

KOOLAIR

series

30

Linear grilles

ISO 9001

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Sistema de Gestión



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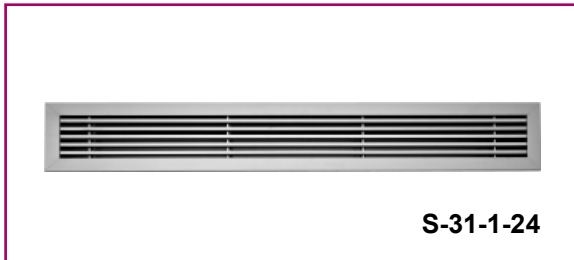


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Linear grilles



S-31-1-24

Description

Type 31-1 aluminium grilles, fixed blades, deflection 0°.
Type 31-15 aluminium grilles, fixed blades, deflection 15°.

Finishes

Anodised aluminium in its natural colour.
Special finishes available upon request.

Dimensions for use with mounting frame

When the grilles are fixed with a metal frame, the size of the opening corresponds to the nominal size of the grilles. For example, a grille of 500 x 300 would require an opening of the same dimensions.

Dimensions for screw mounting

When the grilles are fixed with screws, the size of the opening corresponds to the nominal size of the grilles reduced by 5mm in both length and height. For example, a grille of 500 x 300 would require an opening of 495 x 295.

Dimensions for mounting with lateral clips

For horizontal mounting (e.g. fan-coils), the grille incorporates clips for lateral pressure. The size of the opening corresponds to the nominal size of the grilles. For example, a grille of 500 x 300 would require an opening of the same dimensions. (For additional dimensions see page 6).

Frame models

To meet the stringent design requirements of the market, KOOLAIR has developed a high-end range of frames for this type of grille.

Frames with dimensions:

- 28 (beveled section)
- 24
- 20
- 11
- 8.7 (EPM)
- 6.6
- Sport
- 31-1-filterholder

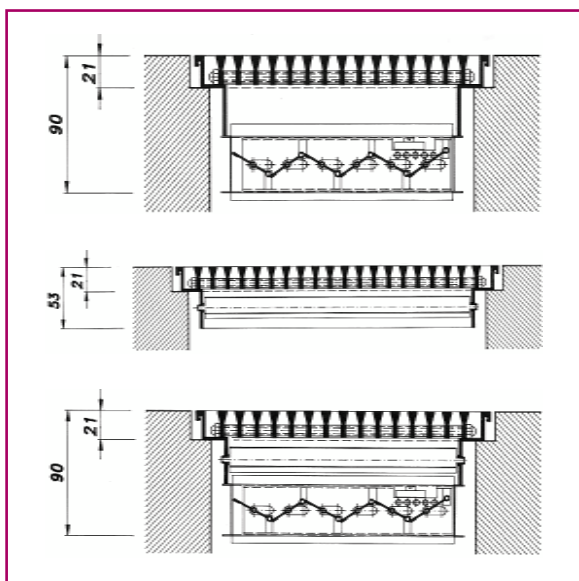
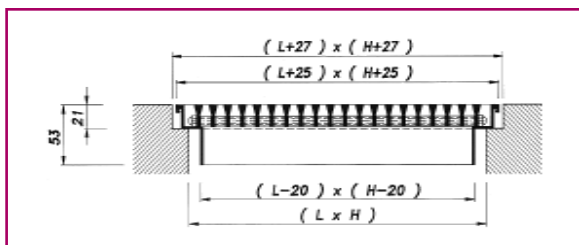
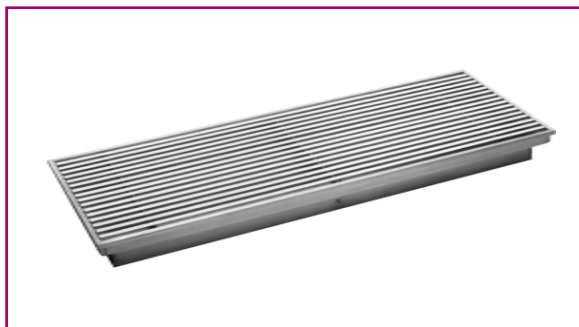


31-1 integrated in drop ceiling plate



31-1-EPM vertical flush-mounting

Linear floor grilles



Description

Type 31-1-F aluminium grilles, fixed blades, deflection 0°.
 Type 31-15 -F aluminium grilles, fixed blades, deflection 15°.

Finishes

Aluminium in its natural colour (not anodised).
 Special finishes available upon request.

Dimensions

The normalised dimensions are for a rebate in the floor of 21 mm.
 To calculate the dimension of the opening, both length and height should be increased 27 mm. Special dimensions are available on request.

31-1-F or 31-15-F

Accessories

The grilles can incorporate volume control damper type 29-O and directional grille type G. (See description on page 9).
 Grille core loose upon customer request.

