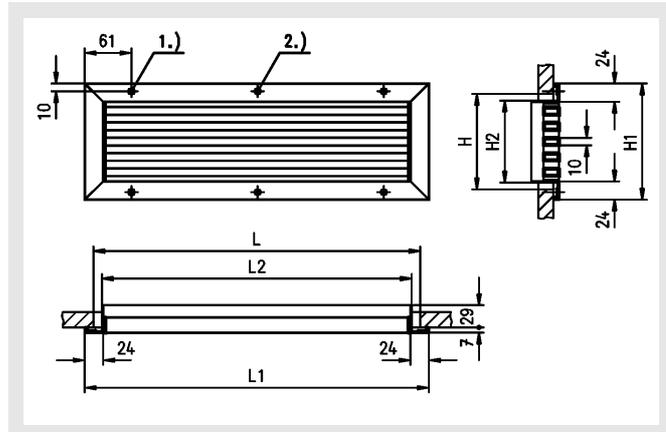
Models and dimensions

BSG-N-...-SB-...



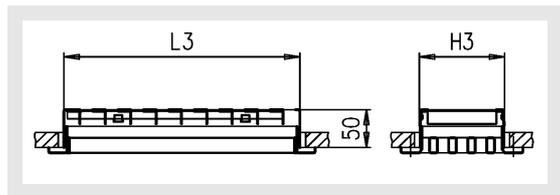
- 1.) Indentation for slotted shallow-raised countersunk-head tapping screw DIN ISO 7051 pitch 3.9 (on-site)
- 2.) From $L \geq 525$

BSG-N-...-AL-...

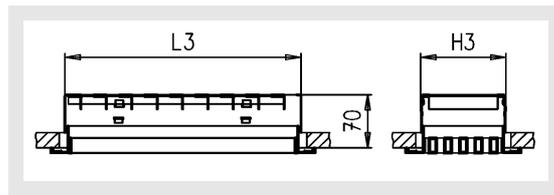


- 1.) Indentation for slotted shallow-raised countersunk-head tapping screw DIN ISO 7051 pitch 3.9 (on-site)
- 2.) From $L \geq 525$

BSG-N-...-SB-...-SS-...



BSG-N-...-AL-...-SS-...



Available sizes BSG-ST

L	L1	L2	L3
325	350	304	310
425	450	404	410
525	550	504	510
625	650	604	610
825	850	804	810
1025	1050	1004	1010
1225	1250	1204	1210

H	H1	H2	H3
125	160	104	112
225	260	204	212
325	360	304	312

All combined lengths and heights available!

Available sizes BSG-Alu

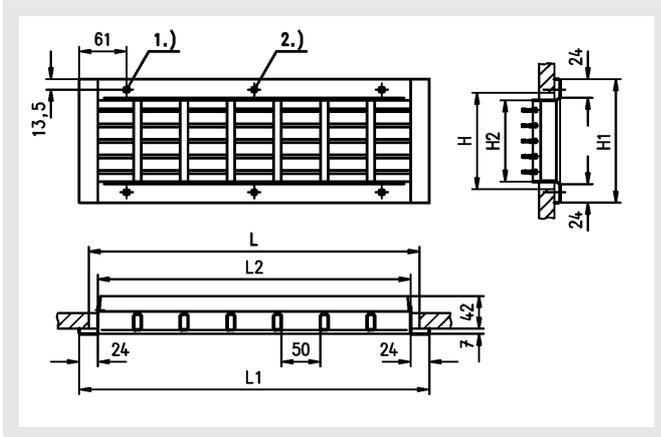
L	L1	L2	L3
325	348	303	310
425	448	403	410
525	548	503	510
625	648	603	610
825	848	803	810
1025	1048	1003	1010
1225	1248	1203	1210

H	H1	H2	H3
125	152	107	112
225	252	207	212
325	352	307	312

All combined lengths and heights available!

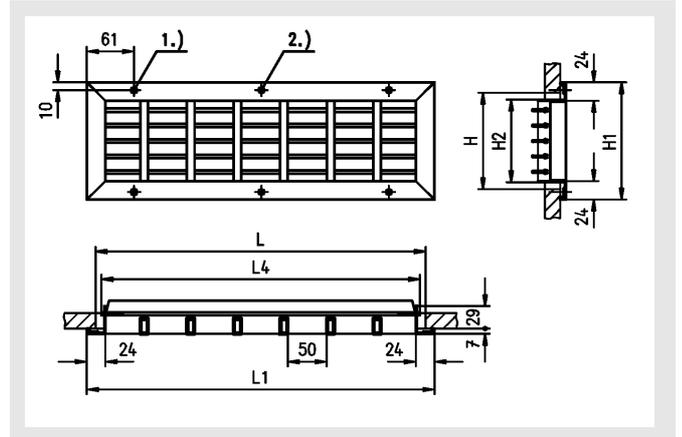
Ball-Impact-Resistant Grilles BSG

BSG-S-...-SB-...



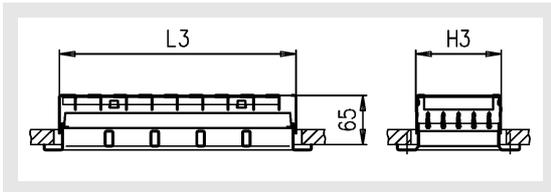
- 1.) Indentation for slotted shallow-raised countersunk-head tapping screw DIN ISO 7051 pitch 3.9 (on-site)
- 2.) From $L \geq 625$

BSG-S-...-AL-...

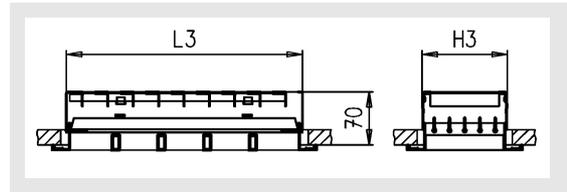


- 1.) Indentation for slotted shallow-raised countersunk-head tapping screw DIN ISO 7051 pitch 3.9 (on-site)
- 2.) From $L \geq 625$

BSG-S-...-SB-...-SS-...



BSG-S-...-AL-...-SS-...



Available sizes BSG-S-...-SB-...

L	L1	L2	L3	H	H1	H2	H3
325	350	304	310	125	160	104	112
425	450	404	410	225	260	204	212
525	550	504	510	325	360	304	312
625	650	604	610				
825	850	804	810				
1025	1050	1004	1010				
1225	1250	1204	1210				

All combined lengths and heights available!

Available sizes BSG-S-...-AL-...

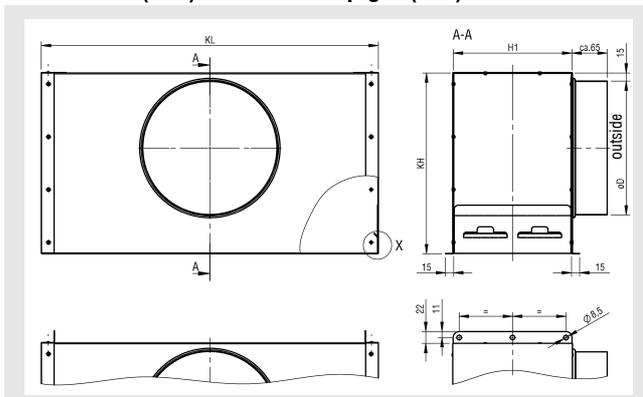
L	L1	L3	L4	H	H1	H2	H3
325	348	310	310	125	152	107	112
425	448	410	410	225	252	207	212
525	548	510	510	325	352	307	312
625	648	610	610				
825	848	810	810				
1025	1048	1010	1010				
1225	1248	1210	1210				

All combined lengths and heights available!

Ball-Impact-Resistant Grilles BSG

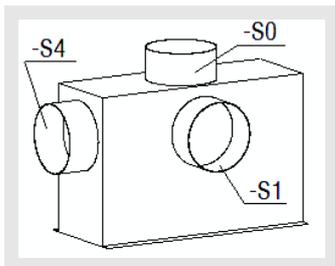
Dimensions of accessories

Plenum box (-AK) with lateral spigot (-S1)



Grilles cannot be fitted with a hit-and-miss damper if a plenum box is attached, i.e., it can either be fitted with a hit-and-miss damper or a plenum box.

