Planning manual part 1.1.6

emcoair **ventilation components**

Grilles · Weather louvres · Ceiling diffusers

emcobad | emcobau | emcoklima

EMCO

emcoair **ventilation systems**

In 1972 emco klima was launched to produce a series of best quality air diffusers.
Continuous development of products for various different air delivery systems and their ‚on-time' despatch, gradually secured the creation of well earned trust between emco and the consultant specifiers, contractors and end users.
emco klima also offers ‚In-house' services that include laboratory testing, computer analysis and product selection during the planning process, to provide functional dependability and optimum economic efficiency for the entire range of air and water based systems.
emco klima has noticed a significant change in clients requirements.
The reason being increased sales of other products such as emcotherm convectors for heating and emcocool chilled ceiling systems, where water is the means of energy transportation.
Reduced electrical energy for water circulation is one of the major driving forces behind market changes, in addition to changes in construction methods and artistic challenges.

emcoair **swirl diffusers**

emcoair **ceiling air diffusers**

emcoair **linear diffusers**

emcoair **circular pipe diffusers**

emcoair **displacement flow diffusers**

emcoair **industrial air diffusers**

emcoair **special air diffusers**

emcoair **floor diffusers**

emcoair **grilles and flow regulators**

emcoair **weather louvres**

emcoair **multi-blade dampers**

emcoair **dampers**

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emcoair **electronic regulation components**

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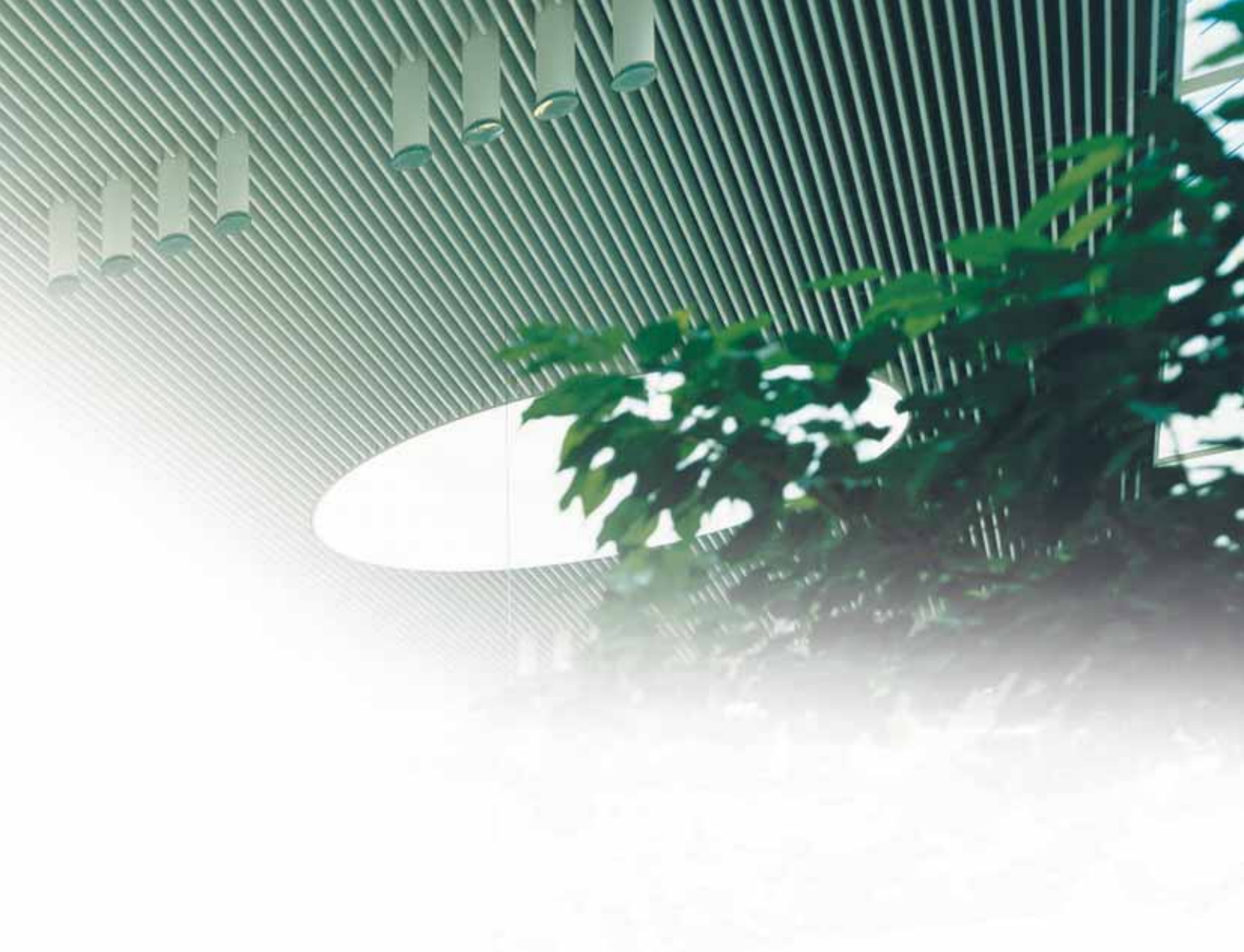
emcoair **grilles**



emcoair grilles are used in all applications of classic ventilation and heating technology in which discharge openings in the floor, wall and ceiling should be covered in an aesthetically please yet functional manner. emco's entire range of grilles is available in a variety of colours to best adapt to the interior and in most cases, they are also available as linear grilles.

Our grilles are highly valued and have been used for years in other sectors, such as the furniture industry, because of their versatility and high quality. One more reason why emco leaves nothing to chance, not even in the production of basic standard products.

G 352

Series 320

Series 310

Opening

Within the field of climate control, air conditioning is becoming increasingly important.

Before now, creating a comfortable space was all that mattered, which meant implementing draught-free air feeds in a way that took spatial, thermal and velocity-related considerations into account. Today, however, we are given the extra challenge of ensuring these requirements are met from an energy-saving perspective. A key factor in achieving this is to not only look at the overall design concept for a system, but also to select the right fan grilles, make the right calculations for them and ensure they meet the right requirements.

The details of the versions on the pages that follow are intended to provide the user of these technical documents with information about the key types of airflows and the criteria for them, as well as the characteristics they demonstrate. They are also designed to help the user determine the right dimensions and choose the products that best meet the needs of the application, with the aid of selection diagrams.

Each of the individual diagrams is accompanied by examples that enable users to get to grips with products quickly and easily.

However, we are very happy to answer any questions you might have. We would also be delighted to receive any suggestions for improvements or other information.

The selection diagrams reflect the characteristics of airflows that are able to disperse through rooms unhindered after exiting a fan grille.

The flow characteristics of airflows that enter rooms with limited space are affected by:

- The shape of the room
- Where the supply air openings are situated, how many there are and their shape
- The difference in temperature between the supply air and the air in the room
- Fixtures in the room that hinder the airflow
- Heat sources that emit their own airflows (radiators, fans, etc.)

To ensure you achieve reliable results when using the diagrams in this document, we recommend a supply air volume flow that produces a basic air change rate of Lw > 3 [1/h].

Additionally, the ratio of room height to room depth (room depth = main flow direction of air introduced into room) must not exceed l/h < 4 to 4.5.

Aerodynamic data grilles A_{eff} [m²] or linear gilles [m²/m]

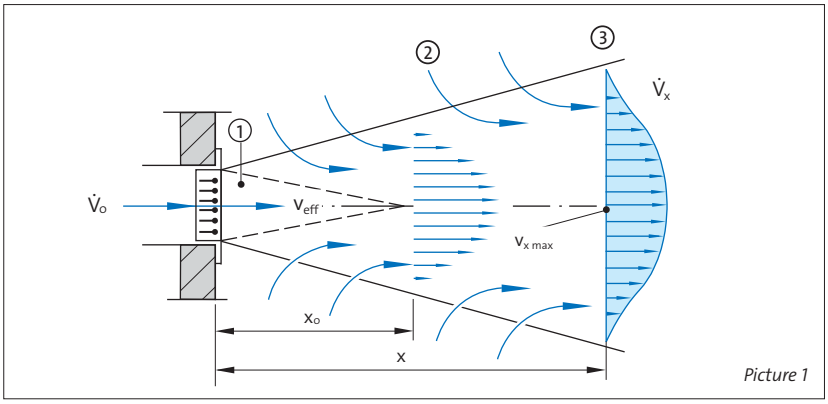
Dimensions H x W [mm]	G 311 [m²]	G 311 [m²/m]	G 411 [m²]	G 418 [m²]	G 419 [m²]	G 326 [m²]	GB 326 [m²/m]	G 328 [m²]	GB 328 [m²/m]	G 329 [m²]	G 341* [m²]		GB 341* [m²/m]	
Slat spacing											8 mm	12 mm	8 mm	12 mm
75 x 225	–	–	0.008	–	–	0.004	0.019	0.004	0.019	–	–	–	–	–
75 x 325	–	–	0.012	–	–	0.006	–	0.006	–	–	–	–	–	–
75 x 425	–	–	0.016	0.016	0.016	0.008	–	0.008	–	–	–	–	–	–
75 x 525	–	–	0.020	0.020	0.020	0.010	–	0.010	–	–	–	–	–	–
75 x 625	–	–	0.024	0.024	0.024	0.012	–	0.012	–	–	–	–	–	–
75 x 825	–	–	0.032	0.032	0.032	0.016	–	0.016	–	–	–	–	–	–
75 x 1025	–	–	0.040	0.040	0.040	0.020	–	–	–	–	–	–	–	–
75 x 1225	–	–	0.048	0.048	0.048	0.024	–	–	–	–	–	–	–	–
125 x 225	0.016	0.075	0.016	–	–	0.012	0.045	0.012	0.045	0.009	–	–	0.041	0.048
125 x 325	0.024	–	0.024	–	–	0.014	–	0.014	–	0.013	0.012	0.014	–	–
125 x 425	0.032	–	0.032	0.032	0.032	0.018	–	0.018	–	0.018	0.016	0.019	–	–
125 x 525	0.040	–	0.040	0.040	0.040	0.023	–	0.023	–	0.022	0.020	0.024	–	–
125 x 625	0.048	–	0.048	0.048	0.048	0.028	–	0.028	–	0.026	0.024	0.029	–	–
125 x 825	0.064	–	0.064	0.064	0.064	0.037	–	0.037	–	0.035	0.033	0.039	–	–
125 x 1025	0.080	–	0.080	0.080	0.080	0.047	–	–	–	–	–	–	–	–
125 x 1225	0.096	–	0.096	0.096	0.096	0.056	–	–	–	–	–	–	–	–
225 x 325	0.046	0.150	0.046	–	–	0.030	0.099	0.030	0.099	0.030	0.026	0.030	0.089	0.105
225 x 425	0.062	–	0.062	0.062	0.062	0.041	–	0.041	–	0.039	0.036	0.041	–	–
225 x 525	0.077	–	0.077	0.077	0.077	0.051	–	0.051	–	0.049	0.045	0.052	–	–
225 x 625	0.093	–	0.093	0.093	0.093	0.062	–	0.062	–	0.059	0.054	0.063	–	–
225 x 825	0.124	–	0.124	0.124	0.124	0.083	–	0.083	–	0.079	0.073	0.085	–	–
225 x 1025	0.155	–	0.155	0.155	0.155	0.104	–	–	–	–	–	–	–	–
225 x 1225	0.186	–	0.186	0.186	0.186	0.125	–	–	–	–	–	–	–	–
325 x 425	0.092	0.225	0.092	–	–	0.063	0.154	0.063	0.154	0.061	0.054	0.063	–	–
325 x 525	0.115	–	0.115	–	–	0.079	–	0.079	–	0.077	0.069	0.079	–	–
325 x 625	0.138	–	0.138	–	–	0.096	–	0.096	–	0.092	0.083	0.097	–	–
325 x 825	0.184	–	0.184	–	–	0.128	–	0.128	–	0.123	0.113	0.130	–	–
325 x 1025	0.230	–	0.230	–	–	0.161	–	–	–	–	–	–	–	–
325 x 1225	0.276	–	0.276	–	–	0.193	–	–	–	–	–	–	–	–

H = height, W = width *Values valid for models G 342, G 345, G 346 as well as GB 342, GB 345, GB 346.

Room airflow / Basics / Method of operation

Picture 1

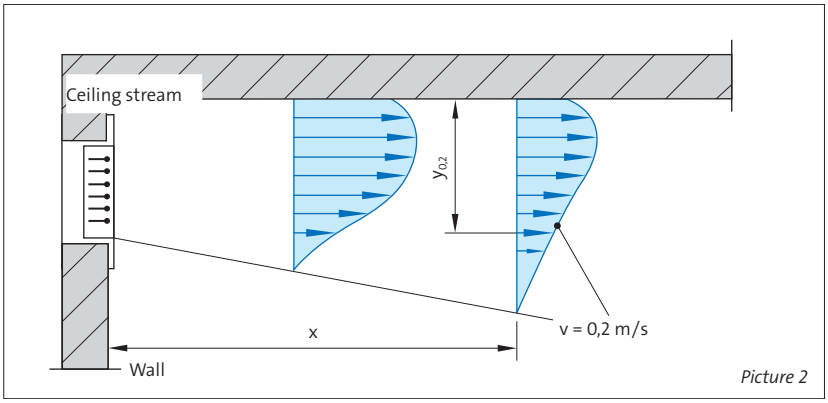
The picture shows the flow pattern of an isothermal open jet (i.e. airflow temperature and room air temperature are at the same level).
In the core flow (1; primary air) with length x_0, the open jet retains its original velocity. At the interface between the flowing and static air, air type 2 (secondary air) is also led out of the room as a result of friction. Swirling in the zone where the air types mix (3) causes the velocity at which the airflow exits the grille (v_{eff}) to fall to velocity v_{max}. Here, the total volume flow in the airflow ($\dot{V}_x$) is made up of the secondary and primary air.



Picture 1

Picture 2

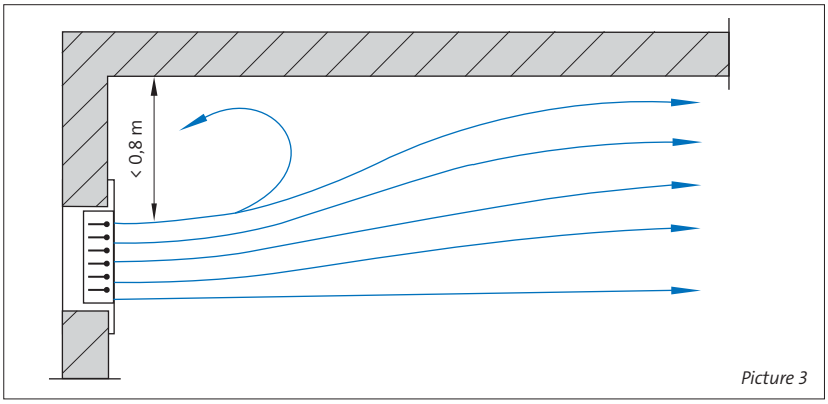
If a ventilation grille is integrated into a side wall immediately beneath the ceiling, then the air flows towards the ceiling. There is less of a drop in velocity in the ceiling airflow than in the open jet, which creates a longer airflow path x (trajectory length).
$y_{0.2}$ is the distance from the airflow axis (open jet) or ceiling (ceiling airflow) at which the velocity v ≈ 0.2 m/s.



Picture 2

Picture 3

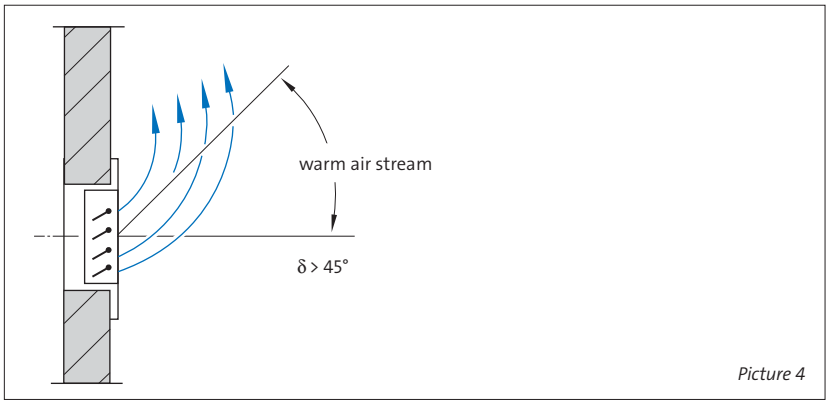
If a ventilation grille integrated into a side wall is more than 0.8 m away from the ceiling, the air that escapes will flow towards the ceiling after a certain distance (Coanda effect).
This also creates a longer airflow path x (trajectory length).