31-1-F-O or 31-15-F-O

31-1-F-G or 31-15-F-G

31-1-F-O-G or 31-15-F-O-G



Selection table

Q		L	1000	1000	1000	1000	1000	1000	1000	1000
		H	50	75	100	125	150	200	250	300
m ³ /h x ml	l/s x ml	A _k	0,024	0,0370	0,0500	0,0630	0,0820	0,1080	0,1400	0,1720
100	27,8	V _k	1,2	0,8	0,6					
		X	2,3	1,9	1,6					
		P _t	0,8	0,3	0,2					
		NR								
120	33,3	V _k	1,4	0,9	0,7					
		X	2,8	2,2	1,9					
		P _t	1,1	0,5	0,3					
		NR								
140	38,9	V _k	1,6	1,1	0,8					
		X	3,2	2,6	2,2					
		P _t	1,5	0,6	0,4					
		NR								
160	44,4	V	1,9	1,2	0,9					
		X	3,7	3,0	2,6					
		P _t	2,0	0,8	0,5					
		NR								
180	50,0	V _k	2,1	1,4	1,0	0,8				
		X	4,1	3,3	2,9	2,6				
		P _t	2,5	1,1	0,6	0,4				
		NR	8							
200	55,6	V _k	2,3	1,5	1,1	0,9				
		X	4,6	3,7	3,2	2,8				
		P _t	3,1	1,3	0,7	0,5				
		NR	10							
250	69,4	V _k	2,9	1,9	1,4	1,1	0,8			
		X	5,8	4,6	4,0	3,6	3,1			
		P _t	4,9	2,0	1,1	0,7	0,4			
		NR	16	7						
300	83,3	V _k	3,5	2,3	1,7	1,3	1,0	0,8	0,6	
		X	6,9	5,6	4,8	4,3	3,7	3,3	2,9	
		P _t	7,0	2,9	1,6	1,0	0,6	0,3	0,2	
		NR	21	11						
350	97,2	V _k	4,1	2,6	1,9	1,5	1,2	0,9	0,7	0,6
		X	8,1	6,5	5,6	5,0	4,4	3,8	3,3	3,0
		P _t	9,5	4,0	2,2	1,4	0,8	0,5	0,3	0,2
		NR	25	15	9					
400	111,1	V _k	4,6	3,0	2,2	1,8	1,4	1,0	0,8	0,6
		X	9,2	7,4	6,4	5,7	5,0	4,3	3,8	3,4
		P _t	12,4	5,2	2,9	1,8	1,1	0,6	0,4	0,2
		NR	28	19	12	8				
450	125,0	V _k	5,2	3,4	2,5	2,0	1,5	1,2	0,9	0,7
		X	10,4	8,3	7,2	6,4	5,6	4,9	4,3	3,9
		P _t	15,7	6,6	3,6	2,3	1,3	0,8	0,5	0,3
		NR	31	22	15	11	5			
500	138,9	V _k	5,8	3,8	2,8	2,2	1,7	1,3	1,0	0,8
		X	11,5	9,3	8,0	7,1	6,2	5,4	4,8	4,3
		P _t	19,4	8,2	4,5	2,8	1,7	1,0	0,6	0,4
		NR	34	25	18	13	8			
600	166,7	V _k	6,9	4,5	3,3	2,6	2,0	1,5	1,2	1,0
		X	13,8	11,1	9,6	8,5	7,5	6,5	5,7	5,2
		P _t	28,0	11,8	6,4	4,1	2,4	1,4	0,8	0,5
		NR	38	29	23	18	12	6		
700	194,4	V _k	8,1	5,3	3,9	3,1	2,4	1,8	1,4	1,1
		X	16,1	13,0	11,2	9,9	8,7	7,6	6,7	6,0
		P _t	38,1	16,0	8,8	5,5	3,3	1,9	1,1	0,7
		NR	42	33	27	22	16	10	5	
800	222,2	V _k	9,3	6,0	4,4	3,5	2,7	2,1	1,6	1,3
		X	18,4	14,8	12,8	11,4	10,0	8,7	7,6	6,9
		P _t	49,7	20,9	11,5	7,2	4,3	2,5	1,5	1,0
		NR	46	37	30	25	20	14	8	
900	250,0	V _k		6,8	5,0	4,0	3,0	2,3	1,8	1,5
		X		16,7	14,4	12,8	11,2	9,8	8,6	7,7
		P _t		26,5	14,5	9,1	5,4	3,1	1,8	1,2
		NR		40	33	28	23	17	11	7
1000	277,8	V _k		7,5	5,6	4,4	3,4	2,6	2,0	1,6
		X		18,5	15,9	14,2	12,5	10,9	9,5	8,6
		P _t		32,7	17,9	11,3	6,7	3,8	2,3	1,5
		NR		42	36	31	25	20	14	10
1200	333,3	V _k			6,7	5,3	4,1	3,1	2,4	1,9
		X			19,1	17,1	14,9	13,0	11,4	10,3
		P _t			25,8	16,2	9,6	5,5	3,3	2,2
		NR			41	36	30	24	19	14
1400	388,9	V _k				6,2	4,7	3,6	2,8	2,3
		X				19,9	17,4	15,2	13,3	12,0
		P _t				22,1	13,0	7,5	4,5	3,0
		NR				40	34	28	23	18

Symbols:
L = Length in mm
H = Nominal height in mm
Q = Air flow rate per m length
A_k = Effective area in m² per m length
V_k = Effective velocity in m/s
X = Throw in m (ΔT=-10° C)
P_t = Total pressure in Pa
dB = Noise level in dB(A)

NR < 10

NR 10 - 20

NR > 20

Example of selection

The selection should take into account, for a given air flow rate, the sound level and throw.

The throws in the Quick Selection Table corresponds to a terminal velocity in the occupied zone of 0,25 m/s.

Example

Requirements:

Air flow rate _____ 350 m³/h
 Throw _____ 3.5 m plus corrections
 Sound level _____ below 20 dB(A)
 Application _____ Medical consult room
 Required pressure loss _____ below 10 Pa
 Effective velocity _____ below 3 m/s
 Location of grille _____ in wall, at 0.3 m from the ceiling

Before entering the Table, the corrected throw (X_c) should be calculated based on throw (X), distance (h) of the grille to the ceiling.

$$X_c = X / C_h$$

$$X_c = 3m$$

Solution:

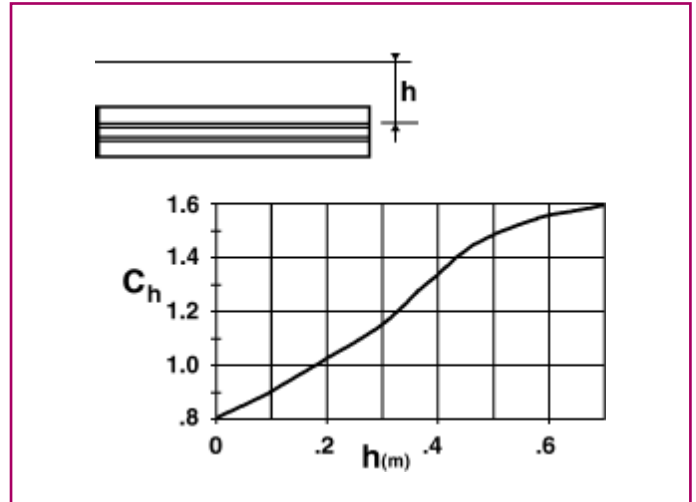
Entering the selection table with an air flow rate of 350 m³/h and a corrected throw of 3 m we obtain:

Q (Air flow rate) _____ 350 m³/h (97,2 l/s)
 V_k (Effective velocity) _____ 2.6 m/s
 X_c (Corrected throw) _____ 3.4 m
 P_t (Pressure loss) _____ 4 Pa
 NR (Sound level) _____ below 20 dB(A)

Grille type 31-1 size 1000 x 75

Correction factors for wall mounting

Apart from the before-mentioned factor C_s (for grilles mounted in sill or floor), another correction factor exists for the distance of the grille to the ceiling, when mounted in a wall. For a free jet this factor C_h will be 1,6 (see next figure).



$$X_c = X \cdot C_h$$

Corrected throw = Throw · C_h , with h in the graph the distance between grille and ceiling.

Useful recommendations

Maximum distance H max

To obtain an adhering jet with cold air when the grille is mounted in a wall, it is advisable not to exceed the distance of the grille with respect to the ceiling (h_{max}) and the temperature difference Δt (difference between room and supply air temperature) according to the following table.