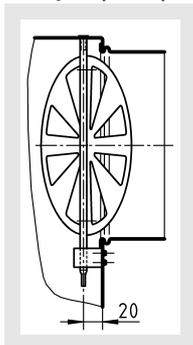
Spigot arrangement



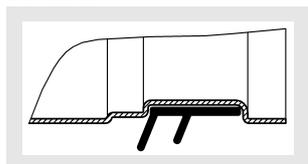
- Lateral spigot (-S1, standard)
- Spigot from above (-S0)
- Spigot front side (-S4)

Dimensions for spigot from above (-S0) and spigot front side (-S4) upon request.

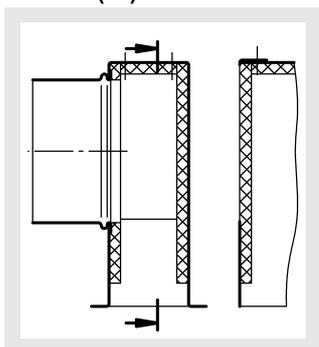
Damper (-DK1)



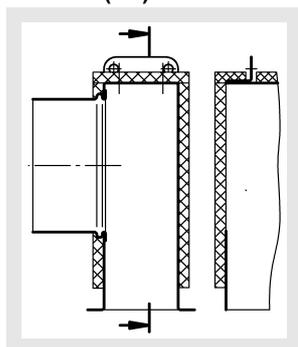
Rubber lip seal (-GD1) Detail X



Insulation for plenum box AK internal (-li)



external (-la)



Available sizes AK-S1

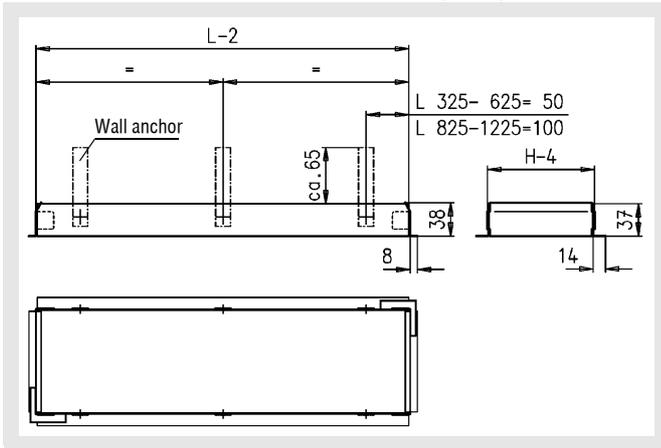
L	H	KL	KBS	KHS	øD	a
325	125	320	118	245	158	138
425		420		245	158	
525		520		245	158	
625		620		245	158	
825		820		285	198	
1025		1020		285	198	
1225		1220		285	198	

L	H	KL	KBS	KHS	øD	a
325	225	320	218	285	198	180
425		420		285	198	
525		520		285	198	
625		620		335	248	
825		820		335	248	
1025		1020		335	248	
1225		1220		335	248	

L	H	KL	KBS	KHS	øD	a
325	325	320	318	335	248	230
425		420		335	248	
525		520		335	248	
625		620		400	313	
825		820		400	313	
1025		1020		400	313	
1225		1220		400	313	

Ball-Impact-Resistant Grilles BSG

Installation frame without wall anchors (-ER1)



Length $L \leq 825$ mm = 4 wall anchors (at an extra charge)

Length $L > 825$ mm = 6 wall anchors (at an extra charge)

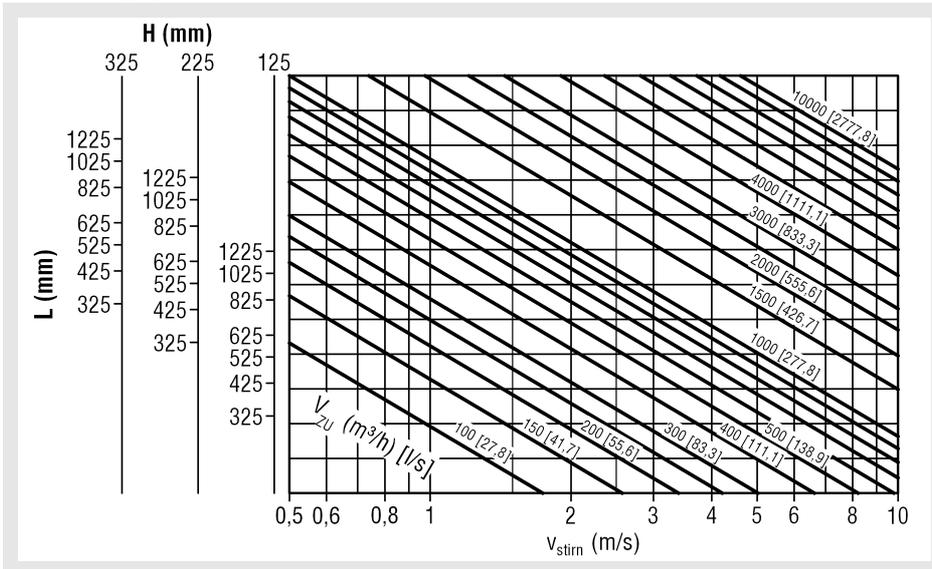
Installation frame E1 made of electrolytic galvanised sheet steel.
Installation frames are only delivered with wall anchors on special request (-ER2, at an extra charge).

Technical data

Pressure loss and noise level

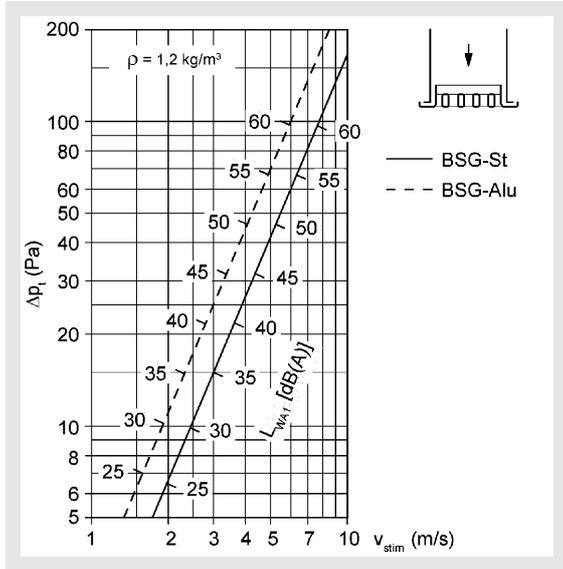
Front side velocity

BSG for supply and return air

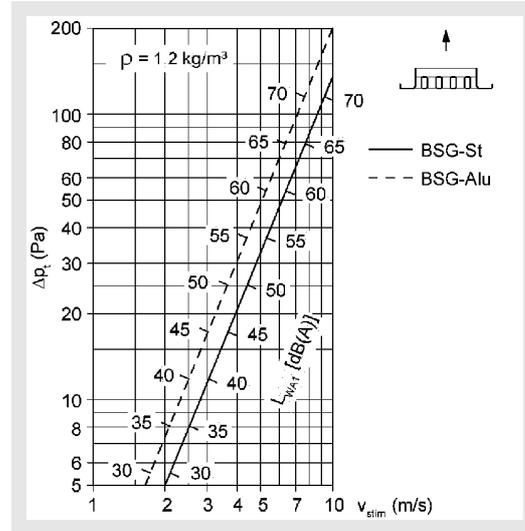


Ball-Impact-Resistant Grilles BSG

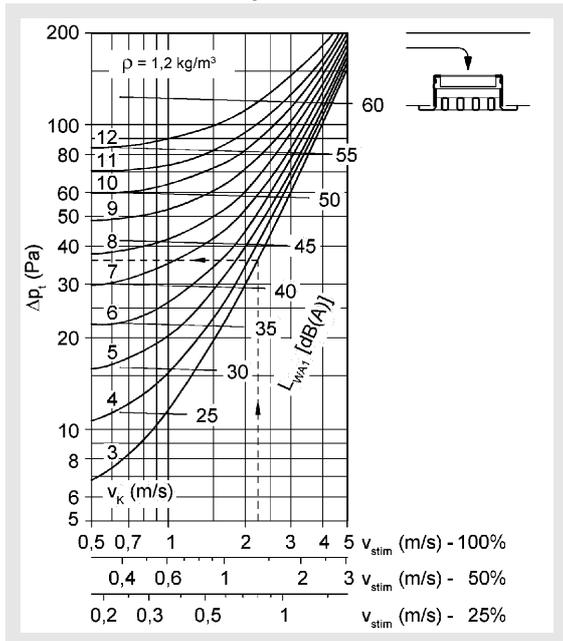
BSG-N (supply air) without hit-and-miss damper