Picture 3

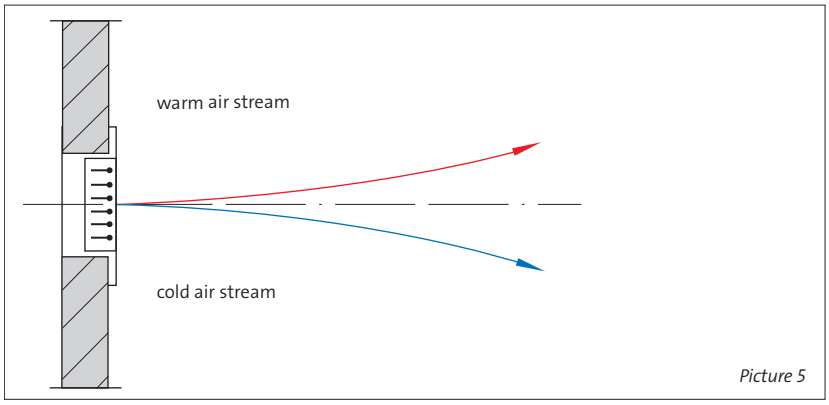
Room airflow / Basics / Method of operation

Picture 4
If the ventilation grille diverts an airflow at an angle of δ > 45°, the air will flow towards the wall where the grille is installed.
The properties of the airflow may also be transferred to the wall and floor in the case of ventilation grilles installed in the same way.



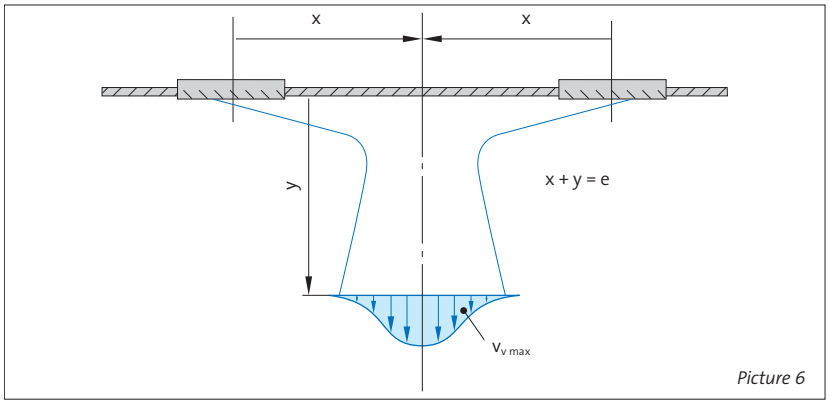
Picture 4

Picture 5
The airflow is affected by not only structural and spatial factors, but also thermal buoyant and output forces. The picture shows a diagram of the direction in which a non-isothermal open jet (i.e. airflow temperature and room air temperature are not at the same level) tends to flow. (See also diagrams “Vertical airflow diversion y (m) due to temperature differences” and “Descent of the ceiling airflows during the cooling operation”).



Picture 5

Picture 6
If two ceiling airflows meet, the max. vertical airflow velocity equals $v_{v\,max}$ after the airflow path x + y = e.



Picture 6

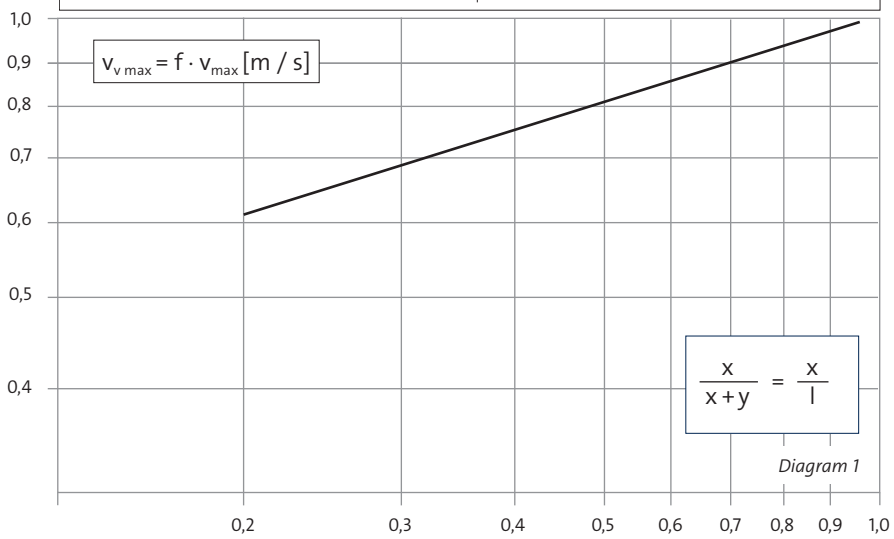
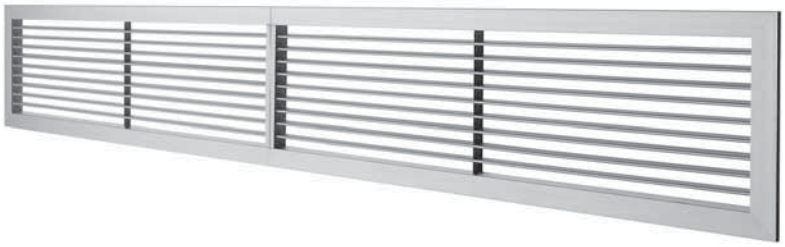


Diagram 1



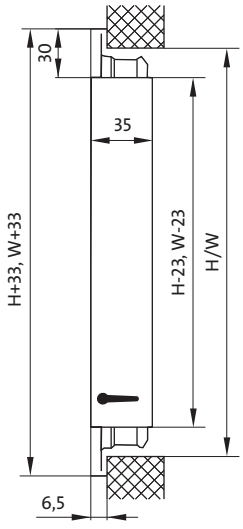
Supply and Exhaust Air Grille G 311
Supply and Exh. Linear Air Grille GB 311

With adjustable aluminium blades in a natural anodized finish (E6C0). Horizontal, individually adjustable front blades. Standard attachments in galvanized material with black baked-finish.
Attached to the subframe with concealed revolving interlock device or recessed screws in the frame.

Supply and Exh. Linear Air Grille GB 311

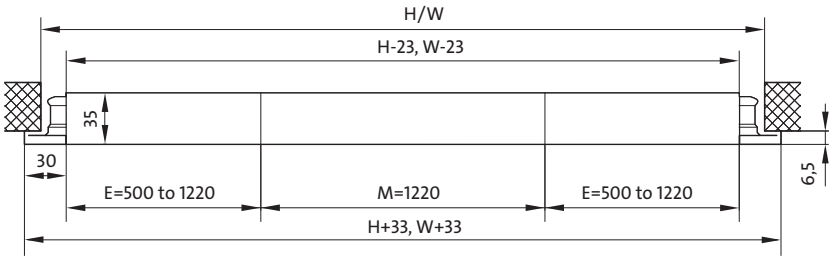
emcoair linear grilles are available in installation-friendly normed sections in the heights 125, 225 and 325 mm. The intermediate sections (“M“) have a fixed length of 1220 mm and the two end sections (”E“) are adjusted to the overall length of the linear grille.
The length of the end sections vary between 500 mm and 1220 mm so that the linear grille could be made up of two end sections.
Standard and special attachments (as per part no.) such as flow rate damper, flap damper, control damper, normal or angled hit-and-miss damper: see cap. emcoair grilles standard- and special attachments.

Supply and Exhaust Air Grille G 311



Installation dimensions with subframe:
H/W = cutout size
Installation dimensions without sub-frame: H/W – 8 mm = cutout size

Supply and Exhaust Linear Air Grille GB 311



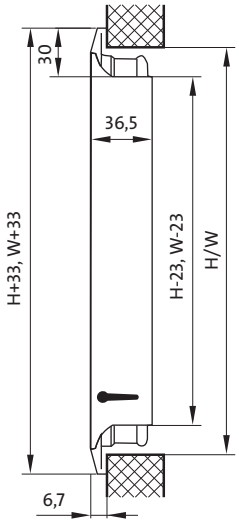
Variants codes (15-digit) Place

G311 = grille or E311 = subframe						1-4
	00 = grille only or					
	L0 = control damper or					
	M0 = flow rate damper or					
	LM = control and flow rate damper or					
	SS = normal hit-and-miss damper or					
	SK = angled hit-and-miss damper					5-6
		0 = evolving interlock device or				
		1 = screw mounting device (at extra cost)				7
			125x0225			
			125x0325	225x0325		
			125x0425	225x0425	325x0425	
			125x0525	225x0525	325x0525	
			125x0625	225x0625	325x0625	
			125x0825	225x0825	325x0825	
			125x1025	225x1025	325x1025	
			125x1225	225x1225	325x1225	= nominal size height x width 8-15
G311	**00**	**0**	**125x0225**	**= example**		

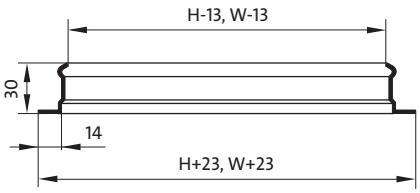
Supply and Exhaust Air Grille G 411
With adjustable steel blades in a white finish (RAL 9010). Horizontal, individual adjustable front blades. Standard attachments in galvanized material with black baked-finish. Attached to the frame with recessed holes in the frame for screw mounting.

Installation dimensions with subframe:
H/W = cutout size
Installation dimensions without subframe: H/W – 5 mm = cutout size

Supply and Exhaust Linear Air Grille G 411



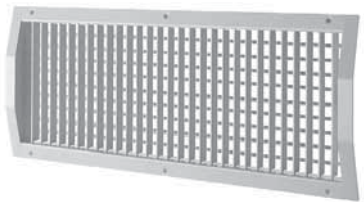
Subframe Model E
for grilles G 311 und G 411



Standard and special attachments (as per part no.) such as flow rate damper, flap damper, control damper, normal or angled hit-and-miss damper: see p. 20.

Variants codes (15-digit)

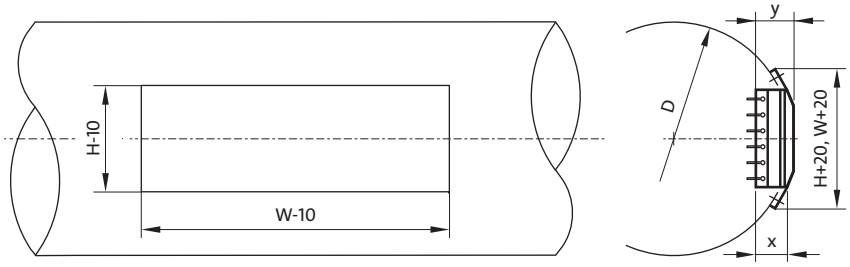
							Place
G411 = grille or E411 = subframe							1-4
	00 = grille only or						
	L0 = control damper or						
	M0 = flow rate damper or						
	LM = control and flow rate damper or						
	SS = normal hit-and-miss damper or						
	SK = angled hit-and-miss damper						5-6
		0 = placeholder					7
			075x0225	125x0225			
			075x0325	125x0325	225x0325		
			075x0425	125x0425	225x0425	325x0425	
			075x0525	125x0525	225x0525	325x0525	
			075x0625	125x0625	225x0625	325x0625	
			075x0825	125x0825	225x0825	325x0825	
			075x1025	125x1025	225x1025	325x1025	
			075x1225	125x1225	225x1225	325x1225	= nominal size height x width 8-15
G411	**00**	**0**	**125x0225**	**= example**			



Supply and Exhaust Air Grille G 418
Made of steel with a specially formed frame for installation in circular ducts. Vertical front blades, horizontal, individually adjustable second row of blades. Standard attachments in galvanized material with black baked-finish. Fixed to the frame with recessed holes in the frame for screw mounting.

Supply and Exhaust Air Grille G 419
Made of steel with a specially formed frame for installation in circular ducts. Vertical, individually adjustable front blades. Standard attachments in galvanized material with black baked-finish. Fixed to the frame with recessed holes in the frame for screw mounting.

Standard and special attachments such as normal or angled hit-and-miss damper: see cap. emcoair grilles standard- and special attachments.



Duct cutout size W – 10 mm /H – 10 mm,
Installation subframe not necessary,
Grille frame outer diameter
= H + 20, W + 20 mm

Height H [mm]	75	125	225
Dimension x [mm]	36	36	36
Dimension y [mm]	37	41	53
Recommend. duct diam. D [mm]	150-400	300-900	600-1900

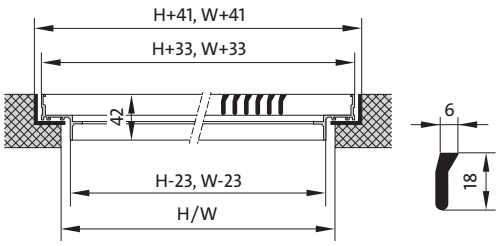
Variants codes (15-digit)

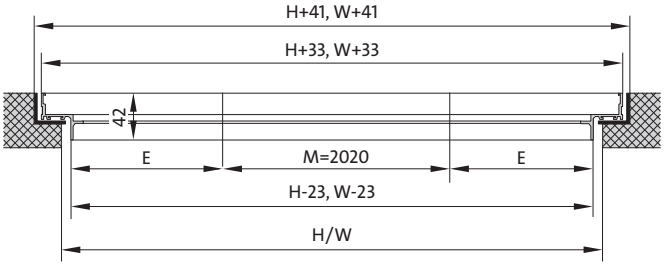
						Place
G418 or G419 = product						1-4
	00 = grille only or					
	SS = normal hit-and-miss damper or					
	SK = angled hit-and-miss damper					5-6
		0 = placeholder				7
			075x0325	125x0325	225x0325	
			075x0425	125x0425	225x0425	
			075x0525	125x0525	225x0525	
			075x0625	125x0625	225x0625	
			075x0825	125x0825	225x0825	
			075x1025	125x1025	225x1025	
			075x1225	125x1225	225x1225 = nominal size height x width	8-15
G418	**00**	**0**	**075x0325**	**= example**		

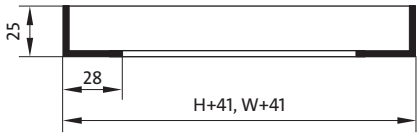
Supply and Exhaust Air Grille G 326
Made of aluminum with rigid longitudinal blades for floor installation. Standard attachments in galvanized material with black baked-finish.

Supply and Exhaust Linear Air Grille GB 326
emco linear grilles are available in installation-friendly normed sections in the heights 75, 125, 225 and 325 mm. The intermediate sections (“M“) have a fixed length of 2020 mm and the two end sections (“E“) are adjusted to the overall length of the linear grille.

Standard and special attachments such as normal or angled hit-and-miss damper: see cap. emcoair grilles standard- and special attachments.







Subframe for floor installation
made of aluminum (AlMgSi 0.5), Dimensions 28 x 25 x 3 mm, unpainted.

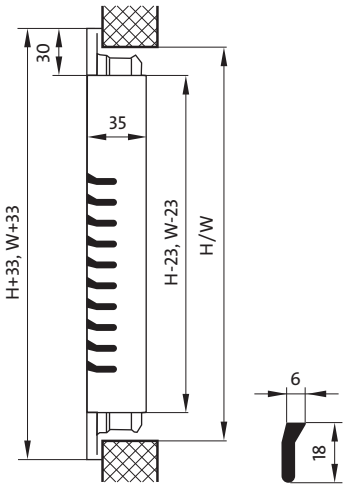
Variants codes (15-digit)

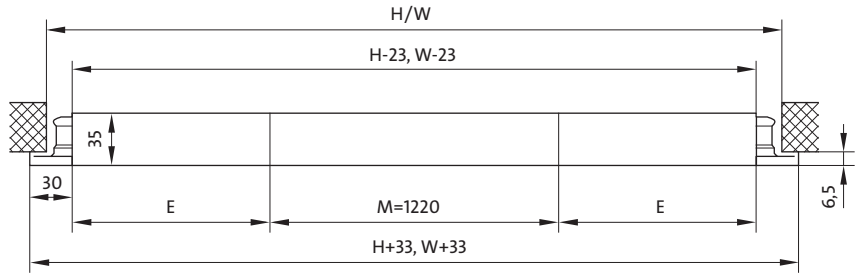
						Place
G326 grille or E326 = subframe						1-4
	00 = grille only or					
	L0 = control damper or					
	M0 = flow rate damper or					5-6
	LM = control and flow rate damper					
		0 = placeholder				7
		075x0225	125x0225			
		075x0325	125x0325	225x0325		
		075x0425	125x0425	225x0425	325x0425	
		075x0525	125x0525	225x0525	325x0525	
		075x0625	125x0625	225x0625	325x0625	
		075x0825	125x0825	225x0825	325x0825	
		075x1025	125x1025	225x1025	325x1025	
		075x1225	125x1225	225x1225	325x1225 = nominal size height x width	8-15
G326	**00**	**0**	**075x0325**	**= example**		

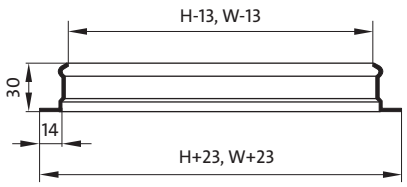
Supply and Exhaust Air Grille G 328
With aluminium blades in a natural anodized finish (E6C0). Rigid horizontal front blades. Standard attachments in galvanized material with black baked-finish.
Attached to the subframe with concealed revolving interlock device or recessed screws in the frame.