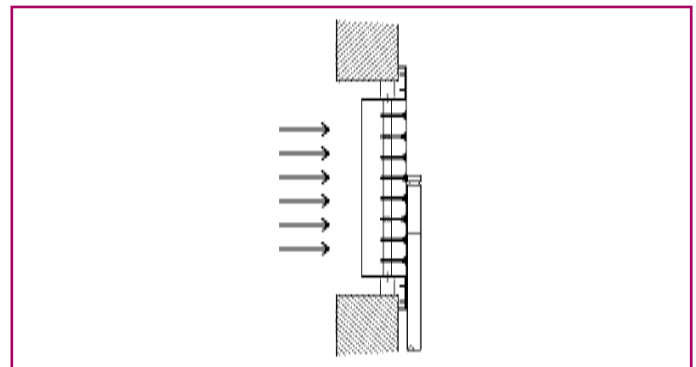
Flow rate measurement

Δt (°C)	0	6	9	12
h_{max} (m)	0,65	0,37	0,25	0,13

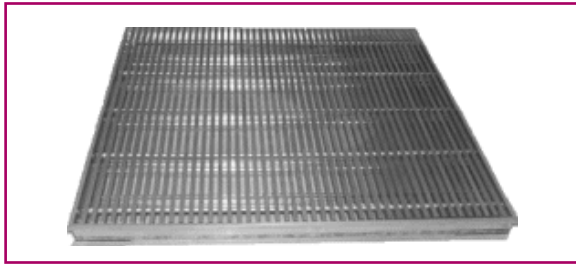
The air flow rate (q_v), is obtained from the product of the effective area of the grille (A_k), and its effective velocity (V_k).

$$q_v \text{ (m}^3\text{/h)} = A_k \text{ (m}^2\text{/ml)} \cdot V_k \text{ (m/s)} \cdot 3600 \cdot L / 1000$$

To obtain (V_k) use is recommended of a hot-wire anemometer.



Floor grilles for technical floors



Description

Heavy duty floor grilles, series 31-1-FS (deflection 0°) or 31-15-FS (deflection 15°), are specially designed to replace 600 x 600 floor tiles in raised access floor systems.

Heavy duty floor grilles are manufactured in extruded aluminium, finished in its natural colour without anodised.

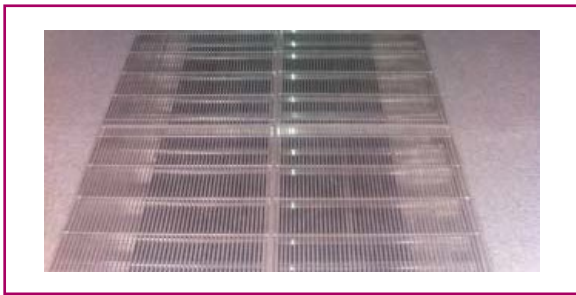
The standard dimension is 600 x 600 (599 x 599 overall) and 600 x 300, on request others dimensions can be manufactured, in order to adapt these grilles to any type of floors.

They can incorporate an opposed blade damper type 29-O, as well as a directional grille on the rear, type "G".

The units have been tested and meet BS EN13264:2001 requirements in Heavy and Extra Heavy Duty specifications.

Applications

Our grilles type 31-1-FS assure a displacement diffusion, supplying cold air in relation to the room temperature to air-condition, and at low velocity. It's recommended to work with a maximum difference of temperature of ± 6° C.



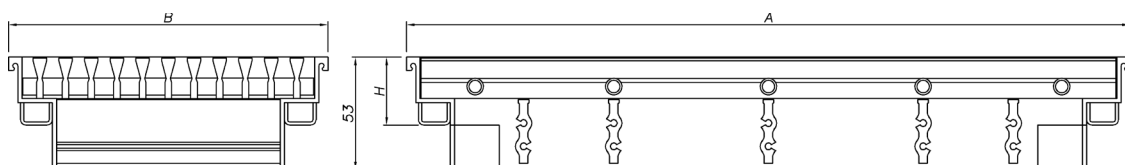
Quick selection table

31-1-FS				
Q		LxH	600x300	600x600
(m³/h)	(l/s)	A (m²)	0,074	0,150
500	138,9	Y _{max} (m):	2,1	1,3
		NR :	<20	<20
		p _t (Pa):	3	1
		V _k (m/s):	2,3	1,2
750	208,3	Y _{max} (m):	3,2	1,9
		NR :	21	<20
		p _t (Pa):	7	2
		V _k (m/s):	3,5	1,7
1000	277,8	Y _{max} (m):	4,2	2,5
		NR :	28	<20
		p _t (Pa):	12	3
		V _k (m/s):	4,6	2,3
1250	347,2	Y _{max} (m):	5,3	3,1
		NR :	34	<20
		p _t (Pa):	19	5
		V _k (m/s):	5,8	2,9

31-1-FS				
Q		LxH	600x300	600x600
(m³/h)	(l/s)	A (m²)	0,074	0,150
1500	416,7	Y _{max} (m):	6,3	3,8
		NR :	38	24
		p _t (Pa):	28	7
		V _k (m/s):	6,9	3,5
1750	486,1	Y _{max} (m):	7,4	4,4
		NR :	42	28
		p _t (Pa):	38	10
		V _k (m/s):	8,1	4,1
2000	555,6	Y _{max} (m):		5,0
		NR :		31
		p _t (Pa):		12
		V _k (m/s):		4,6
2500	694,4	Y _{max} (m):		6,3
		NR :		37
		p _t (Pa):		19
		V _k (m/s):		5,8

Symbols:

V_k = Effective velocity in m/s
 Y_{max} = Maximum vertical penetration for t = -10° C
 P_t = Pressure drop
 NR : Sound power level

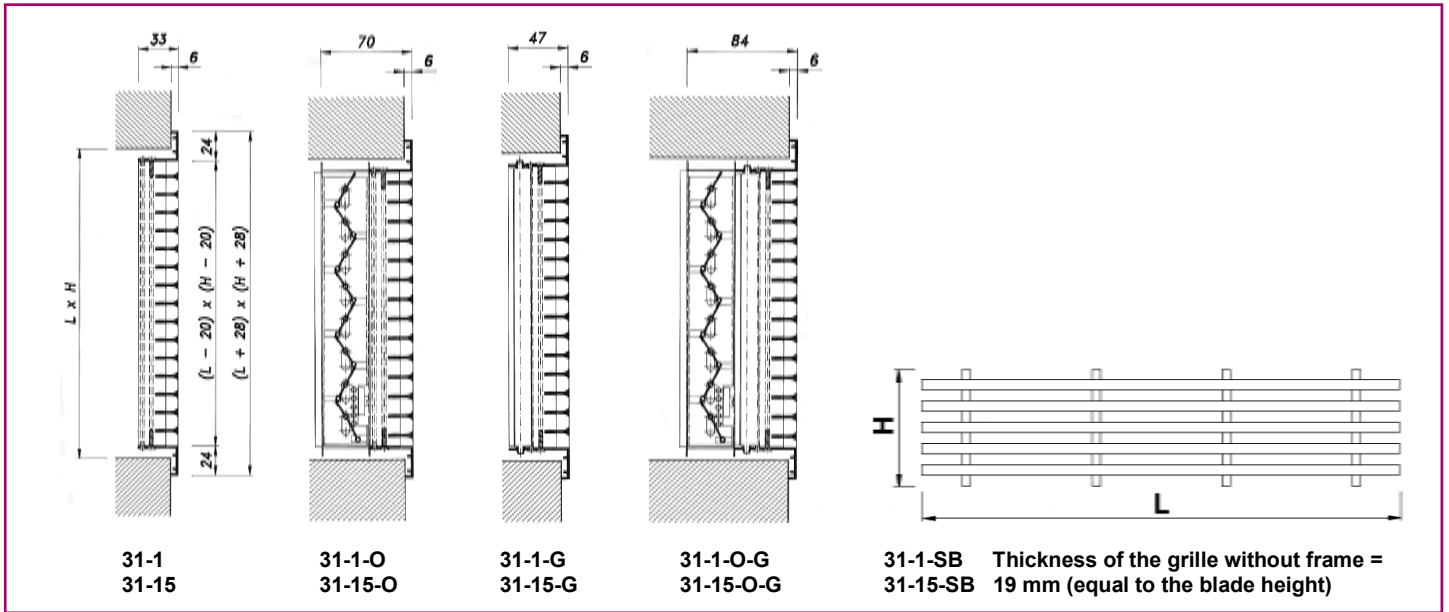


NOMINAL	A	B	H
600 x 600	599	599	VARIABLE HEIGHT
600 x 300	599	299	TO DEFINE

General dimensions and sizes

General dimensions of grilles type 30.