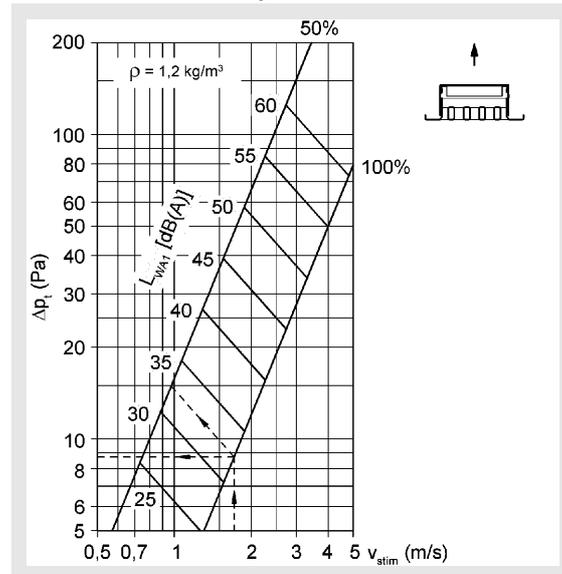
BSG-N (return air) without hit-and-miss damper



BSG-N (supply air) with hit-and-miss damper



BSG-N (return air) with hit-and-miss damper



% = hit-and-miss damper open

Face area BSG-N

	L						
	325	425	525	625	825	1025	1225
125	0,031	0,041	0,051	0,061	0,082	0,102	0,123
H 225	0,061	0,081	0,101	0,122	0,162	0,202	0,243
325	0,091	0,121	0,152	0,182	0,242	0,303	0,363
A_{stirn} (m²)							

Correction factor Supply air

A _{stirn} (m ²)	0,012	0,025	0,05	0,1	0,16	0,2	0,4
KF (-)	-9	-6	-3	0	+2	+3	+6

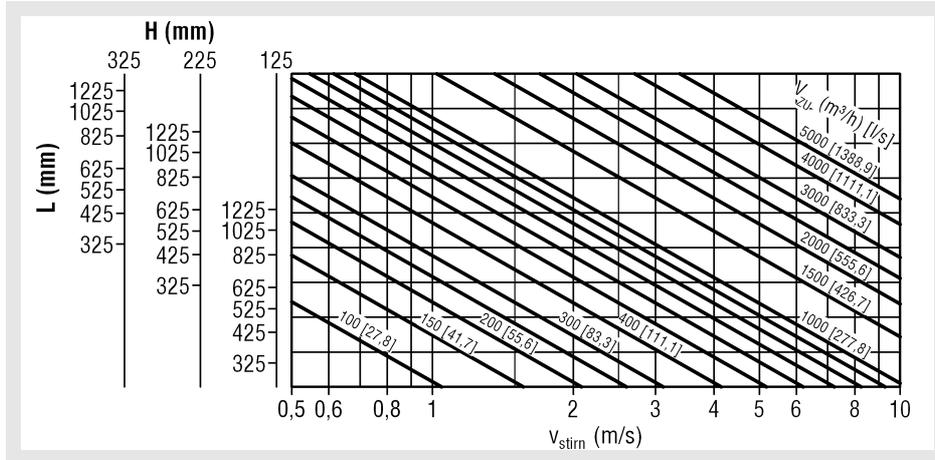
Return air

A _{stirn} (m ²)	0,01	0,02	0,04	0,08	0,16	0,32	0,4
KF (-)	-9	-6	-3	0	+3	+6	+7

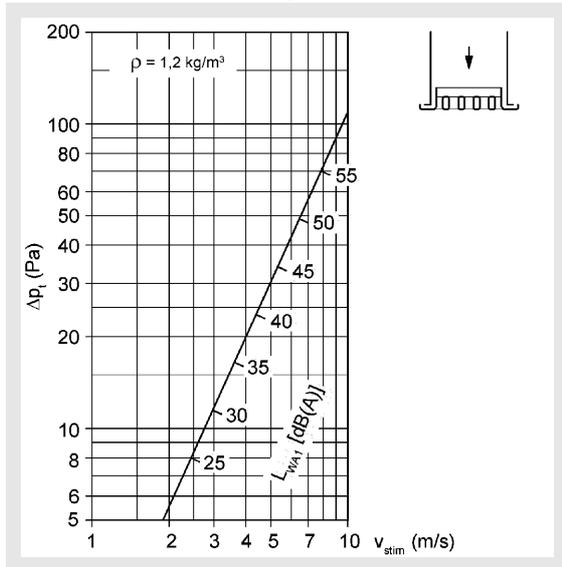
$$L_{WA} = L_{WA1} + KF$$

Ball-Impact-Resistant Grilles BSG

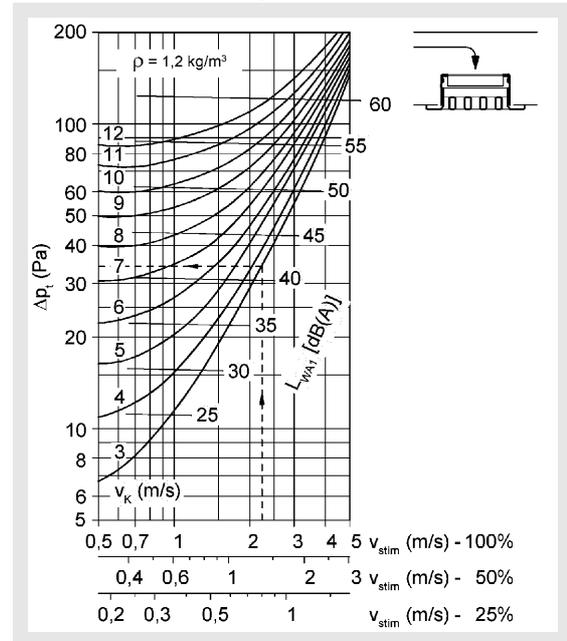
Front side velocity
BSG-S, supply and return air



BSG-S (supply air)
without hit-and-miss damper



BSG-S (supply air)
with hit-and-miss damper



% = hit-and-miss damper open

Face area BSG-S
Supply and return air

H	L						
	325	425	525	625	825	1025	1225
125	0,031	0,041	0,051	0,061	0,082	0,102	0,123
225	0,061	0,081	0,101	0,122	0,162	0,202	0,243
325	0,091	0,121	0,151	0,182	0,242	0,303	0,363
$A_{face} (m^2)$							