Supply and Exhaust Linear Air Grille GB 328
emco linear grilles are available in installation-friendly normed sections in the heights 75, 125, 225 and 325 mm. The intermediate sections ("M") have a fixed length of 1220 mm and the two end sections ("E") are adjusted to the overall length of the linear grille.

Installation dimensions with subframe: H/W = cutout size
Installation dimensions without subframe: H/W – 8 mm = cutout size





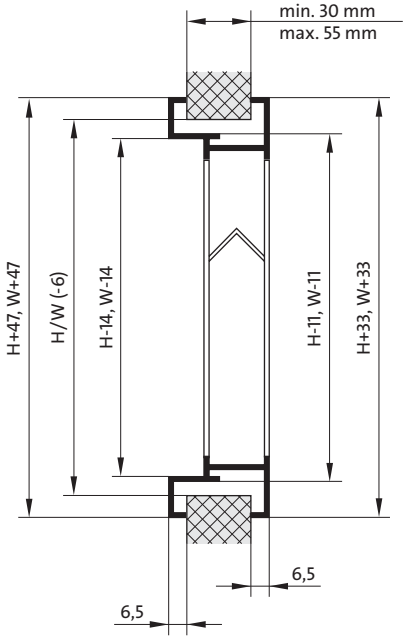


Subframe E
for grille G 328

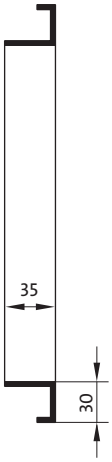
Variants codes (15-digit)

						Place
G328 = grille or E328 = subframe						1-4
	00 = grille only or L0 = control damper or					
	M0 = flow rate damper or LM = control and flow rate damper					5-6
		0 = revolving interlock mounting or 1 = screw mounting (at extra cost)				7
			075x0225	125x0225		
			075x0325	125x0325	225x0325	
			075x0425	125x0425	225x0425	325x0425
			075x0525	125x0525	225x0525	325x0525
			075x0625	125x0625	225x0625	325x0625
			075x0825	125x0825	225x0825	325x0825
			075x1025	125x1025	225x1025	325x1025
			075x1225	125x1225	225x1225	325x1225 = nominal size height x width 8-15
G328	**00**	**0**	**125x0225**	**= example**		

Screening Grille G 329
With fixed horizontal inverted-vee aluminium blades in a natural anodized finish (E6C0) and the corresponding optional frame. Attached to the frame with recessed holes in the frame for screw mounting.



Optional Frame (Standard attachment)



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The emco description of tender can be downloaded in all usable formats
(for example GAEB, PDF, DOC, HTML, DATANORM 5, ÖNORM, TXT, XML) at above named domain.

Variants codes (15-digit)

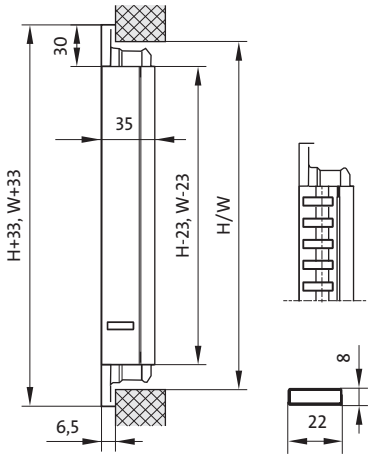
						Place
G329 = product						1-4
	0 = grille only or					
	G = grille with optional frame					5
		00 = placeholder				6-7
			125x0225			
			125x0325	225x0325		
			125x0425	225x0425	325x0425	
			125x0525	225x0525	325x0525	
			125x0625	225x0625	325x0625	
			125x0825	225x0825	325x0825	
			125x1025	225x1025	325x1025	
			125x1225	225x1225	325x1225	= nominal size height x width 8-15
G329	**0**	**0**	**125x0225**	**= example**		

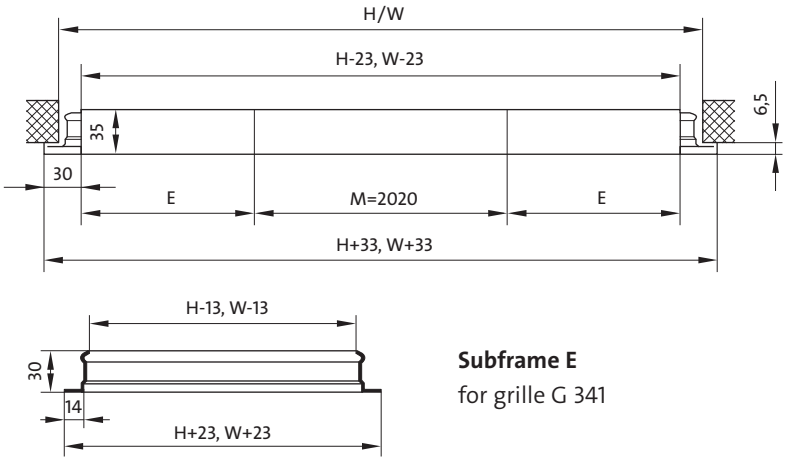
Ventilation Grille G 341
Ventilation grille in a solid, impact-resistant construction (DIN 18032). Standard attachments in galvanized material with black baked-finish. Blades and frame in a natural anodized finish (E6C0). Blade spacing 8 or 12 mm. Attached to the frame with recessed holes in the frame for screw mounting.

Linear Ventilation Grille GB 341
341 emco linear grilles are available in installation-friendly normed sections in the heights 125, 225 and 325 mm. The intermediate sections ("M") have a fixed length of 2020 mm and the two end sections ("E") are adjusted to the overall length of the linear grille.

Standard and special attachments such as flow rate and control damper: see cap. emcoair grilles standard and special attachments.

Installation dimensions with subframe:
H/W = cutout size
Installation dimensions without subframe: H/W – 8 mm = cutout size





Subframe E
for grille G 341

Variants codes (15-digit) — Place

G341 = grille or E341 = subframe						1-4
	00 = only grille or					
	L0 = control damper or					
	M0 = flow rate damper or					
	LM = control and flow rate damper					
		0 = 8 mm blade spacing or				
		1 = 12 mm blade spacing				7
			125x0325	225x0325		
			125x0425	225x0425	325x0425	
			125x0525	225x0525	325x0525	
			125x0625	225x0625	325x0625	
			125x0825	225x0825	325x0825	
			125x1025	225x1025	325x1025	
			125x1225	225x1225	325x1225	= nominal size height x width 8-15
G341	**00**	**0**	**125x0225**	**= example**		

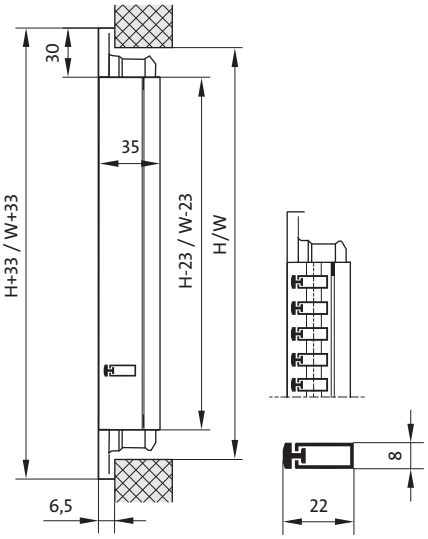
Ventilation Grille G 342
Ventilation grille in a solid, impact-resistent construction (DIN 18032). Blades and standard attachments in galvanized material with black baked-finish. Blade color matches that of the PVC-profile.
Front borders made of PVC. Frame in aluminum natural anodized finish. Following colors are available for PVC borders: aluminum, white, black, brass, bronze and beige. Blade spacing 8 or 12 mm. Attached to the frame with recessed holes in the frame for screw mounting.

Linear Ventilation Grille GB 342
Please refer to detail drawing and description for grille GB 341.

Standard and special attachments such as flow rate and control damper: see cap. emcoair grilles standard and special attachments.

Installation dimensions with subframe: H/W = cutout size
Installation dimensions without subframe: H/W – 8 mm = cutout size

Subframe E
Installation Subframe E for grille G 342 see details for grille G 341



Variants codes (15-digit) — Place

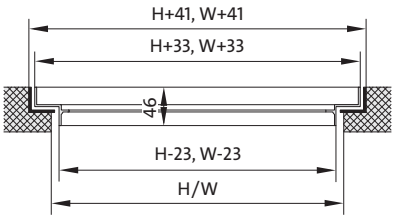
G342 = grille or E342 = subframe						1-4
	00 = only grille or					
	L0 = control damper or					
	M0 = flow rate damper or					
	LM = control and flow rate damper					5-6
		A = 8 mm blade spacing PVC colour: aluminium or				
		B = 8 mm blade spacing PVC colour: white or				
		C = 8 mm blade spacing PVC colour: black or				
		D = 8 mm blade spacing PVC colour: brass or				
		E = 8 mm Stababstand PVC-Farbe: bronze or				
		F = 8mm blade spacing PVC colour: beige or				
		G = 12 mm blade spacing PVC colour: aluminium or				
		H = 12 mm blade spacing PVC colour: white or				
		I = 12 mm blade spacing PVC colour: black or				
		J = 12 mm blade spacing PVC colour: brass or				
		K = 12 mm blade spacing PVC colour: bronze or				
		L = 12 mm blade spacing PVC colour: beige				7
			125x0325	225x0325		
			125x0425	225x0425	325x0425	
			125x0525	225x0525	325x0525	
			125x0625	225x0625	325x0625	
			125x0825	225x0825	325x0825	
			125x1025	225x1025	325x1025	
			125x1225	225x1225	325x1225	= nominal size height x width 8-15
G342	**00**	**A**	**125x0225**	**= example**		

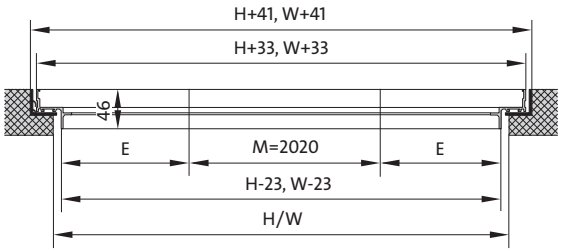
Supply and Exhaust Air Grille G 345
Ventilation grille in a solid, impact-resistant construction (DIN 18032). Standard attachments in galvanized material with black baked-finish. Blades and frame in a natural anodised finish (E6C0). Blade spacing 8 or 12 mm.
Attached to the frame with recessed holes in the frame for screw mounting.

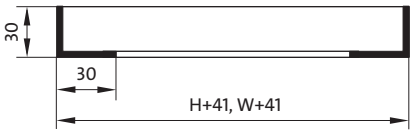
Linear Supply and Exhaust Grille GB 345
emco linear grilles are available in installation-friendly normed sections in the heights 125, 225 and 325 mm. The intermediate sections ("M") have a fixed length of 2020 mm and the two end sections ("E") are adjusted to the overall length of the linear grille.

Standard and special attachments such as flow rate and control damper: see cap. emcoair grilles standard and special attachments.

Installation dimensions with subframe: H/W = cutout size
Installation dimensions without subframe: H/W – 8 mm = cutout size







Subframe E
for grille G 345

Variants codes (15-digit)

						Place
G345 = grille or E345 = subframe						1-4
	00 = only grille or					
	L0 = control damper or					
	M0 = flow rate damper or					
	LM = control and flow rate damper					5-6
		0 = 8 mm blade spacing or				
		1 = 12 mm blade spacing				7
			125x0325	225x0325		
			125x0425	225x0425	325x0425	
			125x0525	225x0525	325x0525	
			125x0625	225x0625	325x0625	
			125x0825	225x0825	325x0825	
			125x1025	225x1025	325x1025	
			125x1225	225x1225	325x1225	= nominal size height x width 8-15
G345	**00**	**0**	**125x0225**	**= example**		

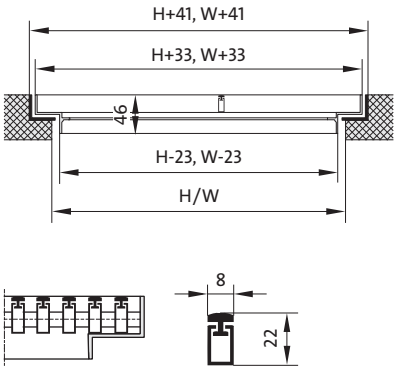
Ventilation Grille G 346
Ventilation grille in a solid, impact-resistant construction (DIN 18032) for floor installation. Blades and standard attachments in galvanized material with black baked-finish. Blade color matches that of the PVC-profile.
Front borders made of PVC. Frame in aluminum natural anodized finish. Following colors are available for PVC borders: aluminum, white, black, brass, bronze and beige. Blade spacing 8 or 12 mm.
Attached to the frame with recessed holes in the frame for screw mounting.

Linear Ventilation Grille GB 346
Please refer to detail drawing and description for grille GB 345.

Standard and special attachments such as flow rate and control damper: see cap. emcoair grilles standard and special attachments.

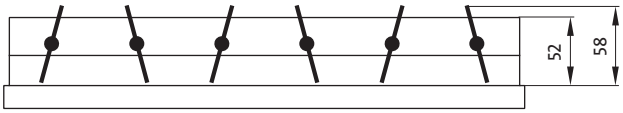
Installation dimensions with sub-frame: H/W = cutout size
Installation dimensions without sub-frame:
H/W – 8 mm = cutout size

Subframe E
for grille G 346: see G 345

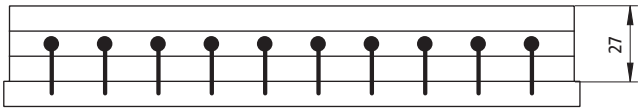


Variants codes (15-digit) — Place

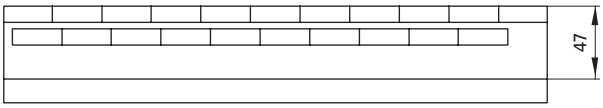
						Place
G346 = grille or E346 = subframe						1-4
	00 = only grille or					
	L0 = control damper or					
	M0 = flow rate damper or					
	LM = control and flow rate damper					5-6
		A = 8 mm blade spacing PVC colour: aluminium or				
		B = 8 mm blade spacing PVC colour: white or				
		C = 8 mm blade spacing PVC colour: black or				
		D = 8 mm blade spacing PVC colour: brass or				
		E = 8 mm Stababstand PVC-Farbe: bronze or				
		F = 8mm blade spacing PVC colour: beige or				
		G = 12 mm blade spacing PVC colour: aluminium or				
		H = 12 mm blade spacing PVC colour: white or				
		I = 12 mm blade spacing PVC colour: black or				
		J = 12 mm blade spacing PVC colour: brass or				
		K = 12 mm blade spacing PVC colour: bronze or				
		L = 12 mm blade spacing PVC colour: beige				7
			125x0325	225x0325		
			125x0425	225x0425	325x0425	
			125x0525	225x0525	325x0525	
			125x0625	225x0625	325x0625	
			125x0825	225x0825	325x0825	
			125x1025	225x1025	325x1025	
			125x1225	225x1225	325x1225	= nominal size height x width 8-15
G346	**00**	**A**	**125x0225**	**= example**		



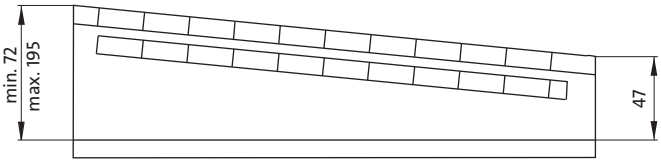
Standard attachment
Flow rate damper M
With opposed blade actions, adjustable from front.



Standard attachment
Control damper L
With vertical or horizontal blades, individually adjustable.



Standard attachment
Hit-or-miss damper SS
With straightening bars, adjustable from front.



Special attachment
Angled hit-or-miss damper SK
With straightening bars and throttle damper which guarantee efficient inflow and exhaust over the area. Standard for grille models G 418 and G 419, available upon request for other models.

Special attachment
Perforated plate baffle LB
Perforated plate with approx. 35% free area for series G 340, models G 411, G 352 and G 452, other free areas upon request.