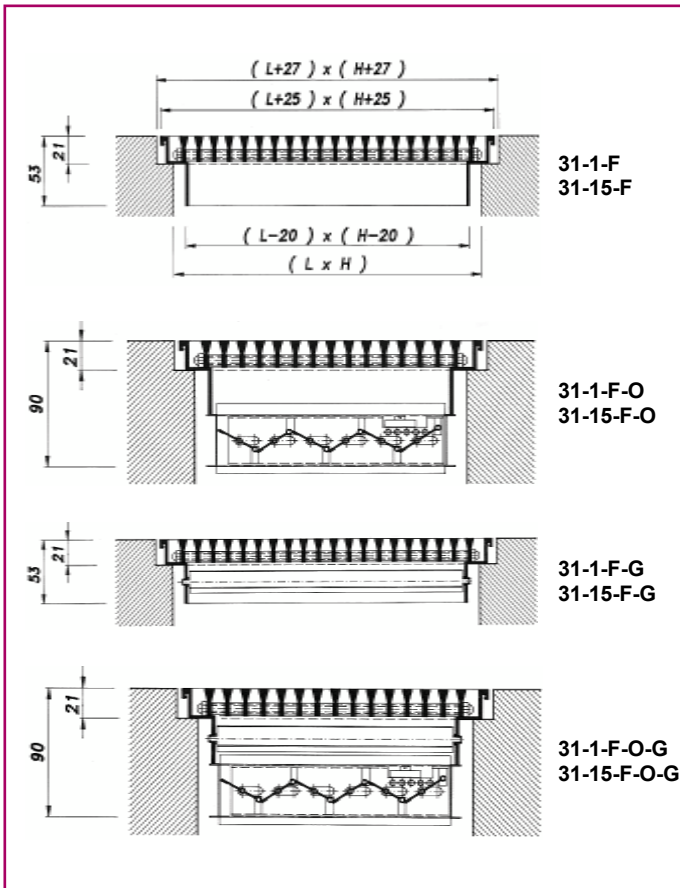
Wall and ceiling.



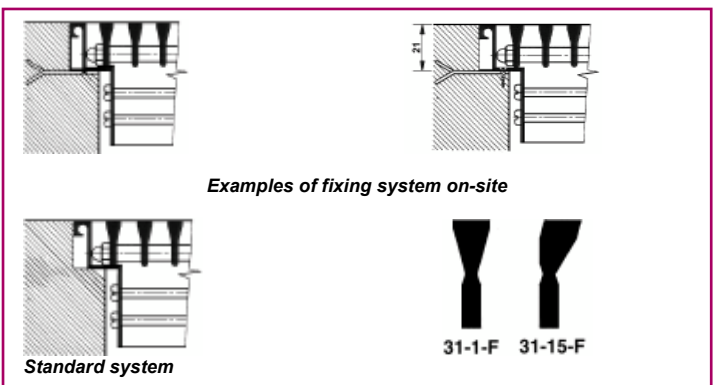
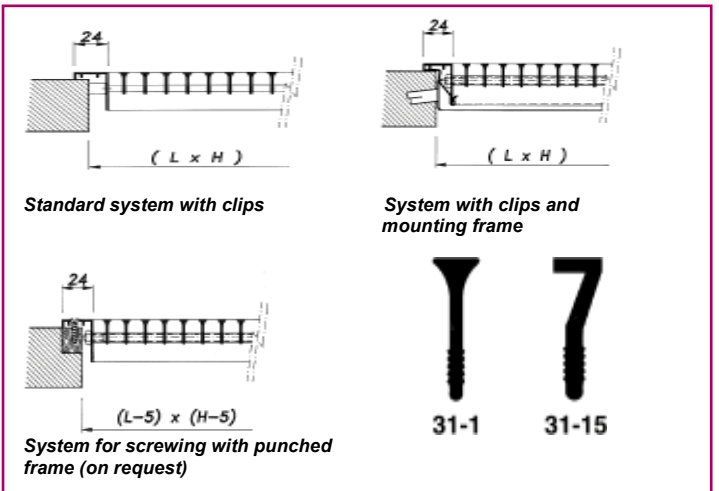
Frame model 24 mm, rest of frames on page 10.

Mounting systems and blade types.