Correction factor
Supply air

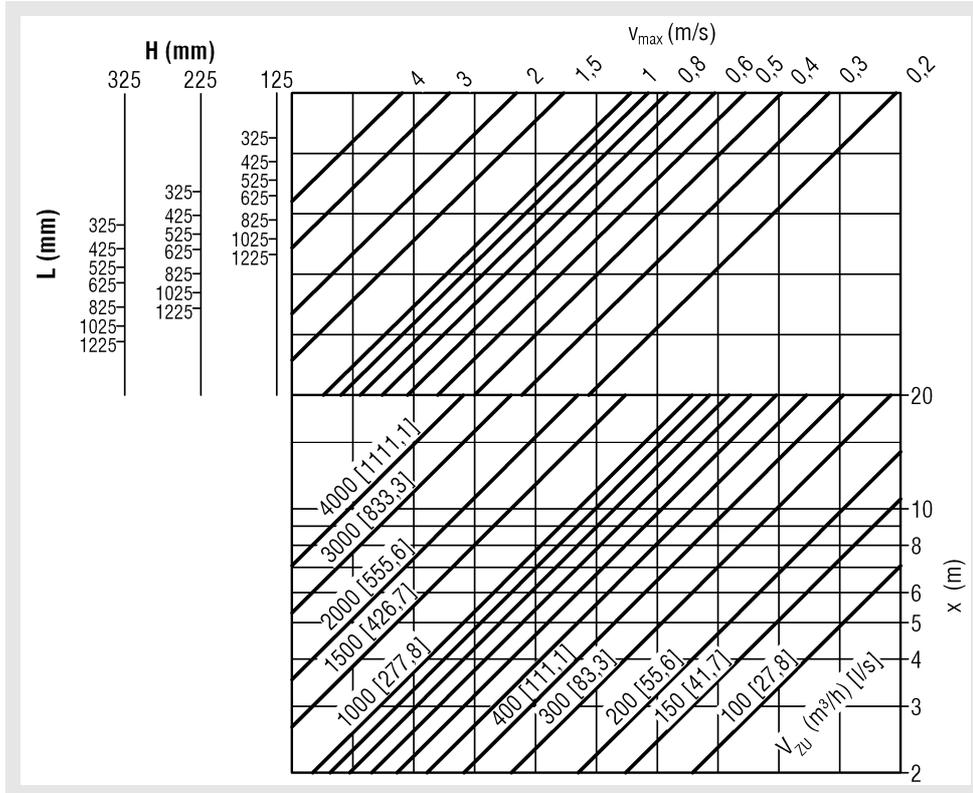
$A_{stirn} (m^2)$	0,01	0,02	0,04	0,08	0,16	0,32
KF (-)	-9	-6	-3	0	+3	+6