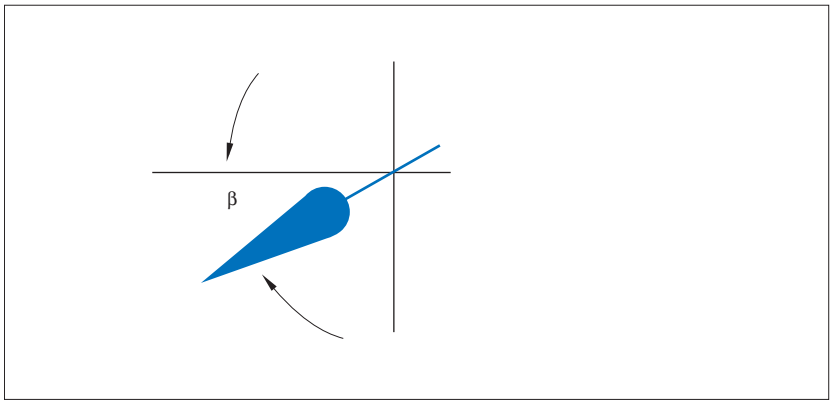
Maximum height of hit-or-miss damper above the grille

Grille height H [mm]	Grille length L [mm]					
	225	325	425	525	625	825
75	72	84	96	96	96	96
125	72	84	96	108	121	145
225	72	84	96	108	121	145
325	72	84	96	108	121	145

Rating:

Airflow spread and division

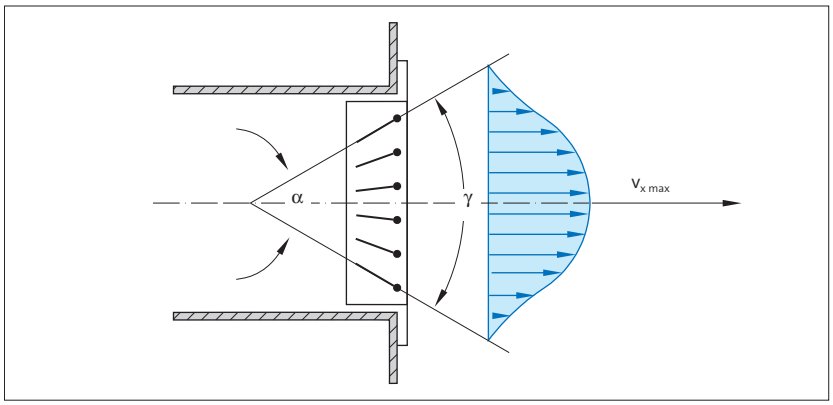
An airflow spread or airflow division can be obtained by means of the adjustment of the front slats of a grille. In this process the airflow path x, the velocity $v_{x\,max}$ in the centre of the airflow and the pressure drop Δp_t is altered depending on the slat angle of incidence β.



Airflow spread

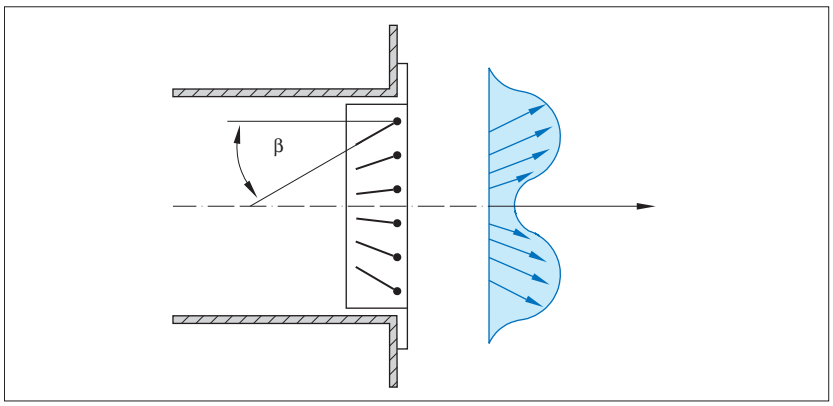
Constantly diverging slats from interior outwards.

Grille aperture angle α	45°	90°
Airflow aperture angle γ	40°	70°



Airflow division

Half of the slats respectively with the same positive or negative angle of incidence β. The airflow is divided into two partial airflows.

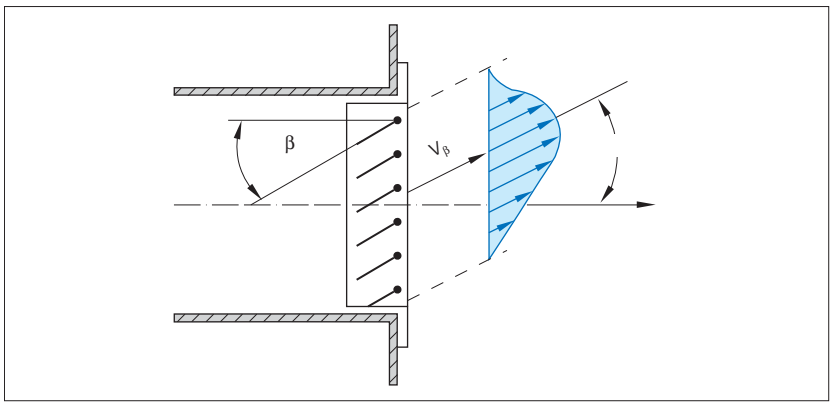


All the slats with the same angle of incidence β

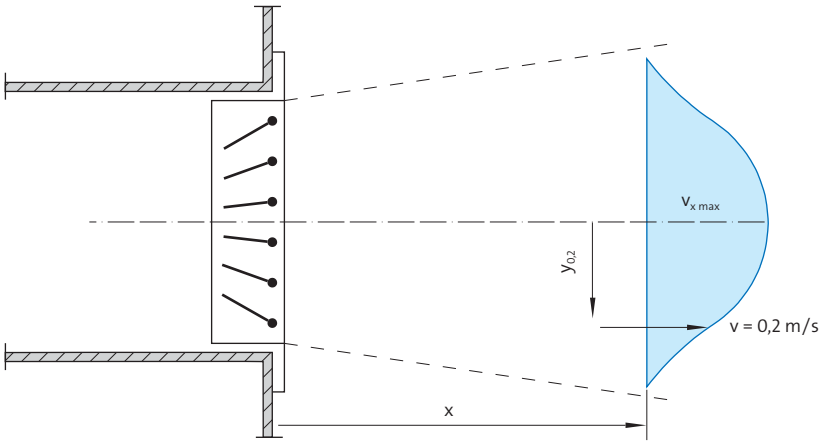
The angle of deflection δ approximately equates to the slat of incidence β (δ ≈ β). The air outgoing speed v_β is greater during the airflow guidance than v_{eff}.

β	0°	15°	30°	45°
K	1,0	1,04	1,15	1,41

$$v_\beta = K \cdot x \cdot v_{eff} \qquad v_{eff} = \frac{\dot{V}_o}{A_{eff}}$$

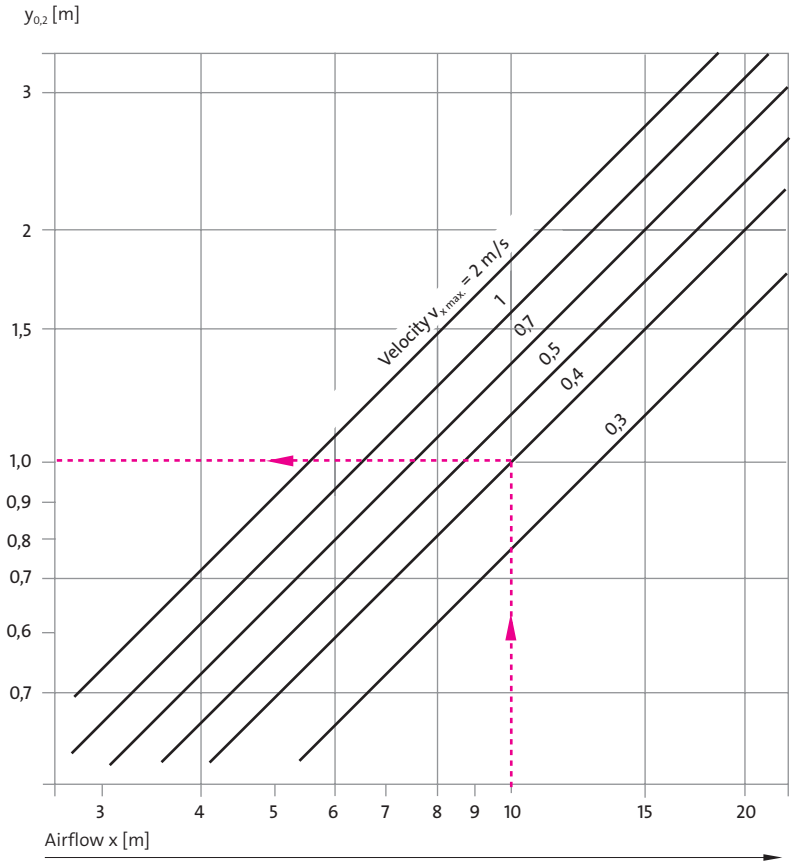


Rating diagrams



Minimum spacing of grilles

Distance from the airflow axis $y_{0.2}$ of an open jet, at which the velocity v ≈ 0,2 m/s. The diagram opposite also applies to ceiling airflows. $y_{0.2}$ therefore specifies the distance from the ceiling at which the velocity v ≈ 0.2 m/s.



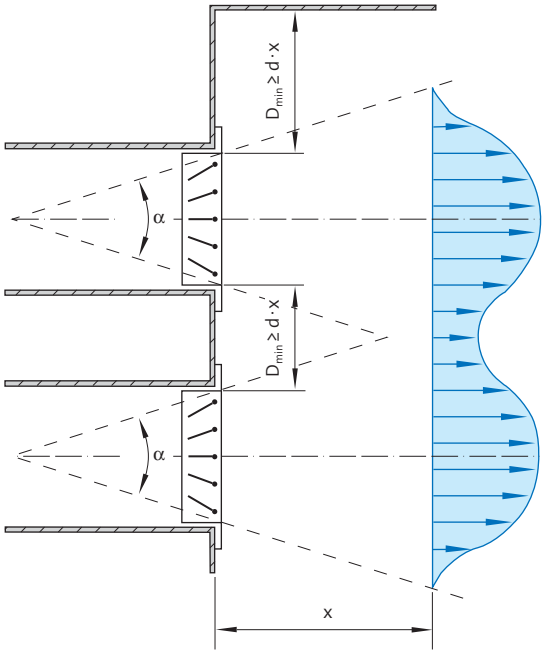
Example

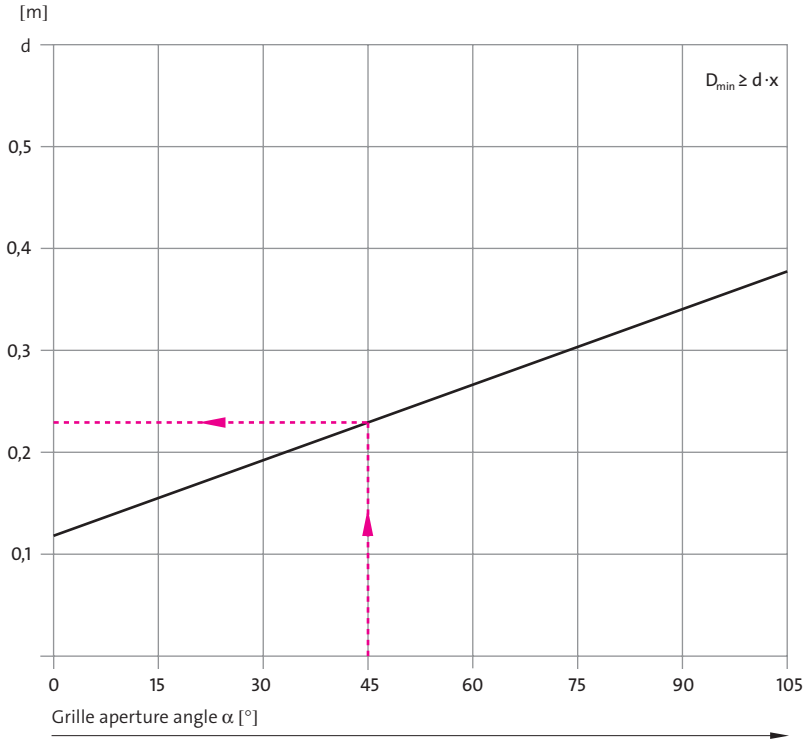
Given: ***An airflow path of x = 10 m with a velocity of $v_{x\,max}$ = 0,4 m/s.***

Required: *Distance from the airflow axis (open jet) or ceiling (ceiling airflow) at which v = 0.2 m/s.*

Solution: *Find the airflow path x = 10 m and the point at which the vertical line from this meets the diagonal line representing $v_{x\,max}$ = 0,4 m/s. From this point, follow the line along to the vertical axis on the left $y_{0,2}$.*

Rating diagrams





Minimum spacing of grilles

If the gaps between the individual grilles is less than D_{min}, then the outflows which are emitted can be concentrated into a single airflow and achieve a greater range than that of an individual grille.
If the gap D_{min} of a grille to a side wall or ceiling is undershot then the outflow will also be spread and achieves greater ranges.

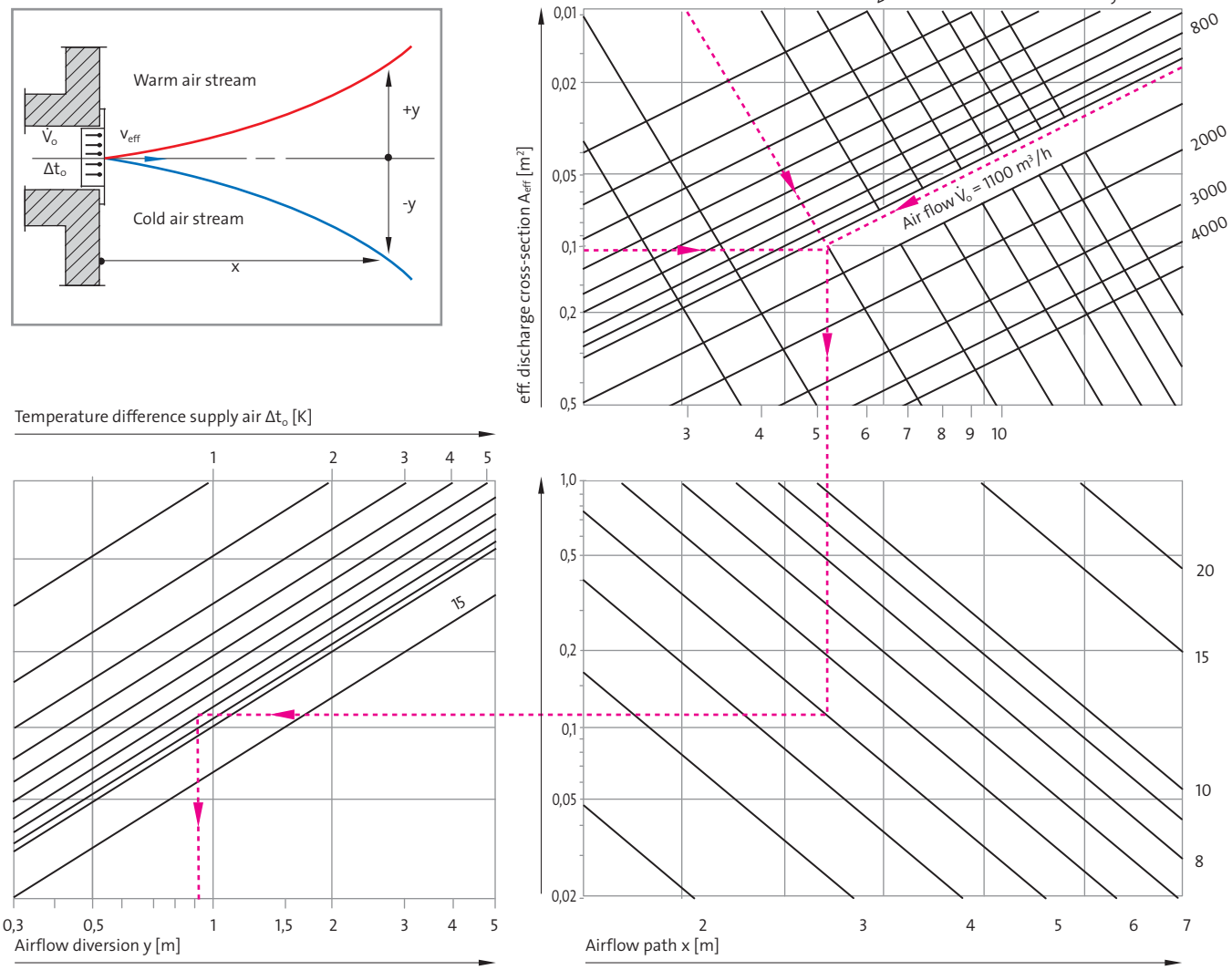
Example

If, in the case of a grille aperture angle of α = 45°, the airflow paths of neighbouring individual airflows x = 7 m, but the airflows are not concentrated into a single airflow, then it is necessary to select a minimum gap of $D_{min} \geq 0{,}23 \times 7 \geq 1{,}6$ m between the grilles.