Floor

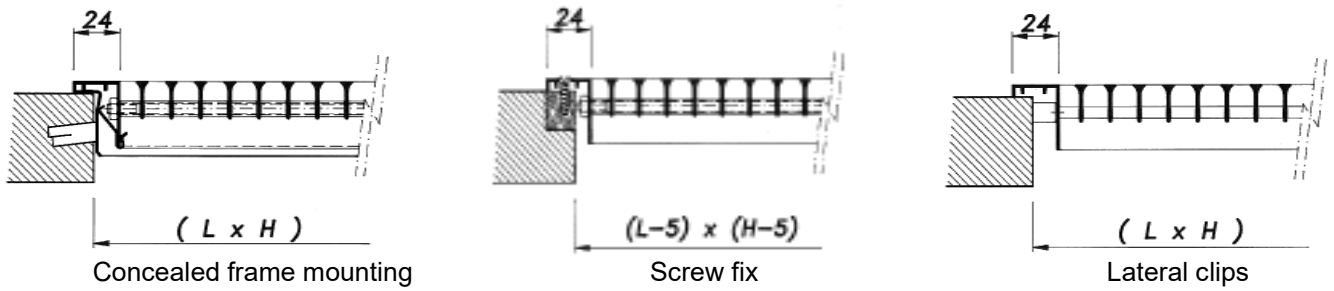


Installation in ceiling or wall

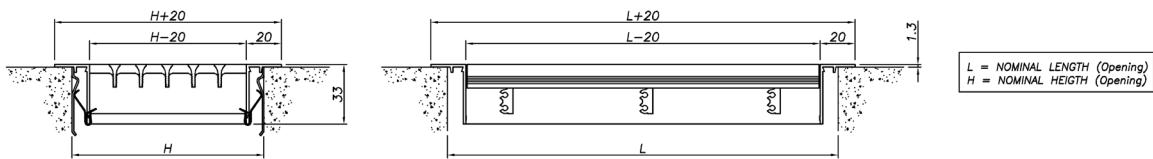


Frame models

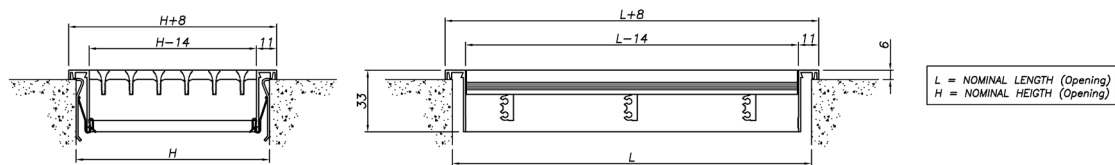
Frame of 24 mm



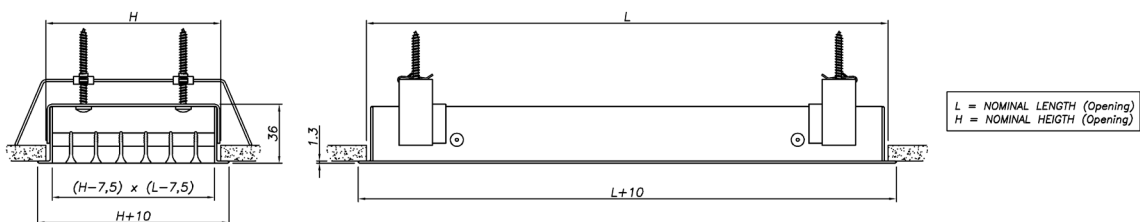
Frame of 20 mm



Frame of 11 mm

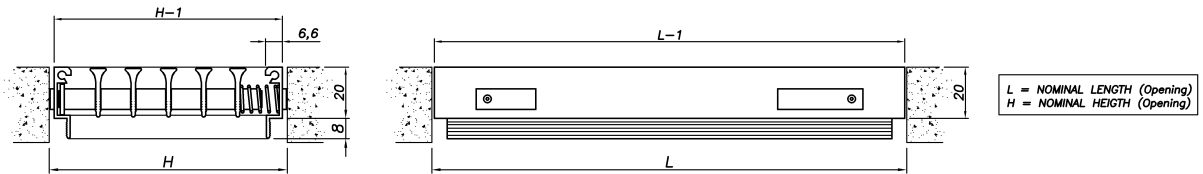


Frame of 8,7 mm

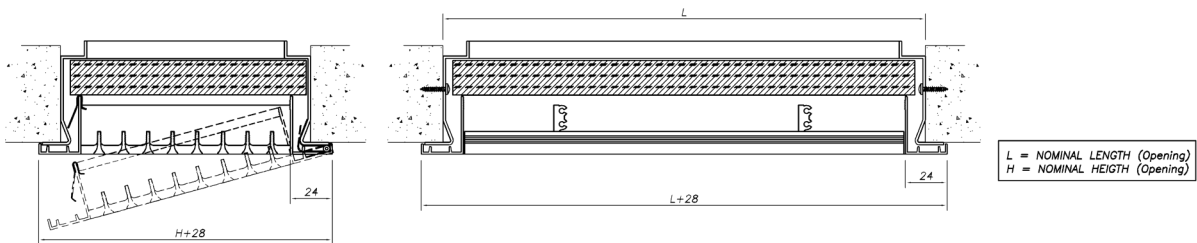


Frame models

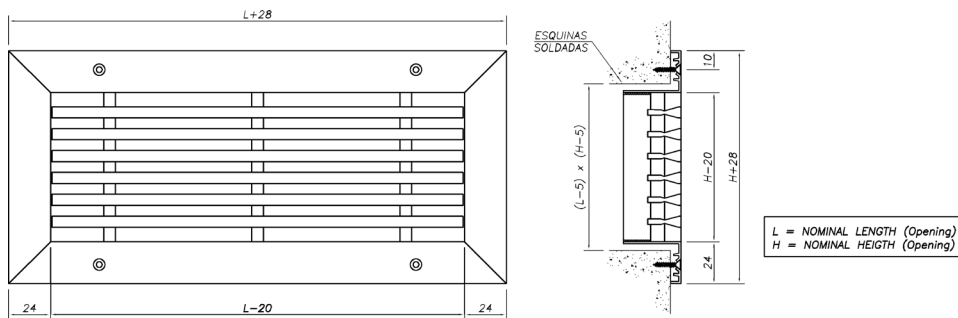
Frame of 6,6 mm



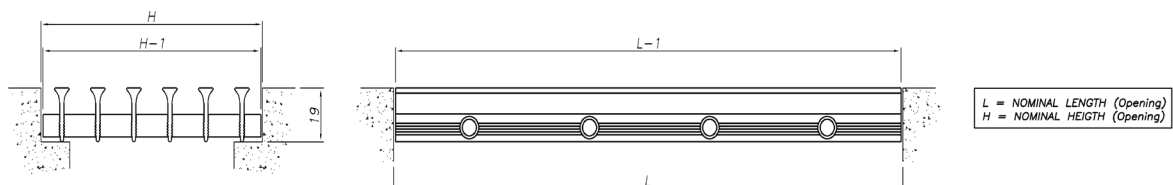
Filterholder Model



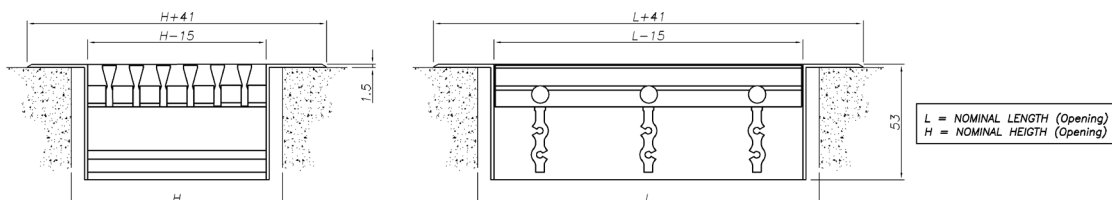
Sport Model



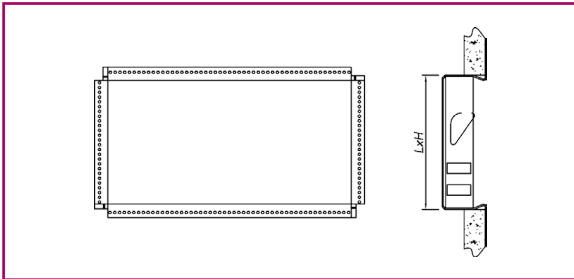
Without frame



31-1-NM model with beveled frame (preferably for floor installations).



ACCESSORIES AND MOUNTING



Type MM

Metallic frame for grille mounting.
Only for types 31-1, 31-15, 31-1-20 and 31-1-11.

Screw mounting

Placing the grille in the opening, it can be screwed directly onto the wall, sheet duct, etc.

For mounting in fibre ducts it is recommended that the metallic mounting frame MM is used.

Fixing with mounting frame

Once the metallic frame is located into the wall opening (fasteners are incorporated in the frame), the grille can be placed. Pressing lightly the grille will be attached perfectly to the mounting frame by means of pressure clips.

Note: The mounting frame is always provided with drilled holes, offering the possibility of screw mounting. This procedure is more useful for larger grilles and recommended for mounting in ceilings.