$$L_{WA} = L_{WA1} + KF$$

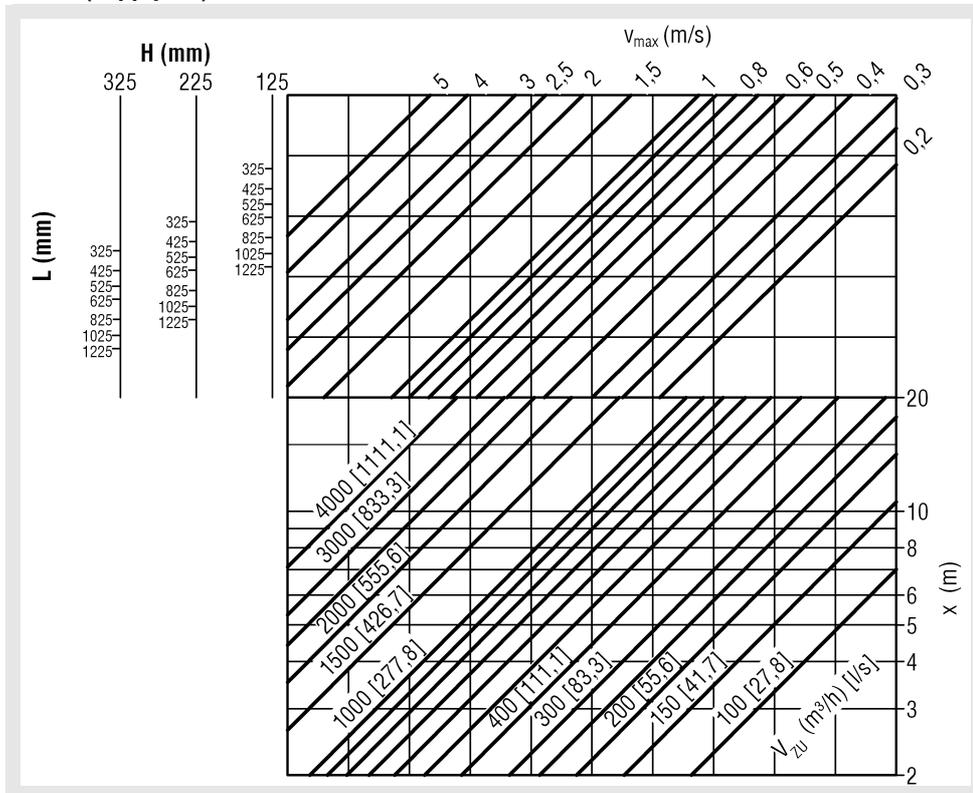
Ball-Impact-Resistant Grilles BSG

Maximum end velocity of jet

BSG-N (supply air), without coanda effect

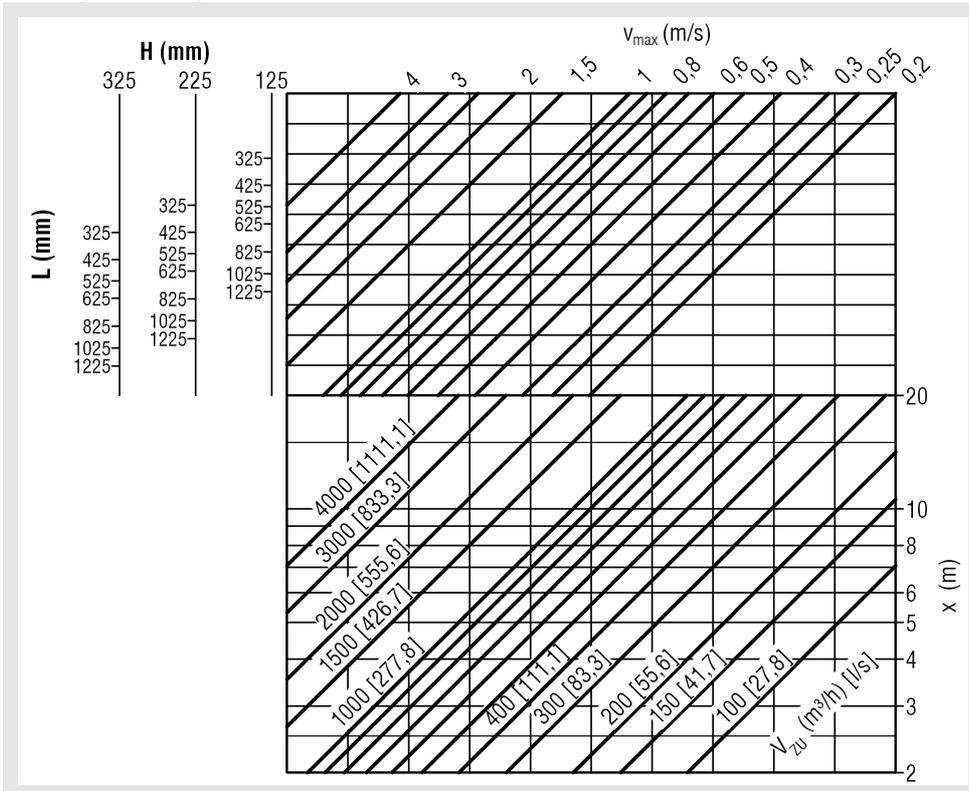


BSG-N (supply air), with coanda effect

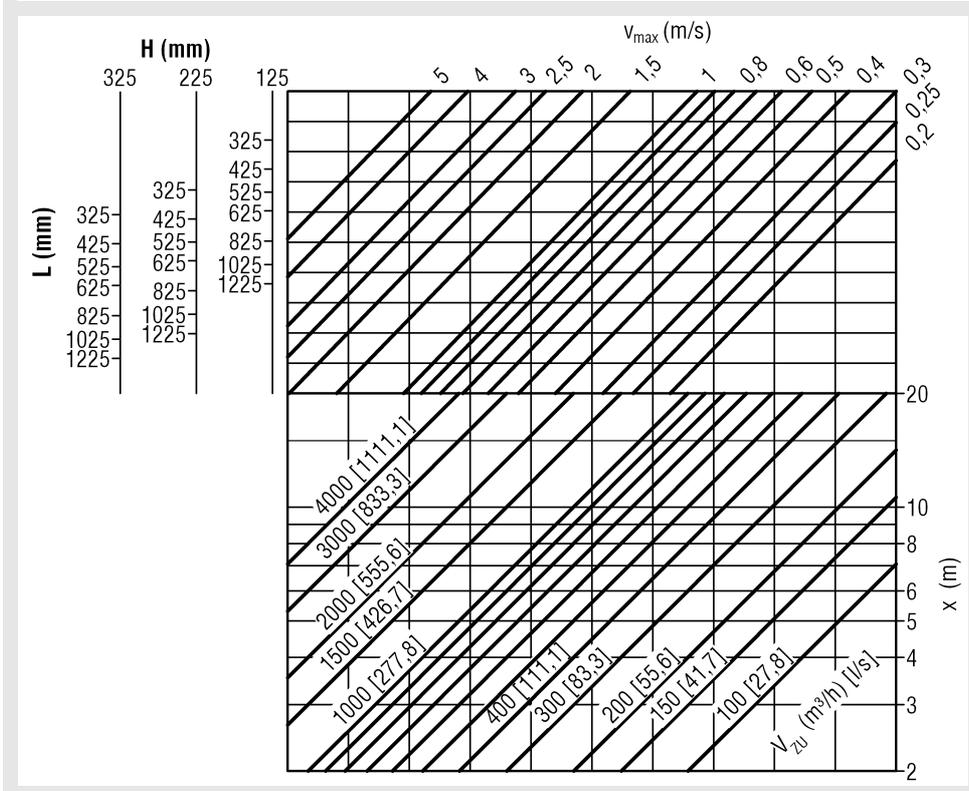


Ball-Impact-Resistant Grilles BSG

BSG-S (supply air), without coanda effect



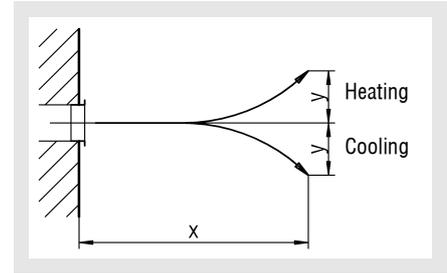
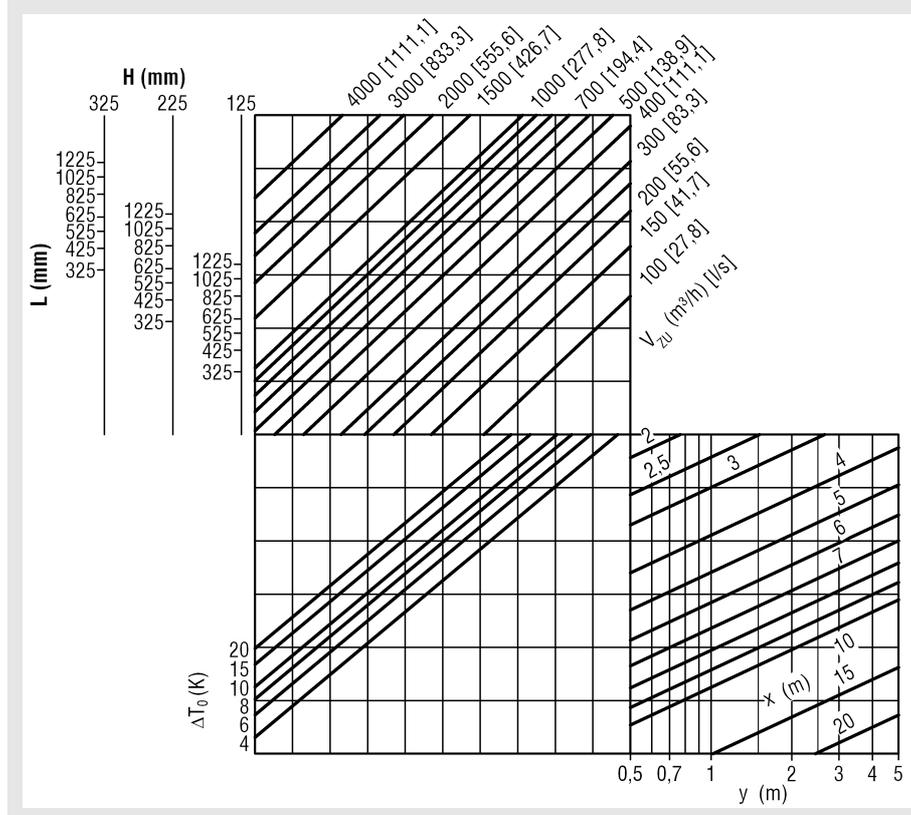
BSG-S (supply air), with coanda effect