Rating diagrams

Vertical airflow diversion y (m) due to temperature differences

The open jet characteristics described in the selection diagrams generally only apply to isothermal airflows.
The non-isothermal open jet that is blown in horizontally is diverted in a vertical direction by lifting and descending forces which are caused by the temperature differences between the stream air and the room air.



Example

Given: ***Individual grille where A_{eff} = 0,1 m², v_{eff} = 3 m/s (or. $\dot{V}_o$ = 1100 m³/h), airflow path x = 5 m nd supply air temperature difference Δt_o = 8 K.***

Required: *Airflow diversion y [m]*

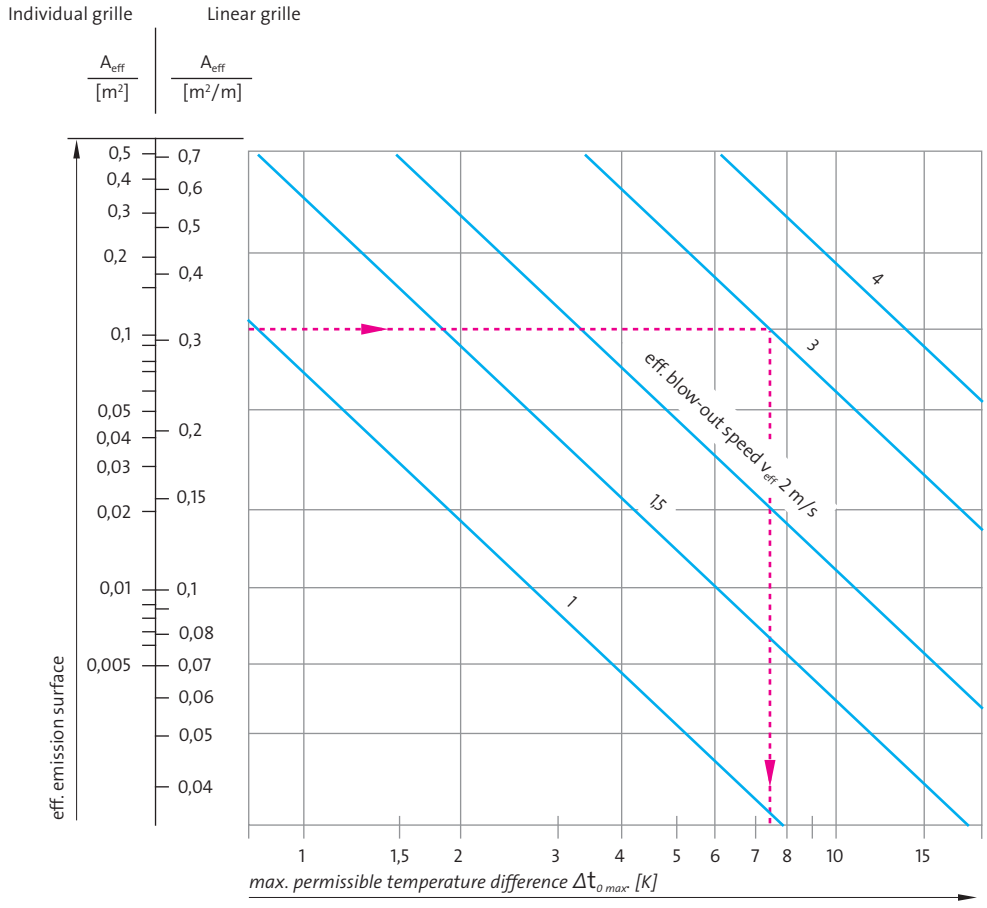
Solution: *Find the A_{eff} -value of 0.1 m². From this point, go horizontally to the right until you reach the point of intersection with the line representing v_{eff} = 3 m/s or $\dot{V}_o$ = 1100 m³/h, and then down vertically until you reach the point of intersection with the line x = 5 m. From this point, go horizontally to the left until you find the point of intersection with the line for Δt_o = 8 K. The airflow diversion value of 0.9 m is located vertically underneath the point of intersection.*

Note:
In the case of grilles with slats angled in different directions, the airflow diversion y changes in relation to grille aperture angle α; $y = y_{Diagr.}/C$.

Rating diagrams

Descent of the ceiling airflows during the cooling operation

Cold air streams, that are blown in immediately below the ceiling, only adhere to the ceiling if the temperature difference $\Delta t_{0\,max}$ (temperature difference between the incoming air and the room air) that can be read from the adjacent diagram is not exceeded.



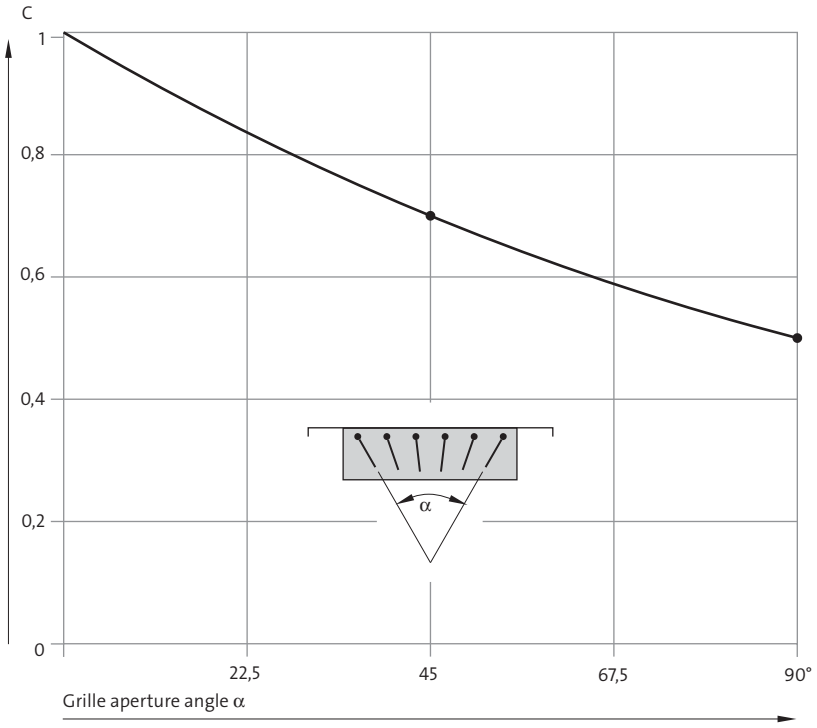
Example

Given: ***Individual grille where A_{eff} = 0.1 m², v_{eff} = 3 m/s***

Required: *Maximum permissible difference in temperature $\Delta t_{0\,max}$ between supply air and room air, at which the airflow adheres to the ceiling.*

Solution: *Find the A_{eff} -value for an individual grille of 0.1 m². From this point, go horizontally to the right until you reach the point of intersection with the line representing v_{eff} = 3 m/s. The max. permissible temperature difference $\Delta t_{0\,max}$ of 7.5 K is located vertically underneath this point.*

Rating diagrams



If the slats of a grille are set so that they diverge then various different layout parameters change:

Induction: $i_\alpha = i_{Diagram} / C$

Temperature ratio:
$\Delta t_{xmax} / \Delta t_0 = C \cdot x \cdot (\Delta t_{xmaxDiagram} / \Delta t_0)$

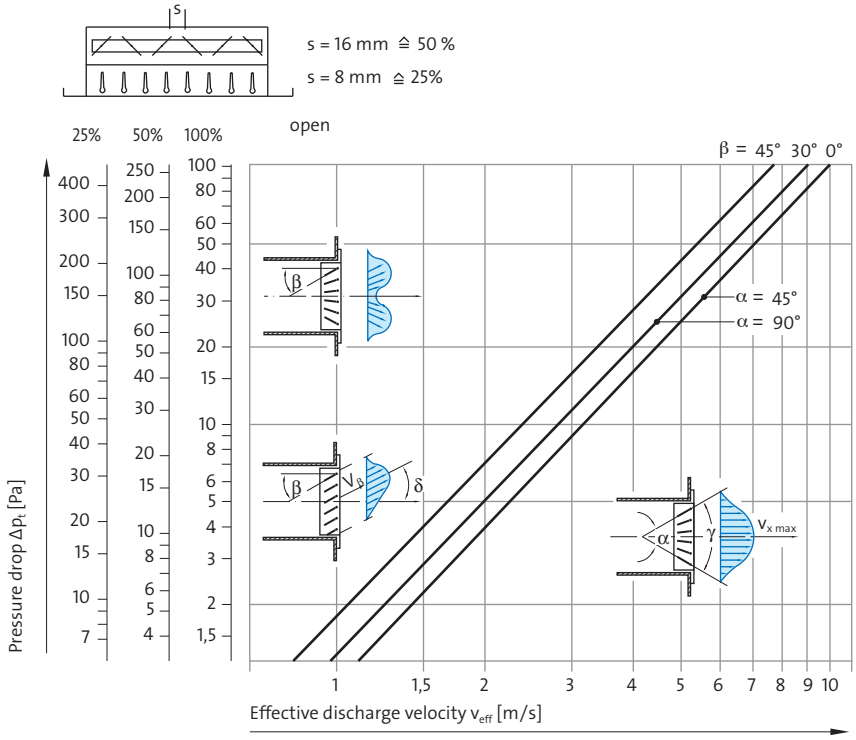
Velocity: $v_{xmax} = C \cdot x \cdot v_{xmaxDiagram}$

The acoustic power level L_{WA} is increased by

ΔL = 1 dB (A) at α = 45°

ΔL = 3 dB (A) at α = 90°

Pressure drop for grilles with flow rate damper, airflow division and airflow spread



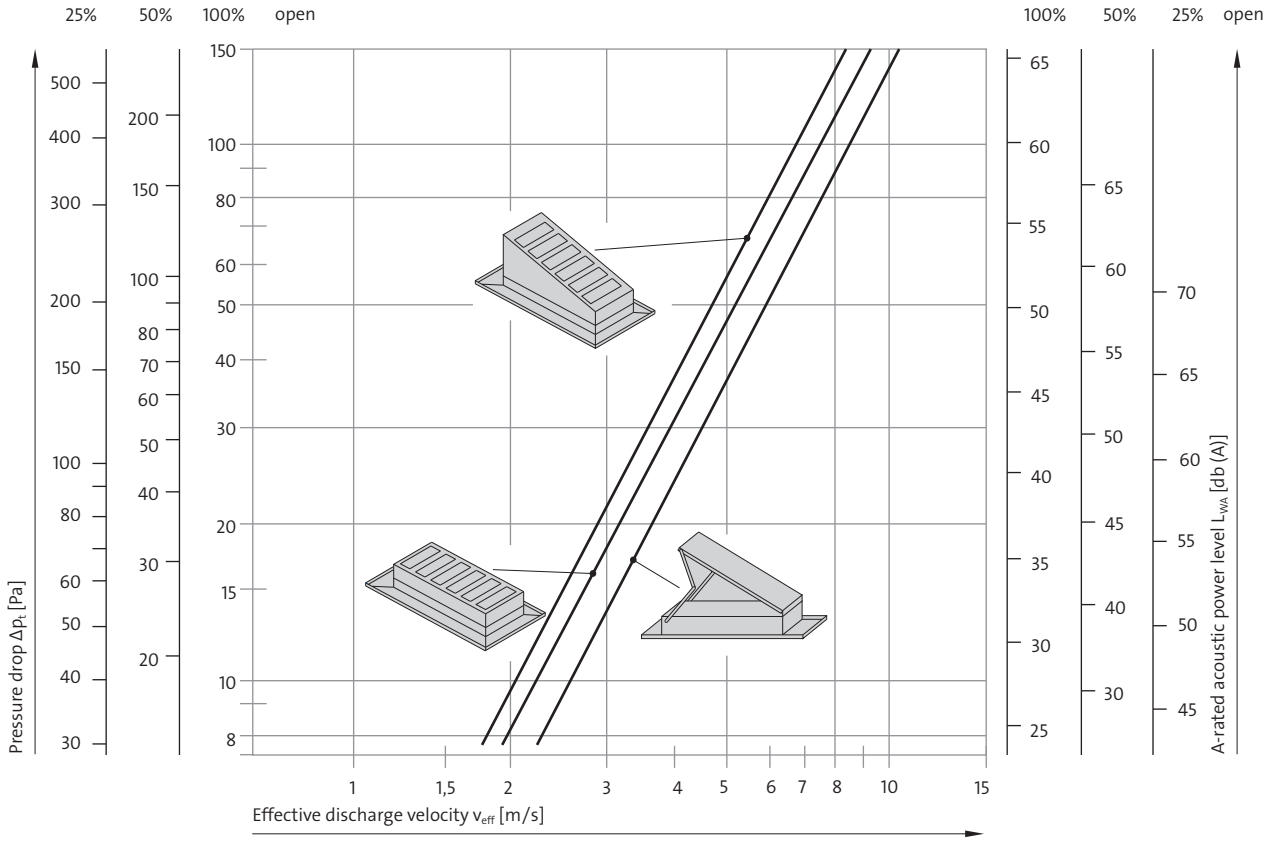
This diagram can be used to determine the pressure drop level for grilles with a flow rate damper as well as the pressure drop level that results from airflow diversion and airflow spread.

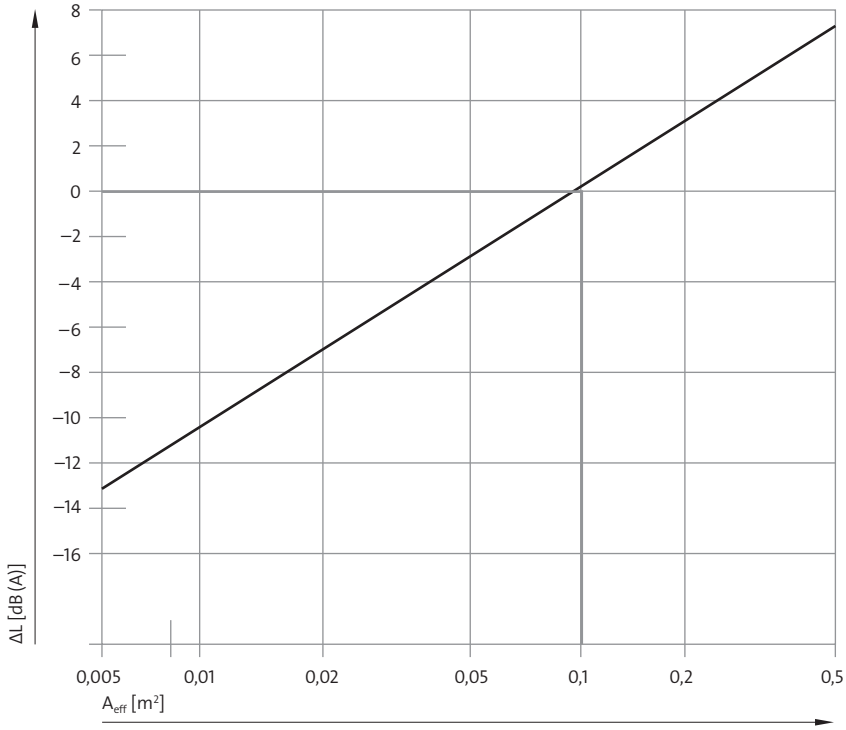
Grille aperture angle α	45°	90°
Airflow aperture angle γ	40°	70°