Fixing with mounting frame- concealed fixing

Once the metallic frame is located into the wall opening (fasteners are incorporated in the frame), the grille can be placed. Introducing the grille will be attached perfectly to the mounting frame by means of a concealed fixing.

Volume control damper 29-0

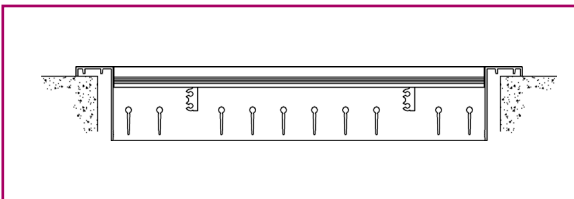
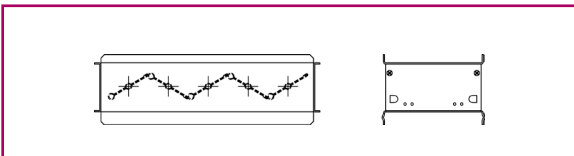
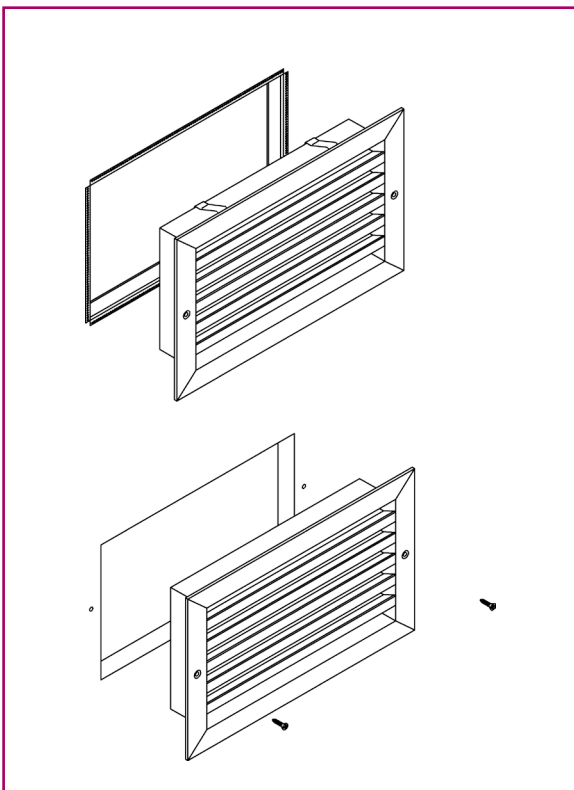
Volume control damper 29-0 is made of galvanised steel sheet with opposite blades.

They can be applied to any type of grille (wall-, ceiling as well as floor-mounted).

It can easily be operated from outside by a screwdriver.

Directional grille type G

Below the linear grilles a second directional grille type "G" can be mounted, with independently adjustable blades.



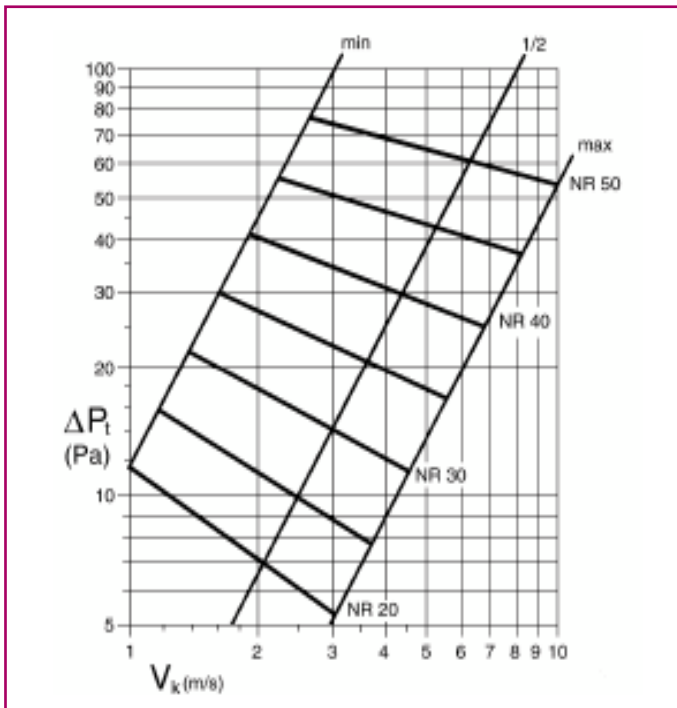
GENERAL INFORMATION

The volume control damper 29-0 modifies the values of sound level and pressure loss given in the selection table.

Hereafter, and in the corresponding graph sound levels and total pressure losses (ΔP_t) are presented for the grille including the volume control damper as a function of the parameters V_k (effective velocity) and percentage of opening of the damper (min, 1/2, max.).

The graph expresses sound level NR as sound power level (without room attenuation) for the combination of grille and damper 29-0.

The value of V_k in the graph is that for the grille without damper.



A correction factor should be applied to the sound level as a function of A_k (effective discharge area) according to the following table.

A_k (m ²)	0,01	0,02	0,03	0,05	0,1	0,2
NR	-5,2	-1,9	0	+2,4	+5,8	+9,1

General information on linear grilles type 30

- All grilles 31-1 and 31-15, both with and without frame, and without volume control damper nor directional grille, can be manufactured with an hingable access panel at one or both ends of the grille. The standard length of each panel piece is 150 mm, although this length can be varied upon request.

- Due to the large amount of possibilities offered by this type of grilles, it is recommended to consult in specific cases with special dimensions (openings, exterior dimensions, separation between blades, etc...).

- Likewise it is recommended to consult when the grilles are to be mounted in a false floor (e.g. computer rooms, etc...), since the existing variety of floors and tiles will have a great influence on the thickness and exterior dimensions of the grille. In general, after consulting and on request, it will be possible to manufacture various models for this type of floors.

- This range of grilles has the necessary characteristics for its integration in contemporary architecture and interior design. They can be installed in ceilings, walls, consoles, fan-coils, induction units, both for supply and return air application and, properly reinforced, in floors.

- The maximum recommended length is 2 m in one piece, although 2 or more modules can be combined so as to give an appearance of continuity.

Normalised dimensions of the grilles (in mm)

Types 31-1, 31-15

Length (L) 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000
 Height (H) 100, 125, 150, 200, 250, 300

Types 31-1-F, 31-15-F

Length (L) 200, 300, 400, 500, 600, 700, 800, 900, 1000
 Height (H) 75, 100, 125, 150, 200, 250, 300, 600

Types 31-1-FS, 31-15-FS

Length (L) 600
 Height (H) 300, 600

Special dimensions can be supplied upon request.