Ball-Impact-Resistant Grilles BSG

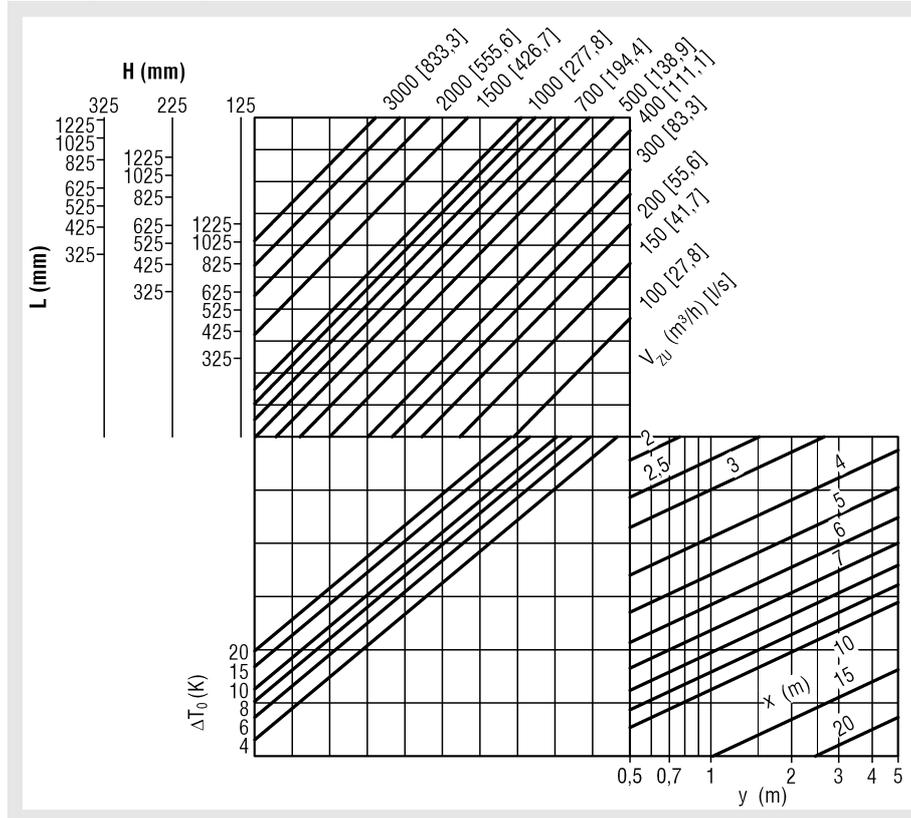
Jet path

BSG-N (supply air), without coanda effect



BSG-...-AL-...
 $V_{Alu} = y \times 0.87$

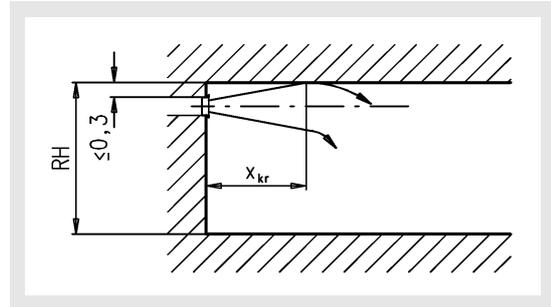
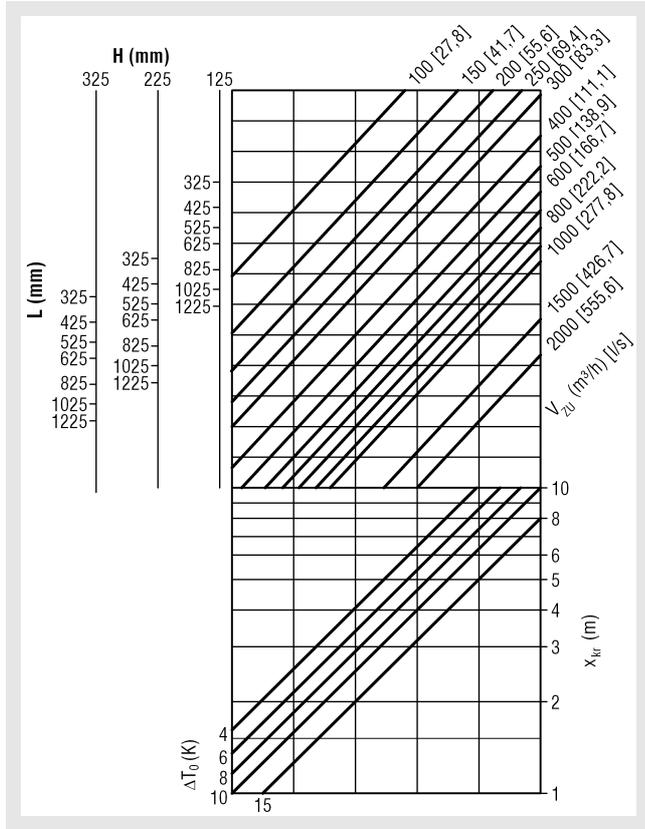
BSG-S (supply air), without coanda effect



Ball-Impact-Resistant Grilles BSG

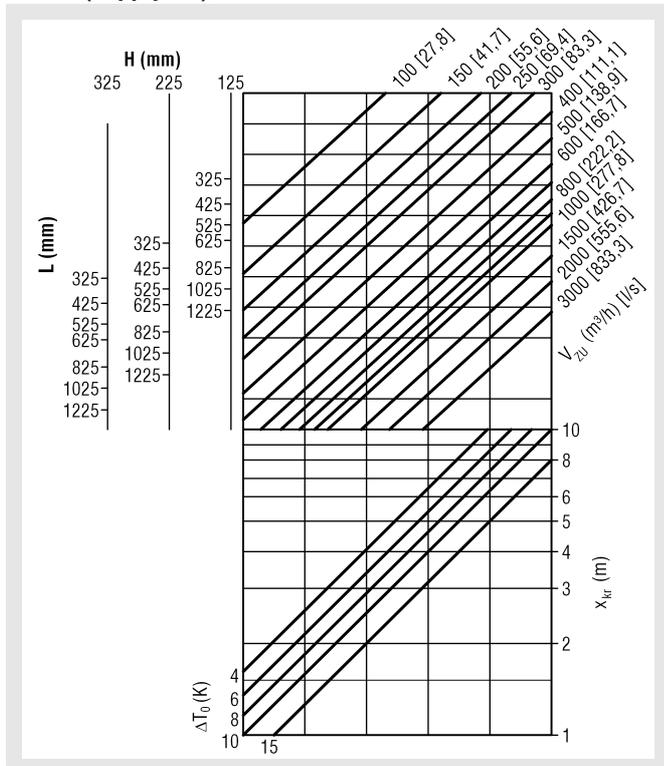
Critical throw

BSG-N (supply air), with coanda effect



BSG-...-AL-...
 $y_{kr Alu} = x_{kr} \times 1.1$

BSG-S (supply air), with coanda effect

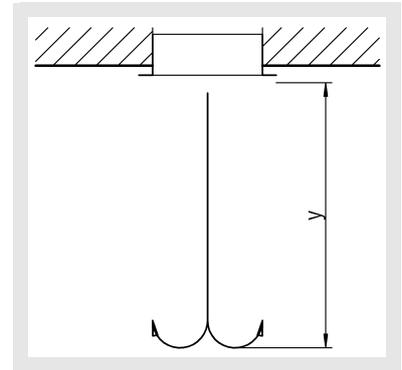
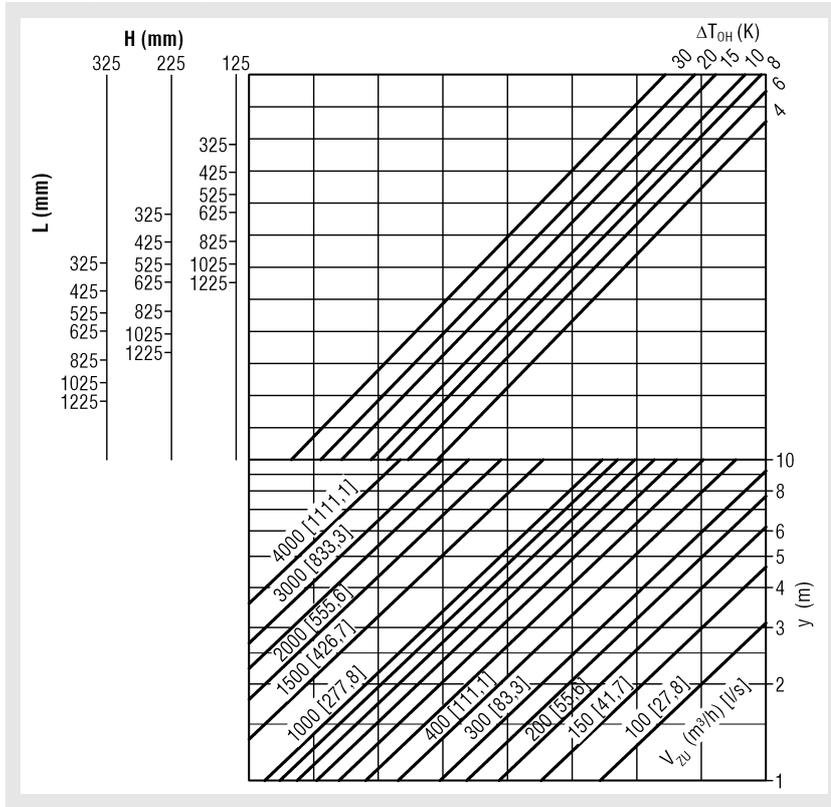