$v_\beta = K \cdot x \cdot v_{eff}$ $\qquad v_{eff} = \frac{\dot{V}_o}{A_{eff}}$

Rating diagrams

Pressure drop and acoustic power level for grilles with volume control



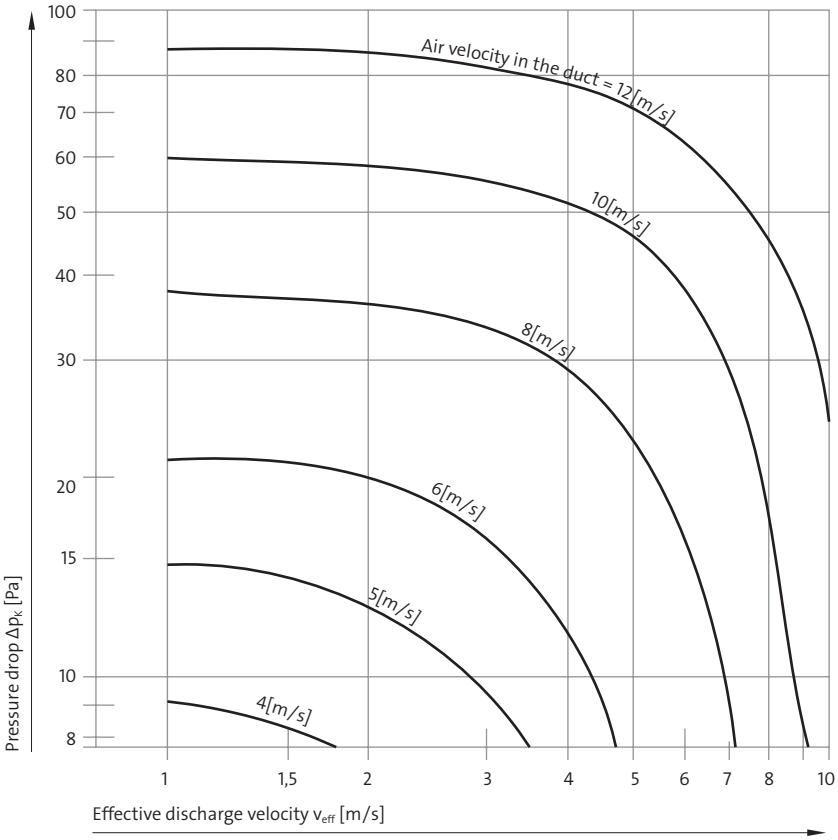


Acoustic power levels listed in above diagram $L_{WA\ Diagram}$ are valid for grilles with an effective discharge cross-section of A_{eff} = 0.1 m².
Grilles with other discharge cross-sections can be determined with the following equation:

$L_{WA} = L_{WA\ Diagr.} + \Delta L$

Rating diagrams

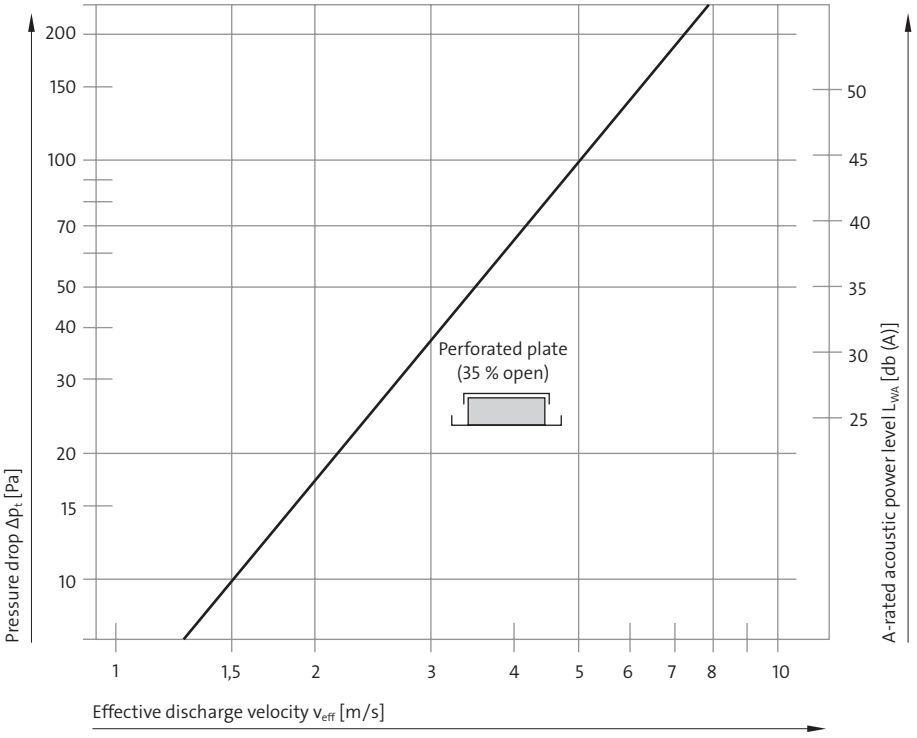
Pressure drop



If the air speed in the conduit is greater than the blowout speed v_{eff} then the pressure drop is increased in accordance with the following equation:

$\Delta p_t = \Delta p_{t\ Diagram} + \Delta p_K$

Pressure drop and acoustic power level for grilles with perforated plate



Individual grilles without ceiling effect

The values in the chart are valid for individual grilles without ceiling or wall effect and a grille opening angle of $\alpha = 0°$.

Make the following corrections for grilles with ceiling or wall effect or with other opening angles:

$v = v_{Diagram} \cdot 1.4$

$\Delta T_{xy}/\Delta T_0 = (\Delta T_{xy}/\Delta T_0)_{Diagram} \cdot 1.4$

$i = i_{Diagram} \cdot 0.7 \quad i = \dot{V}_{xy}/\dot{V}_0$

$x = x_{Diagram} \cdot 0.5 \quad$ at $\alpha = 45°$

$x = x_{Diagram} \cdot 0.35 \quad$ at $\alpha = 90°$

The following is valid for linear grilles:

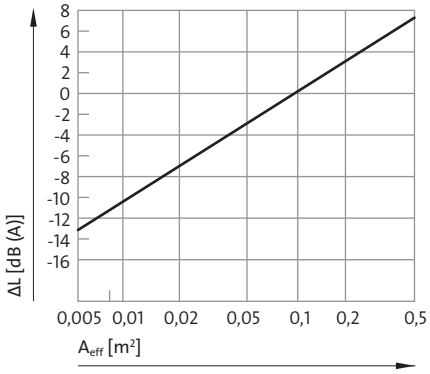
$v_{Band} \cong 0.5 \cdot \sqrt{x} \cdot v_{Grille}$

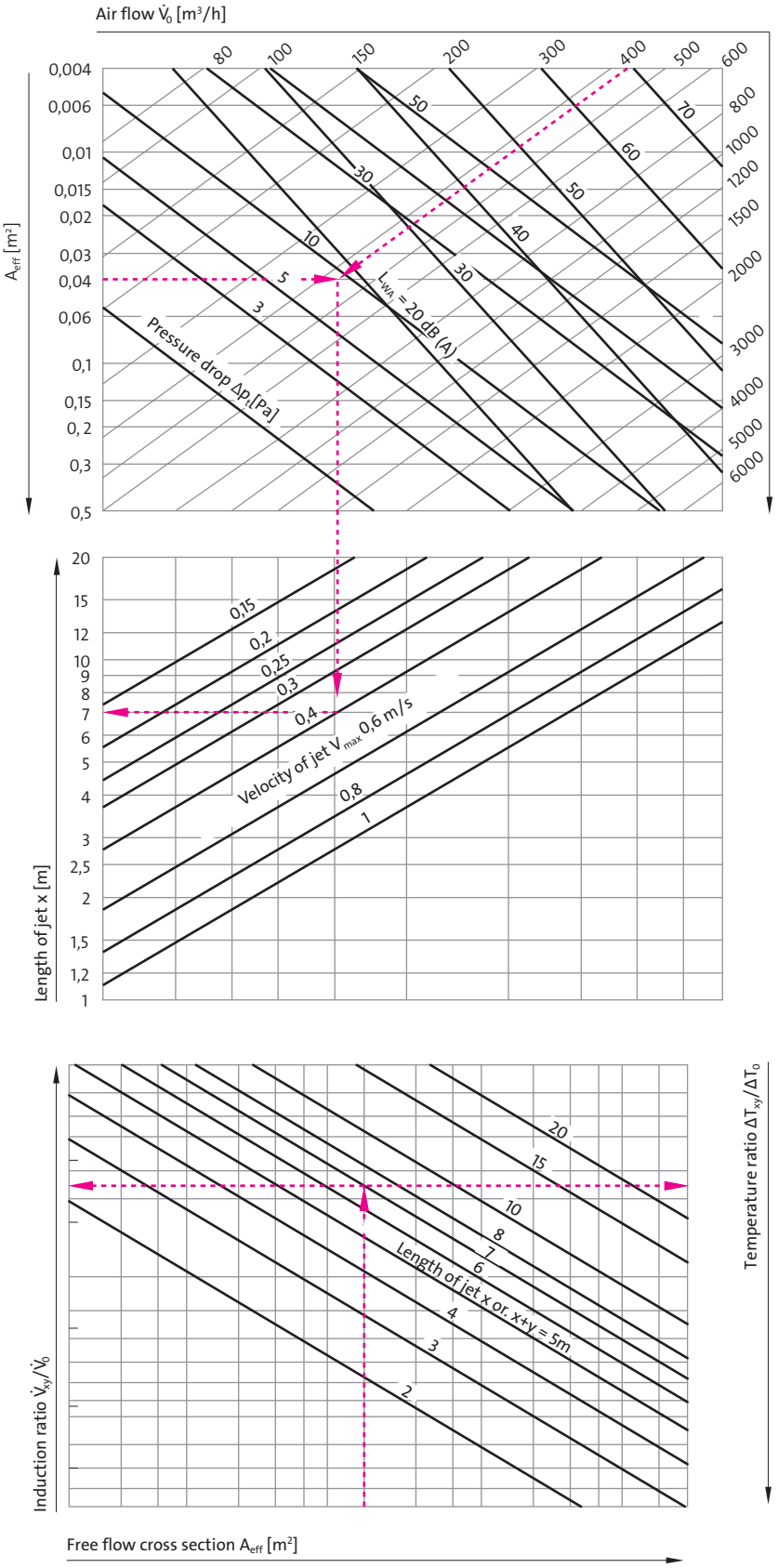
$i_{Band} \cong 1.7 \cdot 1/\sqrt{x} \cdot i_{Grille}$

Sound power level for grilles with a discharge cross-section which deviates from $A_{eff} = 0{,}1\ m^2$ can be determined with the following equation:

$L_{WA} = L_{WA\ Diagram} + \Delta L$

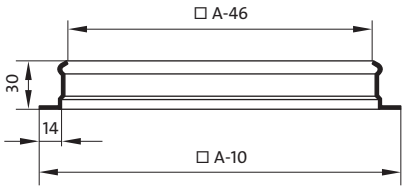
Please refer to the chart below for the correction value ΔL.

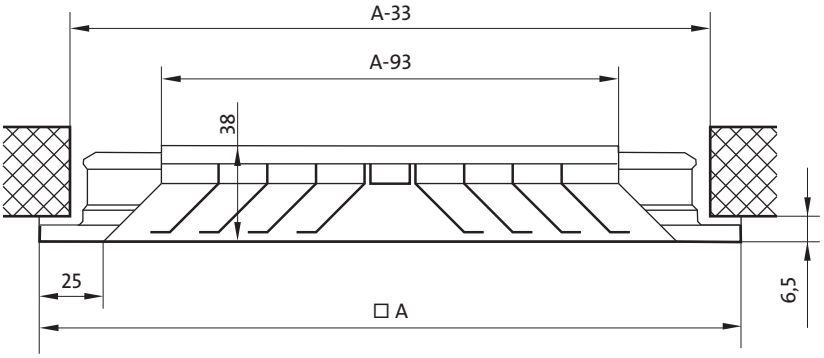




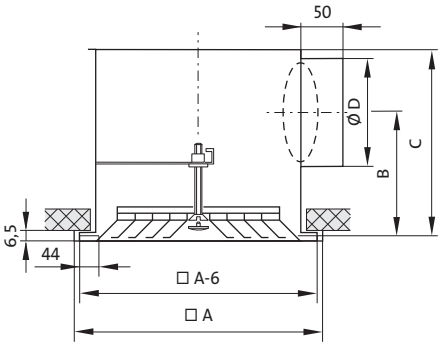
Ceiling Diffuser G 352
Made of aluminum with natural anodized finish (E6C0). Has fixed blades and frame. Standard attachments in galvanized material with black baked finish, galvanized steel plenum box.
Fixing without a plenum box is done via a central screw in combination with a mounting element for duct spigots (central hole is standard), or with four screws in the frame. Please indicate option when ordering.

Subframe E
for grilles G 352 and G 452





Ceiling Diffusers G 352 /G 452 with plenum box



Nominal size DN	300	400	500	600	625
Dimension ☐ A [mm]	298	398	498	598	623
A_{eff} [m²]	0.024	0.054	0.093	0.143	0.161

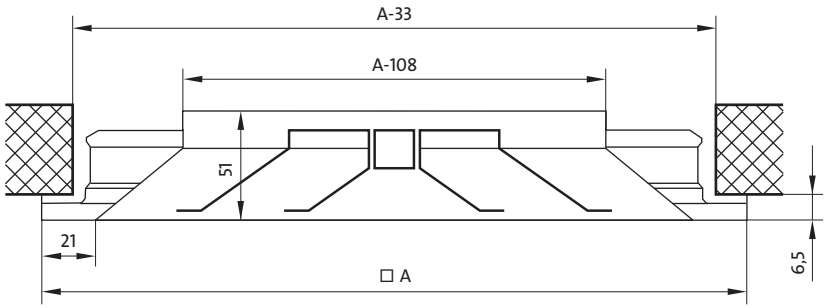
Spacing of slats: 25 mm

Nominal size DN	300	400	500	600	625
Dimension ☐ A [mm]	298	398	498	598	623
Dimension B [mm]	170	190	203	215	215
Dimension C [mm]	275	315	340	365	365
Dim. Ø D [mm]	158	198	222	248	248
G 352 AK Weight [kg]	2.2	5.2	8.0	10.4	11.3
G 342 AK Weight [kg]	3.7	6.0	9.2	12.1	13.1

Ceiling Diffuser G 452

Made of galvanized material, coated in RAL 9010 white finish. With fixed blades and frame. Standard attachments in galvanized material with black baked finish, galvanized steel plenum box.

Fixing without a plenum box is done via a central screw in combination with a duct mounting subframe for the duct spigots (central hole is standard), or with four screws in the frame. Please indicate option when ordering.



Nominal size DN	300	400	500	600	625
Dim. □ A [mm]	298	398	498	598	623
A_{eff} [m²]	0.024	0.047	0.078	0.118	0.124

Spacing of slats: 50 mm

Variants codes (15-digit)

	Place
G352 = ceiling diffuser or	1-4
K352 = duct cross bar or	
E352 = subframe or	
G452 = ceiling diffuser or	
K452 = duct cross bar or	
E452 = subframe	
000 = only diffuser or	
M00 = flow rate damper or	
AKS = plenum box, side spigot or	
AKO = plenum box, top spigot	5-7
0 = fixing with central screw or	
1 = screw holes in cover plate	8
0000 = placeholder	9-12
300, 400, 500, 600 = nominal size DN	13-15

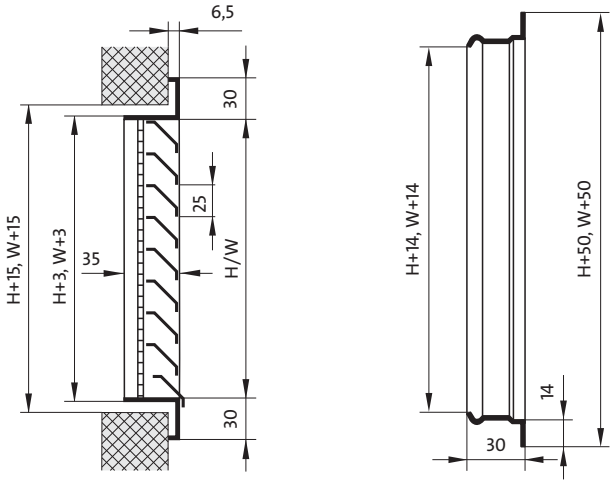
G452 000 0 0000 300 = example

External Weather Resistant Grille G 361

Lightweight external weather resistant grille made of aluminium (AlMgSi 0.5) with natural anodized finish (E6CO), rear-mounted galvanized wire mesh guard, approximately 49% free cross-section (based on W x H).

Installation

Attached to the frame or subframe (factory norm) via recessed holes for screw mounting. When using the subframe: H + 25 mm and W + 25 mm.



www.emco.de/de-en/klima

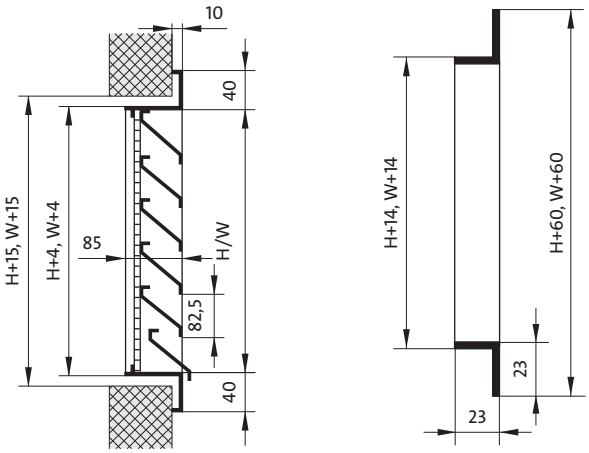
The emco description of tender can be downloaded in all usable formats (for example GAEB, PDF, DOC, HTML, DATANORM 5, ÖNORM, TXT, XML) at above named domain.