Coding

Wall coding

31	Series, aluminium grille
1	Deflection 0°
15	Deflection 15°
24	Frame of 24 mm
20	Frame of 20 mm
11	Frame of 11 mm
8,7	Frame of 8,7 mm
6,6	Frame of 6,6 mm
SPORT	Specific for sport areas
FF	Filterholder
SB	Without frame
O	Without indication, not incorporated Volume control damper type 29-0
G	Without indication, not incorporated Directional grille
MM with MM for MM screw	Without indication, with lateral clips Mounting frame The grille is supplied with mounting frame The grille is supplied without mounting frame, but it is prepared for its usage The grille is provided with holes for screwing
L x H	Length in mm (horizontal direction) x height in mm (vertical direction)

Identification

All grille dimensions are defined by length (L) and followed by height (H). L x H is the dimension of the free opening. When the grille does not incorporate a mounting frame but is prepared for screwing, the dimension of the opening will be L-5 mm x H-5 mm. For mounting with lateral clips, the dimension of the free opening will be equal to the nominal dimension of the grille.

Floor coding

31	Series, aluminium grille
1	Deflection 0°
15	Deflection 15°
F	For floor (reinforced)
NM	With beveled frame
FS	For technical floors
O	Without indication, not incorporated Volume control damper type 29-0
G	Without indication, not incorporated Directional grille
SB	Without indication, with frame Without frame
L x H	Length in mm (horizontal direction) x height in mm (vertical direction)

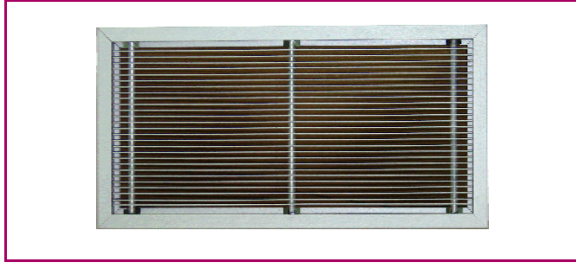
Identification

All grille dimensions are defined by length (L) and followed by height (H). L x H is the dimension of the free opening.

KOOLAIR develops a specific product for each installation, adapting to the needs of the project and integrating light fixtures, speakers or sprinklers, among other components, in the plate.



High induction linear grille



Description

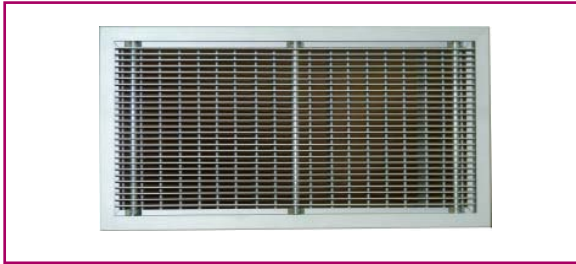
The 31-HI high-induction linear grilles were specifically designed to cover the interior design needs, with a low noise level and excellent diffusion behavior.

Comprised of a detachable central core that allows the fin deflection angle to be adjusted from 5° to 15° upward or downward.

The fin design provided high levels of induction, allowing homogeneous mixing with ambient air, preventing air currents and stratifications in the occupied area.

The grilles meet the following requirements:

- High degree of air diffusion and induction.
- Possibility to adjust the fin deflection angle from 5° to 15°.
- Applicable for air supply or return installations.
- Applicable for both cold and hot air supply.
- Low noise level.
- Flexible integration in any type of decoration or interior design.



Coding 31-HI

31-HI	Series, high-induction aluminium grille
O	If not specified, not included Volume control damper, 29-O model
G	If not specified, not included Directional grille
MM	If not specified, with lateral straps Metal frame
With MM	The grille is supplied with a metal frame
For MM	The grille is supplied without a metal frame, but designed to allow mounting therein
screw	The grille has drill holes for bolting
L x H	Length in mm (horizontal direction) x height in mm (vertical direction)

Finishes

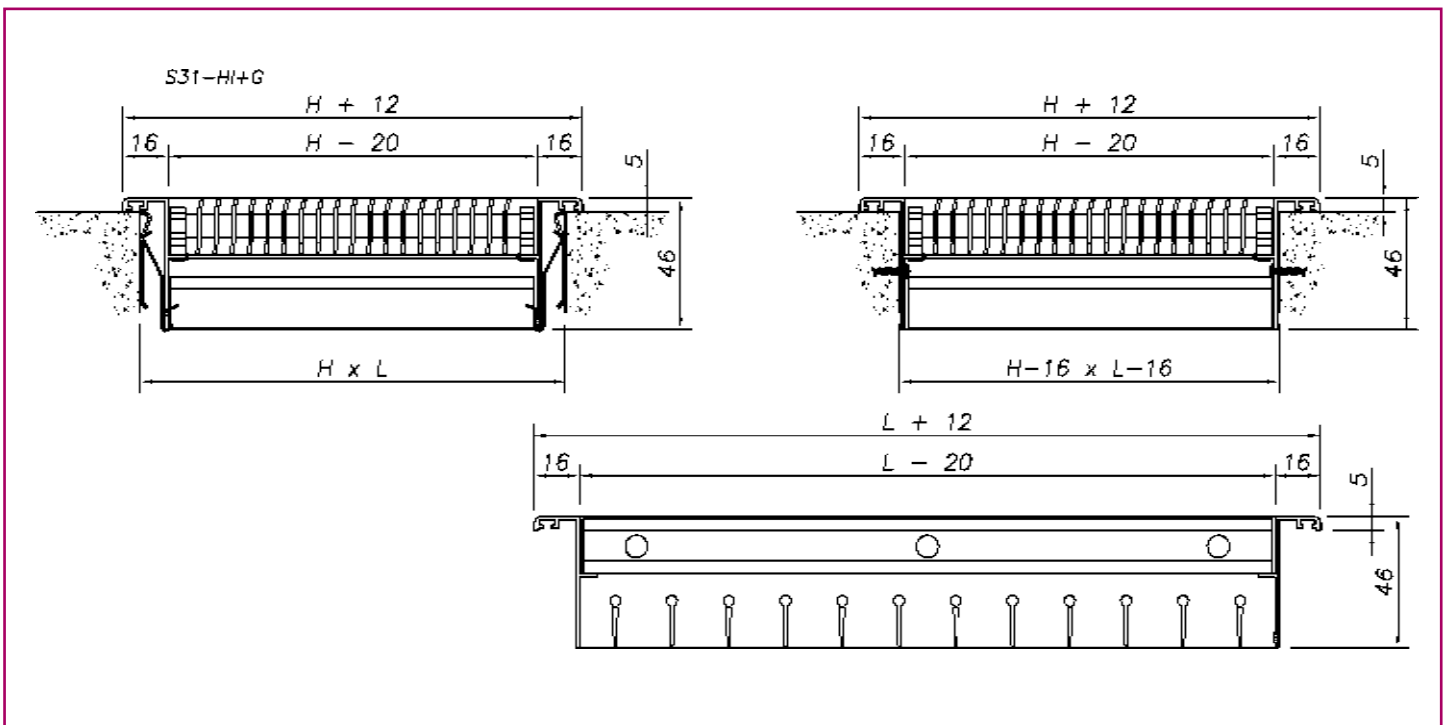
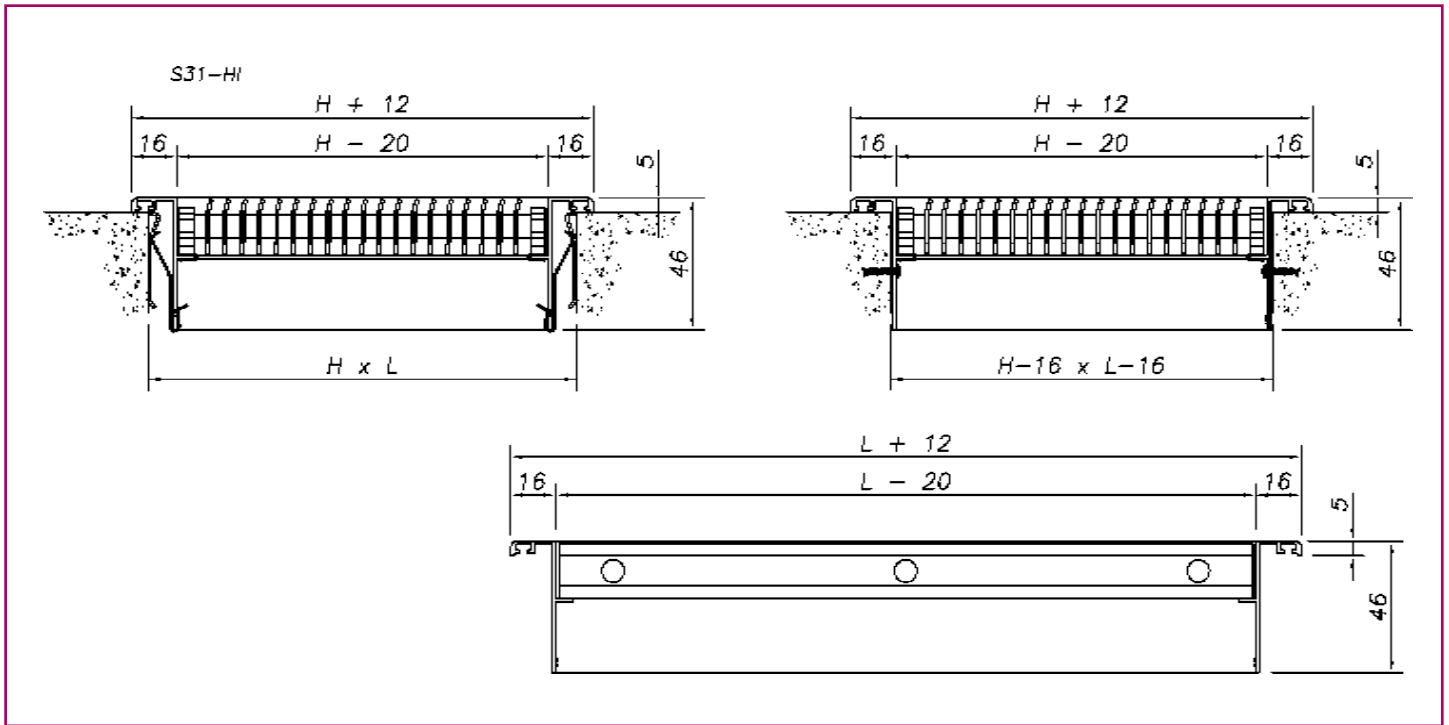
Anodized aluminium