Ball-Impact-Resistant Grilles BSG

Maximum penetration

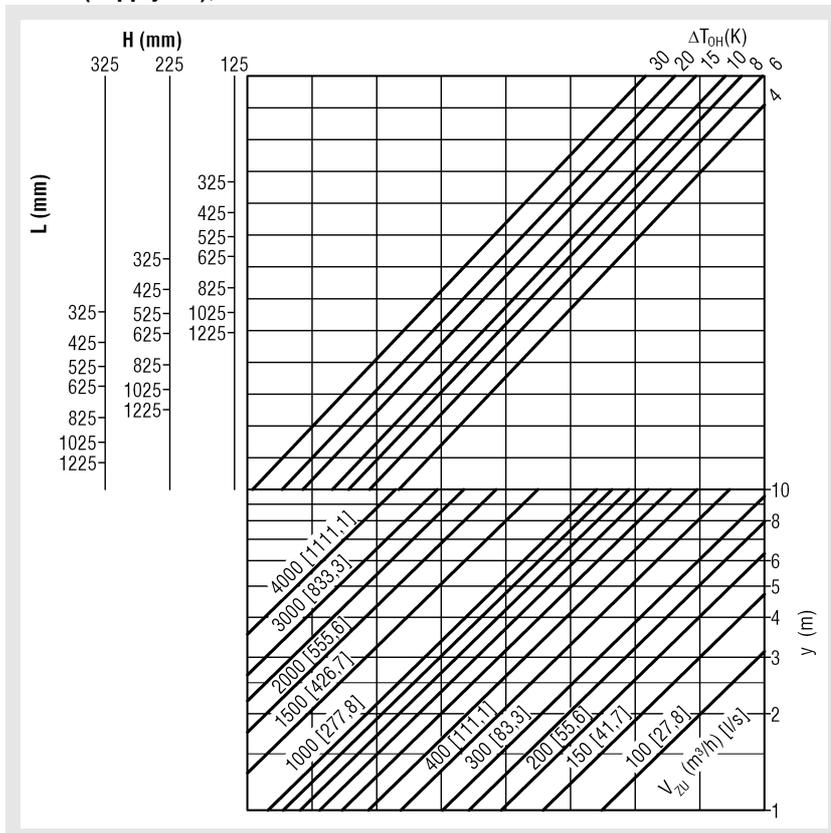
In heating mode

BSG-N (supply air), without coanda effect



BSG-...-AL-...
 $y_{Alu} = y \times 0.87$

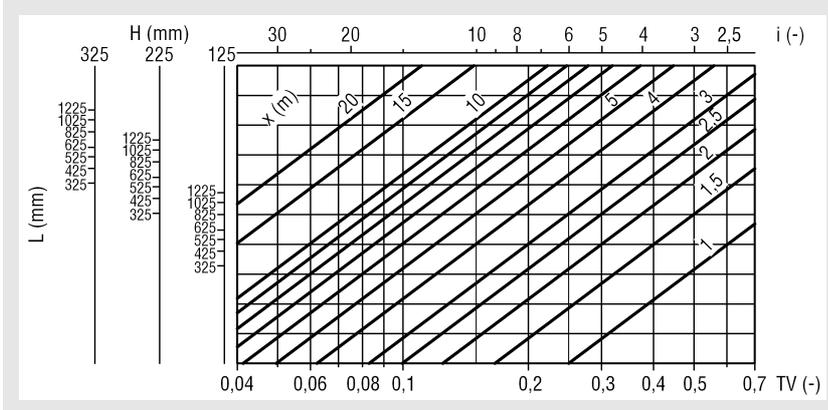
BSG-S (supply air), without coanda effect



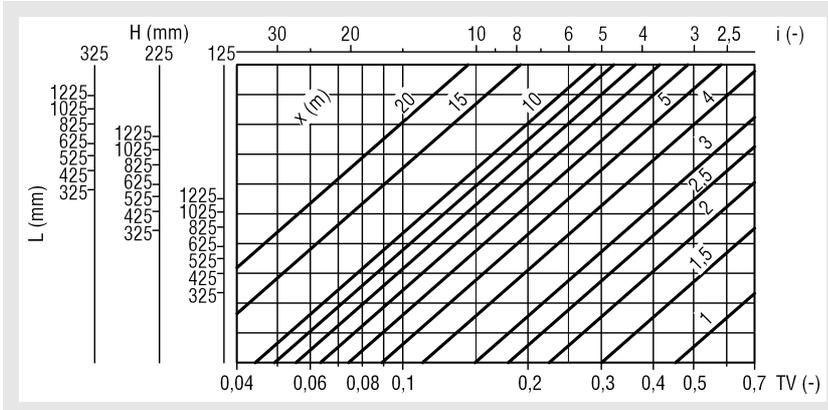
Ball-Impact-Resistant Grilles BSG

Induction ratios and temperature ratios

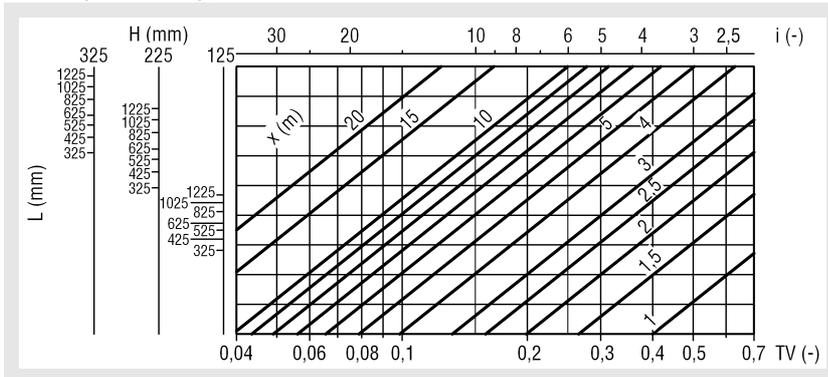
BSG-N (supply air), without coanda effect



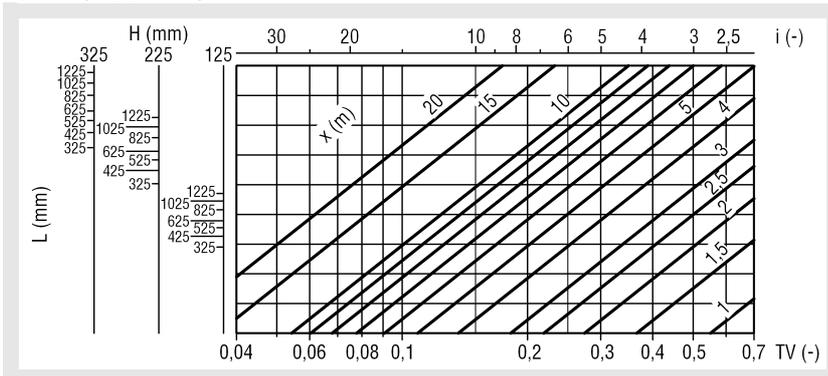
BSG-N (supply air), with coanda effect



BSG-S (supply air), without coanda effect



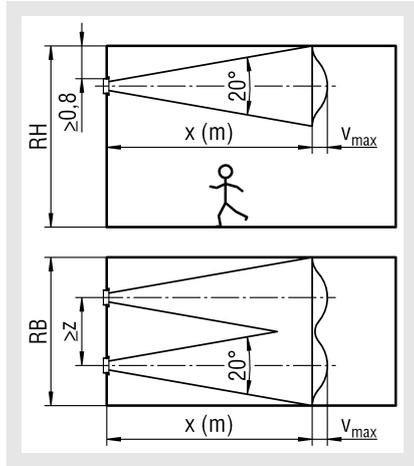
BSG-S (supply air), with coanda effect



Ball-Impact-Resistant Grilles BSG

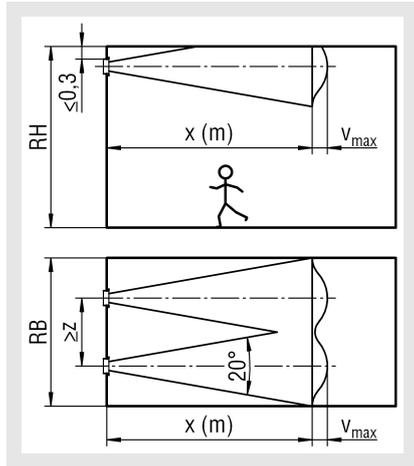
Minimum distances

BSG, supply air without coanda effect



For the diagrams to be correct, the distance z between two grilles must be $\geq x$ (m) \times 0.2.

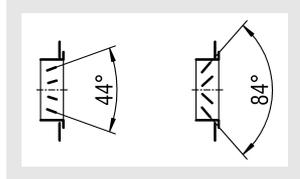
BSG, supply air with coanda effect



For the diagrams to be correct, the distance z between two grilles must be $\geq x$ (m) \times 0.2.

Correction factor (for scattered air jet)

BSG-S (supply air), with or without coanda effect



Blade position	44°	84°
End velocity of jet	v_{max} (m/s) \times 0.65	v_{max} (m/s) \times 0.5
Critical throw x_{kr}	\times 0.77	\times 0.6
$TV = \Delta T_x / \Delta T_0$	\times 0.65	\times 0.5
Induction ratio	$i \times 1.3$	$i \times 2$
Jet drop - Jet rise	$y \times 1.3$	$y \times 2$
Grille distance z (m)>	$x \times 0.20$	$x \times 0.25$