Variants codes (15-digit) — Place

G361 = grille or E361 = subframe												1-4
000 = placeholder												5-7
098x0198	098x0298	098x0398	098x0498	098x0598	098x0698	098x0798	098x0898	098x0998	098x1098	098x1198		
198x0198	198x0298	198x0398	198x0498	198x0598	198x0698	198x0798	198x0898	198x0998	198x1098	198x1198		
298x0198	298x0298	298x0398	298x0498	298x0598	298x0698	298x0798	298x0898	298x0998	298x1098	298x1198		
398x0198	398x0298	398x0398	398x0498	398x0598	398x0698	398x0798	398x0898	398x0998	398x1098	398x1198		
498x0198	498x0298	498x0398	498x0498	498x0598	498x0698	498x0798	498x0898	498x0998	498x1098	498x1198		
598x0198	598x0298	598x0398	598x0498	598x0598	598x0698	598x0798	598x0898	598x0998	598x1098	598x1198		
= nominal size height x width												8-15
G361	**000**	**098x0198**	**= example**									

External Weather Resistant Grille
G 363
Lightweight external weather resistant grille made of aluminium (AlMgSi 0.5) rear-mounted galvanized wire mesh guard, approximately 60% free cross-section (based on W x H).

Installation
Recessed holes for screw mounting in the frame and/or galvanized sub-frame with wall anchor (factory norm).
When using the subframe:
H + 30 mm and W + 30 mm.



Variants codes (15-digit) — Place

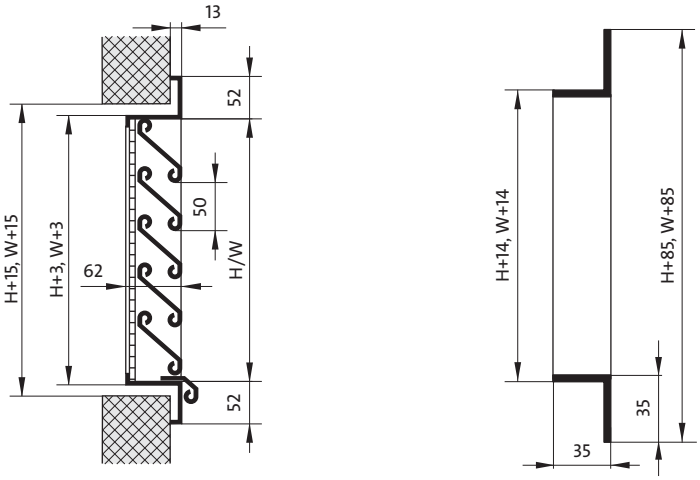
G363 = grille or E363 = subframe											1-4
	00 = placeholder										5-6
		0330x0385	0330x0585	0330x0785	0330x0985	0330x1185	0330x1385	0330x1585	0330x1785	0330x1985	
		0495x0385	0495x0585	0495x0785	0495x0985	0495x1185	0495x1385	0495x1585	0495x1785	0495x1985	
		0660x0385	0660x0585	0660x0785	0660x0985	0660x1185	0660x1385	0660x1585	0660x1785	0660x1985	
		0825x0385	0825x0585	0825x0785	0825x0985	0825x1185	0825x1385	0825x1585	0825x1785	0825x1985	
		0990x0385	0990x0585	0990x0785	0990x0985	0990x1185	0990x1385	0990x1585	0990x1785	0990x1985	
		1155x0385	1155x0585	1155x0785	1155x0985	1155x1185	1155x1385	1155x1585	1155x1785	1155x1985	
		1320x0385	1320x0585	1320x0785	1320x0985	1320x1185	1320x1385	1320x1585	1320x1785	1320x1985	
		1485x0385	1485x0585	1485x0785	1485x0985	1485x1185	1485x1385	1485x1585	1485x1785	1485x1985	
		1650x0385	1650x0585	1650x0785	1650x0985	1650x1185	1650x1385	1650x1585	1650x1785	1650x1985	
		1815x0385	1815x0585	1815x0785	1815x0985	1815x1185	1815x1385	1815x1585	1815x1785	1815x1985	
		1980x0385	1980x0585	1980x0785	1980x0985	1980x1185	1980x1385	1980x1585	1980x1785	1980x1985	
		= nominal size height x width									7-15
G363	**00**	**0330x0385**	**= example**								

Heavy External Weather Resistant Grille G 463

Heavy external weather resistant grille of galvanized material with a rear-mounted wire mesh guard. Approximately 58% free cross-section (based on W x H). Also available as linear grille.

Installation

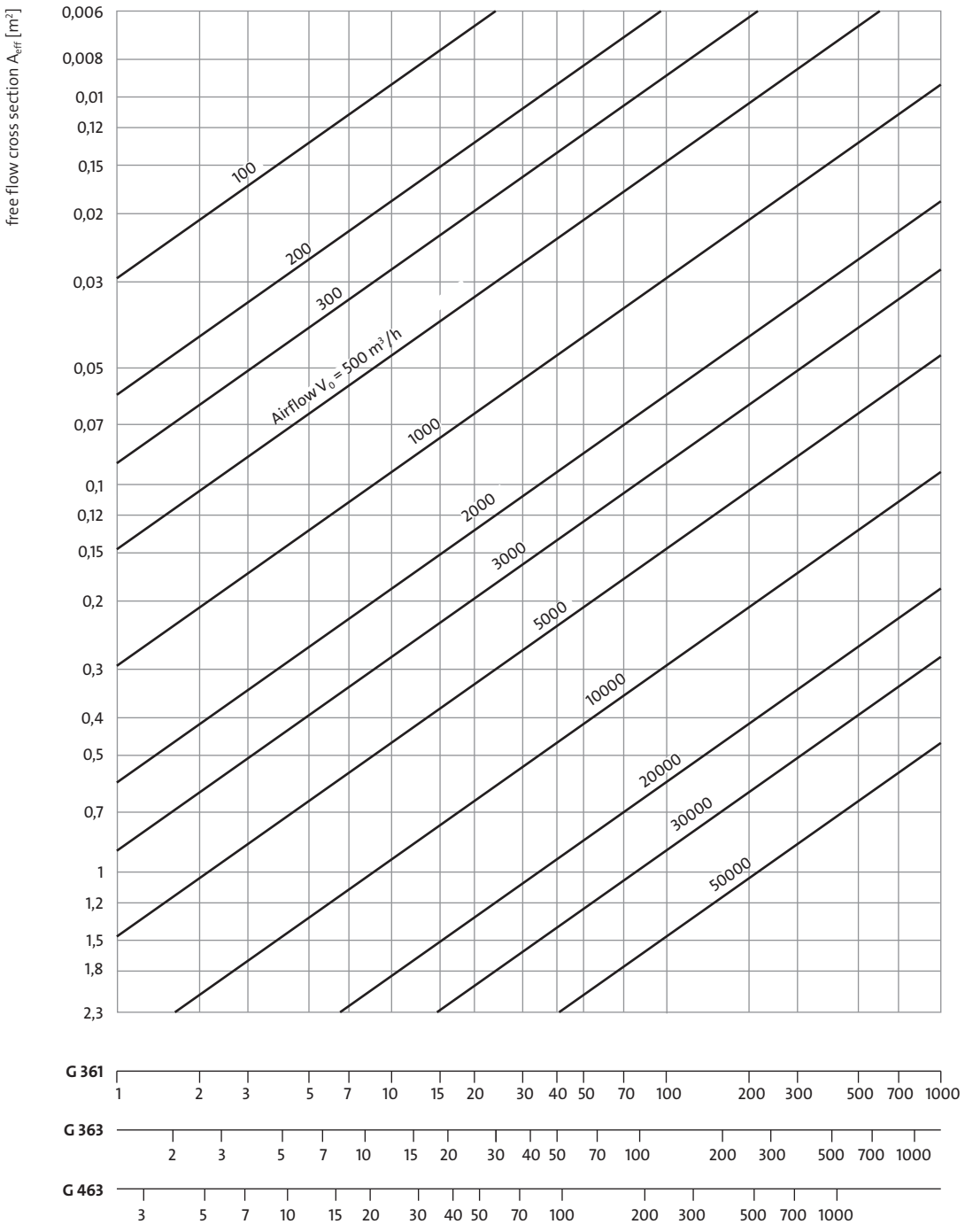
Recessed holes for screw mounting in the frame and/or galvanized subframe with wall anchor (factory norm).
When using the subframe:
H + 30 mm and W + 30 mm.



Variants codes (15-digit) Place

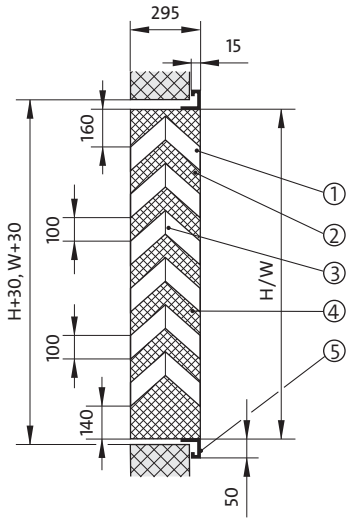
G463 = grille or E463 = subframe										1-4
	00 = placeholder									5-6
	0330x0385	0330x0585	0330x0785	0330x0985	0330x1185	0330x1385	0330x1585	0330x1785	0330x1985	
	0495x0385	0495x0585	0495x0785	0495x0985	0495x1185	0495x1385	0495x1585	0495x1785	0495x1985	
	0660x0385	0660x0585	0660x0785	0660x0985	0660x1185	0660x1385	0660x1585	0660x1785	0660x1985	
	0825x0385	0825x0585	0825x0785	0825x0985	0825x1185	0825x1385	0825x1585	0825x1785	0825x1985	
	0990x0385	0990x0585	0990x0785	0990x0985	0990x1185	0990x1385	0990x1585	0990x1785	0990x1985	
	1155x0385	1155x0585	1155x0785	1155x0985	1155x1185	1155x1385	1155x1585	1155x1785	1155x1985	
	1320x0385	1320x0585	1320x0785	1320x0985	1320x1185	1320x1385	1320x1585	1320x1785	1320x1985	
	1485x0385	1485x0585	1485x0785	1485x0985	1485x1185	1485x1385	1485x1585	1485x1785	1485x1985	
	1650x0385	1650x0585	1650x0785	1650x0985	1650x1185	1650x1385	1650x1585	1650x1785	1650x1985	
	1815x0385	1815x0585	1815x0785	1815x0985	1815x1185	1815x1385	1815x1585	1815x1785	1815x1985	
	1980x0385	1980x0585	1980x0785	1980x0985	1980x1185	1980x1385	1980x1585	1980x1785	1980x1985	
	= nominal size height x width									7-15
G463	**00**	**0330x0385**	**= example**							

G 361/G 363/G 463 - Rating diagram



Calculate the effective flow cross section:

G 361: A_{eff} [m²] = W [mm] x (H - 25) [mm] x 0.49 x 10^{-6}
G 363: A_{eff} [m²] = W [mm] x (H - 82.5) [mm] x 0.60 x 10^{-6}
G 463: A_{eff} [m²] = W [mm] x (H - 66) [mm] x 0.58 x 10^{-6}



① Blade
② Perforated plate (not applicable with melamine filling)
③ Wire mesh / gutter
④ Filling: mineral wool or melamine
⑤ Surrounding angle flange 50 x 50 x 3 (accessories)

Sound-attenuating external grille SWG

Sound-attenuating external grille SWG consists of a sendzimir galvanized steel plate with sound-attenuating mineral wool or plastic (melamine), covered with glass fibre, a perforated metal plate and an integrated wire mesh guard. Available upon request in aluminium, stainless steel or a painted finish (RAL).

Areas of Application

This grille is suitable for use in all applications where high sound-attenuation, low flow resistance and minimal penetration depths are required:

- Supply and exhaust air openings in air conditioning systems in building shells
- Machine and other technical rooms
- Sound-insulated booths and housing
- Ventilation openings in circuit / distribution stations
- Boiler houses
- Car parks
- As a shield in refrigerated warehouses and condenser units

SWG is best used in situations with air velocities of up to 1.0 m/s (based on area H x W).

Variants codes (15-digit)

										Place
SWG = product										1-3
	AL = aluminium or ST = galvanized steel									4-5
		0 = placeholder								6
		0400x0600	0400x0900	0400x1200	0400x1500	0400x1800	0400x2100	0400x2400		
		0600x0600	0600x0900	0600x1200	0600x1500	0600x1800	0600x2100	0600x2400		
		0800x0600	0800x0900	0800x1200	0800x1500	0800x1800	0800x2100	0800x2400		
		1000x0600	1000x0900	1000x1200	1000x1500	1000x1800	1000x2100	1000x2400		
		1200x0600	1200x0900	1200x1200	1200x1500	1200x1800	1200x2100	1200x2400		
		1400x0600	1400x0900	1400x1200	1400x1500	1400x1800	1400x2100	1400x2400		
		1600x0600	1600x0900	1600x1200	1600x1500	1600x1800	1600x2100	1600x2400		
		1800x0600	1800x0900	1800x1200	1800x1500	1800x1800	1800x2100	1800x2400		
		2000x0600	2000x0900	2000x1200	2000x1500	2000x1800	2000x2100	2000x2400		
		2200x0600	2200x0900	2200x1200	2200x1500	2200x1800	2200x2100	2200x2400		
		2400x0600	2400x0900	2400x1200	2400x1500	2400x1800	2400x2100	2400x2400	= height x width	7-15
SWG	**AL**	**0**	**0400x0600**	**= example**						

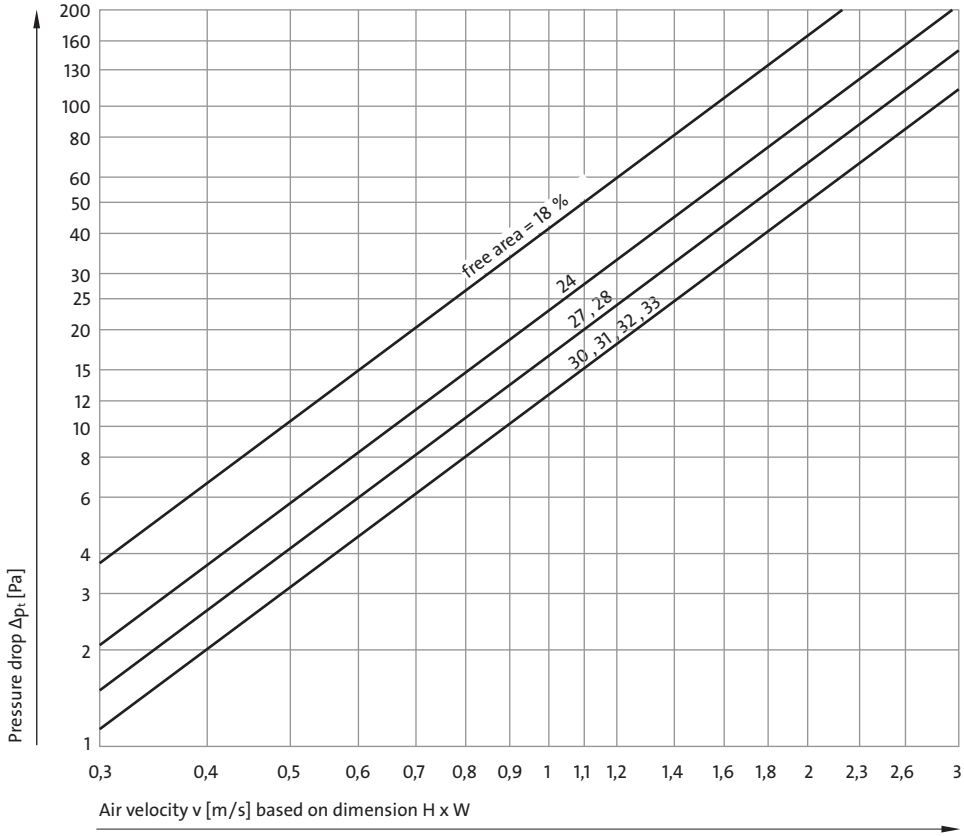
Grille SWG Aerodynamic data and weights

Height [mm]	Width [mm]														free area in [%]
	600		900		1200		1500		1800		2100		2400		
	m [kg]	A_{eff}[cm²]	m [kg]	A_{eff}[cm²]	m [kg]	A_{eff}[cm²]	m [kg]	A_{eff}[cm²]	m [kg]	A_{eff}[cm²]	m [kg]	A_{eff}[cm²]	m [kg]	A_{eff}[cm²]	
400	15	426	21	639	26	852	32	1065	38	1278	44	1491	49	1704	18
600	22	852	31	1278	39	1704	48	2130	56	2556	65	2982	73	3408	24
800	29	1278	41	1917	52	2556	63	3195	74	3834	86	4473	97	5112	27
1000	37	1704	51	2556	65	3408	79	4260	93	5112	107	5964	121	6816	28
1200	44	2130	61	3195	77	4260	94	5325	111	6990	128	7455	145	8520	30
1400	51	2556	71	3834	90	5112	110	6390	129	7668	149	8946	169	10224	30
1600	58	2982	81	4473	103	5964	125	7455	148	8946	170	10437	192	11928	31
1800	65	3408	91	5112	116	6816	141	8520	166	10224	191	11928	216	13632	32
2000	73	3834	101	5754	129	7668	156	9585	184	11502	212	13419	240	15336	32
2200	80	4260	111	6390	141	8520	172	10650	203	12780	233	14910	264	17040	32
2400	87	4686	121	7029	154	9372	188	11715	221	14058	254	16401	288	18744	32