Legend

- V_{ZU} (m³/h) [l/s] = Supply air volume
- V_X (m³/h) [l/s] = Total air jet volume at point x
- v_{max} (m/s) = Maximum end velocity of jet
- v_K (m/s) = Duct velocity
- v_{stirn} (m/s) = Intake velocity, blower stream velocity, out-flow velocity, relative to A_{stirn}
- A_{stirn} (m²) = Face area
- x (m) = Horizontal throw
- y (m) = Vertical throw
- x_{kr} (m) = Critical throw
- y_{Alu} (m) = Vertical throw for aluminium model
- $y_{kr Alu}$ (m) = Critical throw for aluminium model
- ρ (kg/m³) = Density
- Δp_t (Pa) = Pressure loss
- L_{WA} [dB(A)] = A-weighted sound power level
[$L_{WA} = L_{WA1} + KF$]
- L_{WA1} [dB(A)] = A-weighted sound power level, relative to $A_{stirn} = 0.08$ m²
- KF (-) = Correction factor
- ΔT_0 (K) = Temperature difference between supply air temperature and room temperature ($\Delta T_0 = t_{ZU} - t_R$)
- ΔT_{OH} (K) = Temperature difference between air supply and room temperature in heating mode ($\Delta T_{OH} = t_{ZUH} - t_{RH}$)
- ΔT_x (K) = Temperature difference at point x
- t_{ZU} (°C) = Supply air temperature
- t_R (°C) = Room temperature
- t_{ZUH} (°C) = Supply air temperature in heating mode
- t_{RH} (°C) = Room temperatures in heating mode
- i (-) = Induction ratio ($i = V_X / V_{ZU}$)
- TV (-) = Temperature ratio ($TV = \Delta T_x / \Delta T_0$)
- z (m) = Minimum clearance between two grilles x (m) \times 0.2
- RH (mm) = Room height
- RB (mm) = Room width
- H (mm) = Height
- L (mm) = Length

Ball-Impact-Resistant Grilles BSG

Order code BSG

01	02	03	04	05	06	07	08
Type	Model	Length	Height	Material	Paint	Hit-and-miss damper	Installation frame
Example							
BSG	-N	-0625	-125	-SB	-9010	-SN	-ERO

All fields must be filled when ordering

Sample

BSG-N-0625-125-SB-9010-SN-ERO

Ventilation grille type BSG | with facing horizontal fixed profiled rods | length 625 mm | height 125 mm | sheet steel | painted to RAL 9010 | without hit-and-miss damper | without installation frame

ORDER DETAILS

01 - Type

BSG = Ventilation grille type BSG

02 - Model

N = With facing horizontal fixed profiled rods

S = With facing vertical fixed profiled rods and pivoting horizontal air deflection blades

03 - Length

0325 = Grille length 325 mm

0425 = Grille length 425 mm

0525 = Grille length 525 mm

0625 = Grille length 625 mm

0825 = Grille length 825 mm

1025 = Grille length 1025 mm

1225 = Grille length 1225 mm

04 - Height

125 = 125 mm

225 = 225 mm

325 = 325 mm

xxx = Height in mm (maximum 999 mm)

05 - Material

SB = Sheet steel (standard, only available with paint)

AL = Aluminium

06 - Paint

9010 = RAL 9010 (white, standard)

ELOX = Natural colour anodised (E6/EV1)

xxxx = RAL colour can be freely selected (always with 4 digits)

07 - Hit-and-miss damper

SN = Without hit-and-miss damper (standard)

SS = With hit-and-miss damper

08 - Installation frame

ERO = Without installation frame (standard)

ER1 = With installation frame

ER2 = With installation frame with wall anchors

Ball-Impact-Resistant Grilles BSG

Order code AK

01	02	03	04	05	06	07
Type	Air diffuser	Length	Height	Single / band design	Fastening	Material
Example						
AK-	-40	-00325	-125	-N	-SM	-SV

08	09	10	11	12	13	14
Damper	Rubber lip seal	Insulation	Height of plenum box	Width of box	Spigot diameter	Spigot position
-DK1	-GD1	-I0	-KHS	-KBS	-SDS	-S1

All fields must be filled when ordering

Sample

AK-40-00325-125-N-SM-SV-DK1-GD1-I0-KHS-KBS-SDS-S1

Plenum box, rectangular design | suitable for diffuser type BSG | length 325 mm | height 125 mm | single length | with screw mounting | galvanised sheet steel | with damper | with rubber lip seal | without box insulation | standard height of box | standard width of box | standard spigot diameter | lateral spigot

ORDER DETAILS

01 - Type

AK = Plenum box, rectangular design

02 - Air diffuser

40 = For ball-impact-resistant grilles type BSG

03 - Length

00325 = Grille length 325 mm

00425 = Grille length 425 mm

00525 = Grille length 525 mm

00625 = Grille length 625 mm

00825 = Grille length 825 mm

01025 = Grille length 1025 mm

01225 = Grille length 1225 mm

04 - Height

125 = Grille height 125 mm

225 = Grille height 225 mm

325 = Grille height 325 mm

xxx = Height in mm (maximum 999 mm)

05 - Single / band design

N = Single length (standard)

06 - Fastening

SM = Screw mounting (standard, screws must be provided on site)

07 - Material

SV = Galvanised sheet steel (standard)

08 - Damper

DK0 = Without damper (standard)

DK1 = With damper

09 - Rubber lip seal

GD0 = Without rubber lip seal (standard)

GD1 = With rubber lip seal

10 - Insulation

I0 = Without insulation (standard)

Ii = With box insulation inside

Ia = With box insulation outside

11 - Height of plenum box

KHS = Height of plenum box standard

xxx = Height of plenum box in mm (minimum height = spigot diameter +72 mm, always with 3 digits)

12 - Width of box

KBS = Standard width of box

xxx = Width of box in mm (minimum width = spigot diameter +30 mm, always with 3 digits)

13 - Spigot diameter

SDS = Standard spigot diameter

xxx = Spigot diameter in mm (always with 3 digits)

14 - Spigot position

S0 = Spigot from above

S1 = Lateral spigot on the box (standard)

S4 = Spigot front side (not possible with band design)

Ball-Impact-Resistant Grilles BSG

Specification texts

Ventilation grille type BSG-N for supply and return air, in ball-impact-resistant design to DIN 180 32, Part 3. Consisting of a frame with facing horizontal fixed profiled rods made of sheet steel painted to RAL 9010 (white). Fastening by means of screw mounting (-SM).

Product: SCHAKO type **BSG-N-...-SB-9010-...**

- With slide cover (-SS) made of electrolytic galvanised sheet steel.

Product: SCHAKO type **BSG-N-...-SB-9010-...-SS-...**

Ventilation grille type BSG-N for supply and return air, in ball-impact-resistant design to DIN 180 32, Part 3. Consisting of a frame with facing horizontal fixed profiled rods made of natural colour anodised aluminium (E6/EV1). Fastened with screw mounting.

Product: SCHAKO type **BSG-N-...-AL-ELOX-...**

- With slide cover (-SS) made of electrolytic galvanised sheet steel.

Product: SCHAKO type **BSG-N-...-AL-ELOX-...-SS-...**

Ventilation grille type BSG-S for supply and return air, in ball-impact-resistant design to DIN 180 32, Part 3. Consisting of a frame with facing horizontal fixed profiled rods and pivoting air deflection blades made of sheet steel painted to RAL 9010 (white). Fastening by means of screw mounting (-SM). Mounting height is at least 2 m.

Product: SCHAKO type **BSG-S-...-SB-9010-...**

- With slide cover (-SS) made of electrolytic galvanised sheet steel.

Product: SCHAKO type **BSG-S-...-SB-9010-...-SS-...**

Ventilation grille type BSG-S for supply and return air, in ball-impact-resistant design to DIN 180 32, Part 3. Consisting of a frame with facing horizontal fixed profiled rods and pivoting air deflection blades made of natural colour anodised aluminium (E6/EV1). Fastening by means of screw mounting (-SM). Mounting height is at least 2 m.

Product: SCHAKO type **BSG-S-...-AL-ELOX-...**

- With slide cover (-SS) made of electrolytic galvanised sheet steel.

Product: SCHAKO type **BSG-S-...-AL-ELOX-...-SS-...**

Accessories:

- Plenum box (-AK) made of electrolytically galvanised sheet steel (only possible without hit-and-miss damper)
 - With damper (-DK1) in plenum box, adjustable, for simple air volume regulation
 - Rubber lip seal (-GD1), made of special rubber at the connection spigot
 - With thermal insulation
 - internal (-li)
 - external (-la)
- Installation frame (-ER1), made of electrolytically galvanised sheet steel
- Installation frame with wall anchors (-ER2) made of electrolytically galvanised sheet steel.