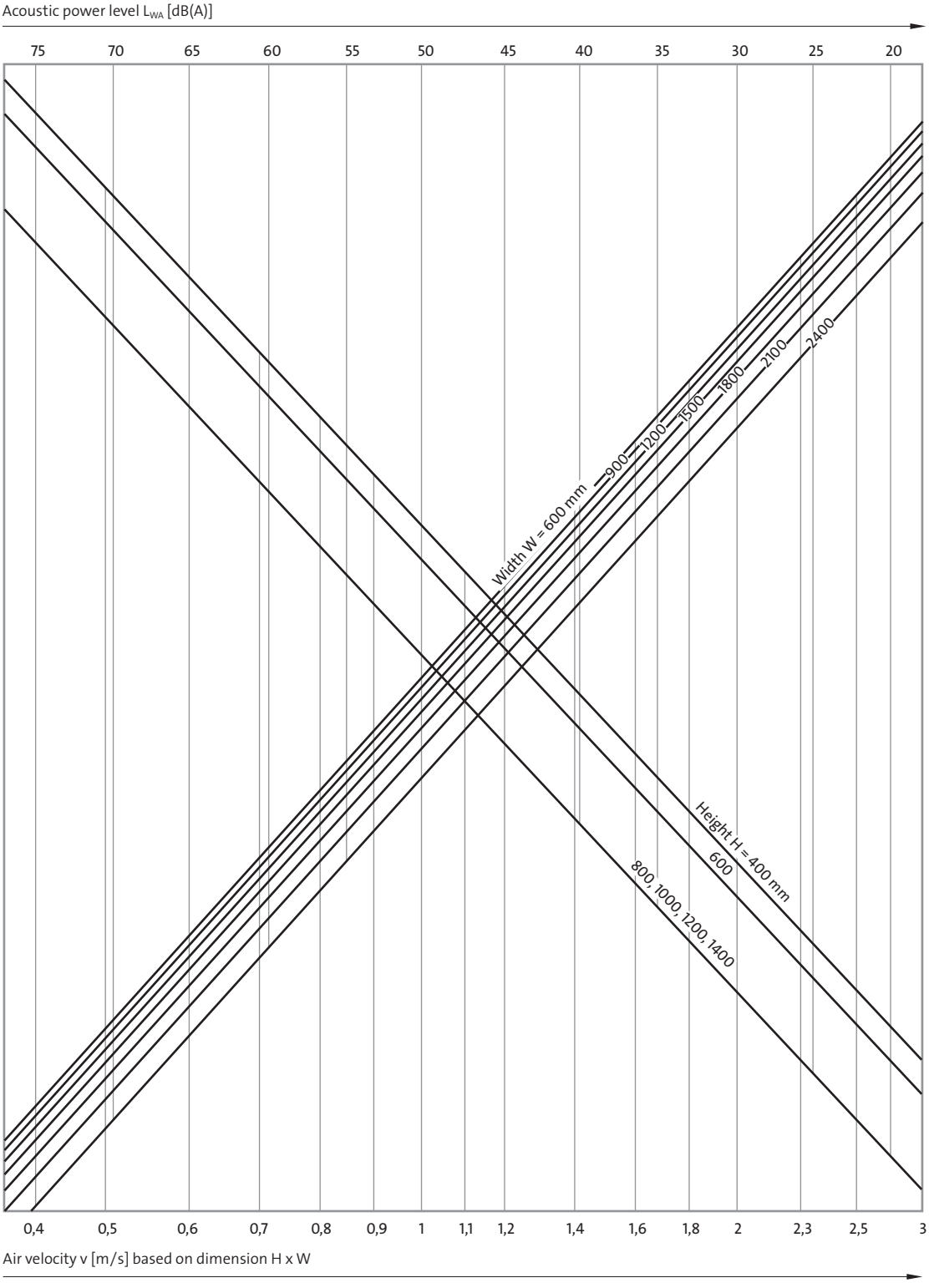
Sound Absorption Dimensions R according to DIN 52210-75 / Insertion Attenuation D_e

Material	$f_{m, okt}$ [Hz]	63	125	250	500	1 K	2 K	3,15 K	R_W [dB]
Mineral wool	R [dB]	-	5	7	13	19	22	22	17
Mineral wool	$D_{e,okt}$ [dB]	3	5	8	12	16	19	21	-
Flamex	R [dB]	-	5	7	13	22	23	21	18
Flamex	$D_{e,okt}$ [dB]	5	5	8	11	15	20	20	-

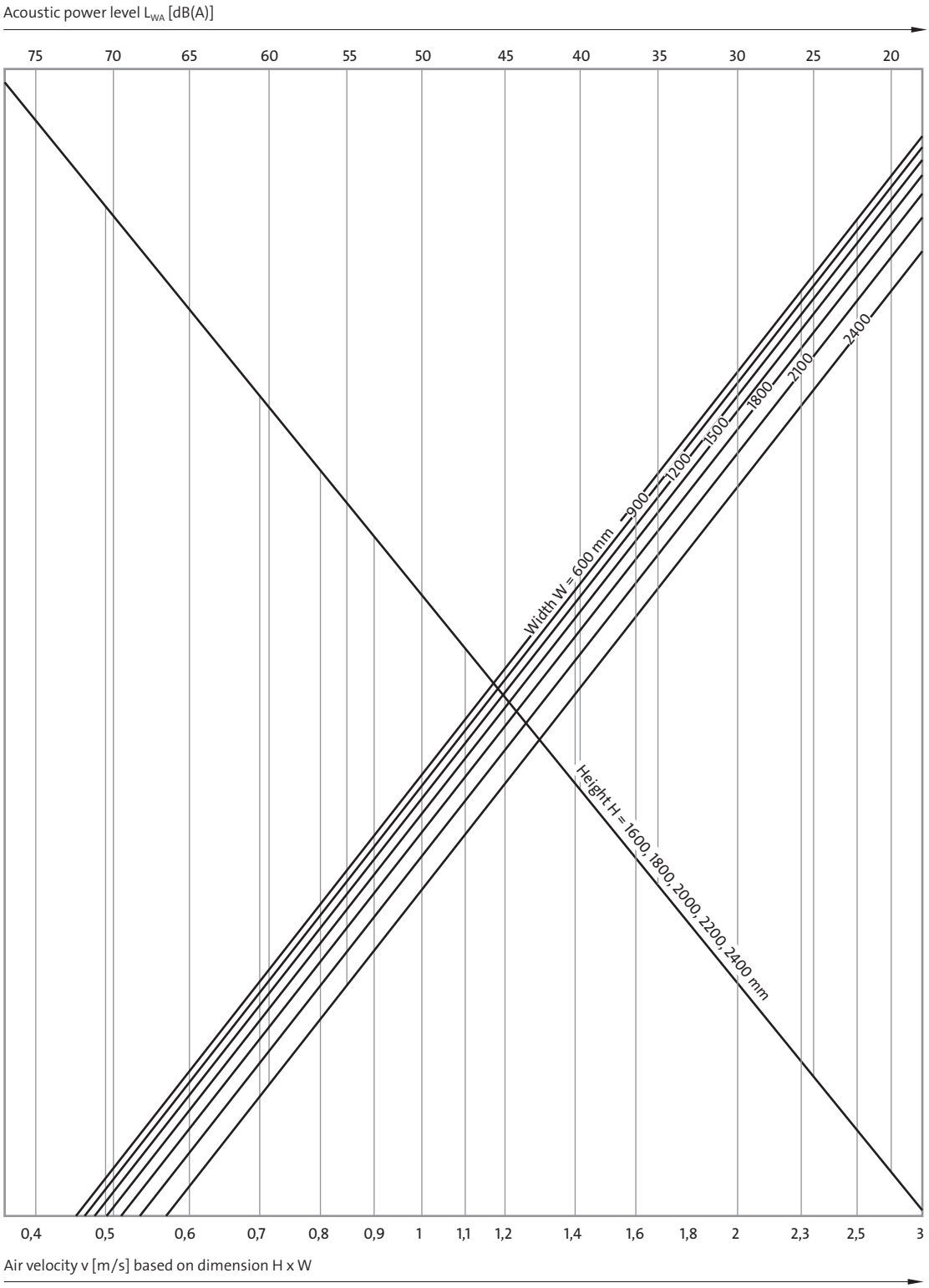
SWG diagram
Pressure drop in dependence on air velocity



Sound-attenuating External Grille Model SWG – acoustic power level
Height of the grids: 0.4 m–1.4 m

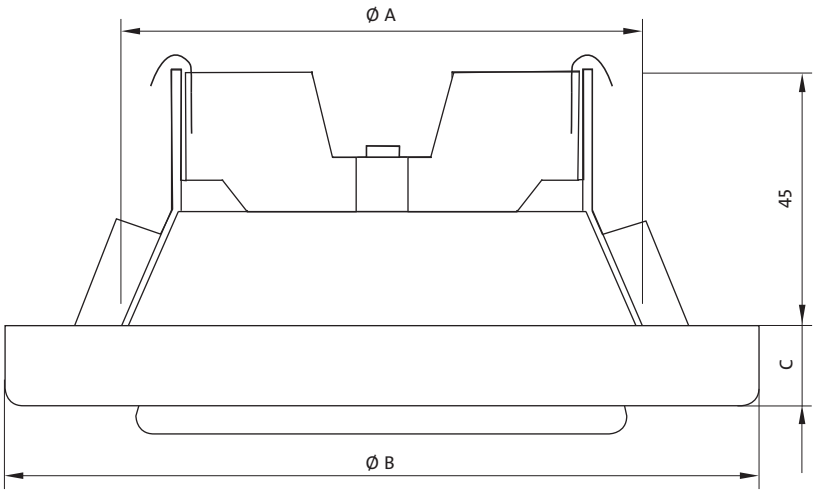


Sound-attenuating External Grille Model SWG – acoustic power level
Height of the grids: 1.6 m – 2.4 m



Disc Valve ALV
Disc valve ALV is suitable for use in all types of ventilation systems. It consists of a wedge-shaped inlet with inlet ring for wall mounting as well as a closable valve cone. The disc valve is made of powder-coated sheet steel (RAL 9010). ALV can generally be clipped directly onto the duct. An installation ring is necessary for size DN 200, but is optional for all other sizes.

Volume flow setting
Rotating the central disc changes the A spacing. Please refer to the design graphs for the correlation between pressure drop and volume flow in various central disc positions.



Nominal size DN	80	100	125	160	200
Dimension Ø A [mm]	80	100	125	160	200
Dimension Ø B [mm]	106	135	160	194	238
Dimension C [mm]	15	15	15	15	18

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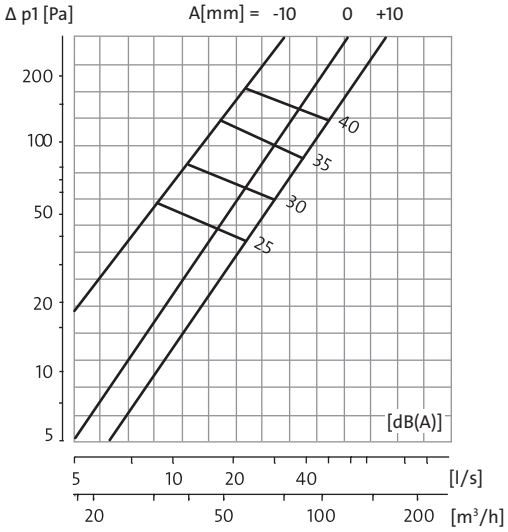
The emco description of tender can be downloaded in all usable formats (for example GAEB, PDF, DOC, HTML, DATANORM 5, ÖNORM, TXT, XML) at above named domain.

Variants codes (15-digit)

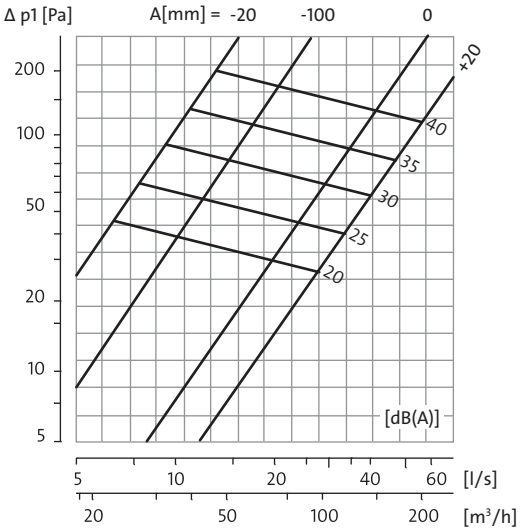
		Place
ALV = product		1-4
	0 = disc valve only or E = installation ring	
	00000000 = placeholder	5-12
	080, 100, 125, 160, 200 = nominal size DN	13-15
ALV	**0** 00000000 **080**	

Pressure drop and acoustic power level diagram

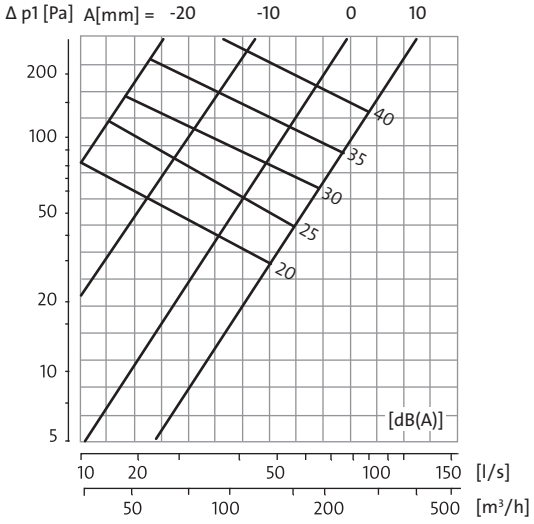
ALV 080



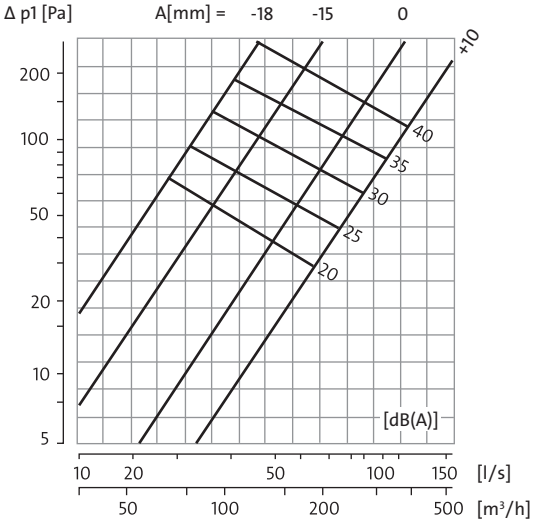
ALV 100



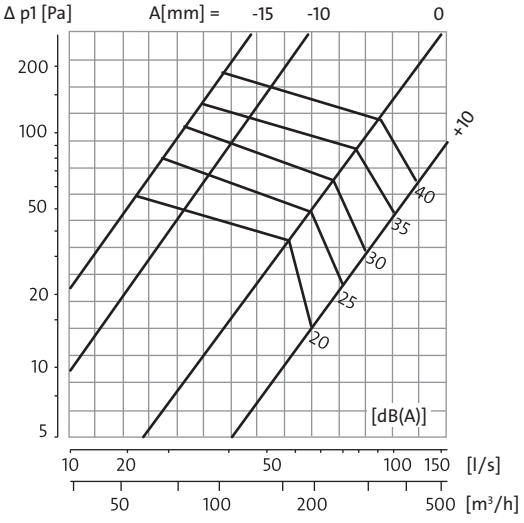
ALV 125



ALV 160



ALV 200



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emco Bau- und Klimatechnik GmbH & Co. KG

Postfach 1860

D-49803 Lingen (Ems)

Tel. +49 / 591 91 40-0

Fax +49 / 591 91 40-851

klima@emco.de

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