Connection plenum in galvanized steel sheet with inlet of standard diameter according to ISO, with manual volume control damper. Other special finishes can be supplied by special order and upon prior consultation with the sales department.

Dimensions

Dimensions for use with mounting frame

When the grilles are fixed with a metal frame, the size of the clear opening corresponds to the nominal dimension of the grilles. For example, a grille of 500 x 300 would require a clear opening of the same dimensions.



Selection tables

Q		31-HI										
(m ³ /h)	(l/s)	Dim.	325x125	425x125	525x125	625x125	425x225	525x225	625x225	825x225	625x325	825x325
100	27,8	X (m) L _w - dB(A) P _{st} (Pa)	1,2 < 1									
150	41,7	X (m) L _w - dB(A) P _{st} (Pa)	1,8 < 2	1,6 < 1								
200	55,6	X (m) L _w - dB(A) P _{st} (Pa)	2,5 < 4	2,1 < 2	1,9 < 1							
250	69,4	X (m) L _w - dB(A) P _{st} (Pa)	3,1 19 6	2,7 < 4	2,4 < 2	2,2 < 2	1,9 < 1					
300	83,3	X (m) L _w - dB(A) P _{st} (Pa)	3,7 24 9	3,2 18 5	2,9 < 3	2,7 < 2	2,3 < 1	2,1 < 1	1,9 < 1			
400	111,1	X (m) L _w - dB(A) P _{st} (Pa)	4,9 32 15	4,3 27 9	3,9 22 6	3,5 18 4	3,1 < 2	2,8 < 1	2,5 < 1	2,2 < 1	2,1 < 0	
500	138,9	X (m) L _w - dB(A) P _{st} (Pa)	6,1 39 24	5,4 33 14	4,8 28 9	4,4 25 6	3,8 17 3	3,4 < 2	3,2 < 2	2,7 < 1	2,6 < 1	2,3 < 0
600	166,7	X (m) L _w - dB(A) P _{st} (Pa)	7,4 44 35	6,4 38 20	5,8 34 13	5,3 30 9	4,6 22 5	4,1 18 3	3,8 < 2	3,3 < 1	3,1 < 1	2,7 < 1
750	208,3	X (m) L _w - dB(A) P _{st} (Pa)		8,0 44 32	7,2 40 21	6,6 36 15	5,7 29 8	5,2 24 5	4,7 20 4	4,1 < 2	3,9 < 2	3,4 < 1
1000	277,8	X (m) L _w - dB(A) P _{st} (Pa)			9,7 48 37	8,9 44 26	7,7 37 14	6,9 32 9	6,3 28 6	5,5 20 4	5,2 18 3	4,6 < 2
1250	347,2	X (m) L _w - dB(A) P _{st} (Pa)				11,1 51 41	9,6 43 22	8,6 39 14	7,9 35 10	6,9 27 6	6,6 25 5	5,7 19 3
1500	416,7	X (m) L _w - dB(A) P _{st} (Pa)					11,5 48 31	10,3 44 20	9,5 40 14	8,2 32 8	7,9 30 7	6,9 24 4
1750	486,1	X (m) L _w - dB(A) P _{st} (Pa)						12,0 48 28	11,0 44 20	9,6 36 11	9,2 34 9	8,0 28 5
2000	555,6	X (m) L _w - dB(A) P _{st} (Pa)							12,6 48 26	11,0 40 15	10,5 38 12	9,1 32 7
2500	555,6	X (m) L _w - dB(A) P _{st} (Pa)								13,7 46 23	13,1 44 19	11,4 38 11
3000	555,6	X (m) L _w - dB(A) P _{st} (Pa)										13,7 44 16

Symbols

α (°) Second deflection angle
 X (m) Throw for a terminal air velocity of 0,25 m/s within the occupied area.
 L_w - dB(A) Sound power noise level.
 P_{st} (Pa) Pressure drop.
 < Sound power noise level less than 15 dB(A).

Selection tables

Q		31-HI+G																					
		Dim.	325x125		425x125		525x125		625x125		525x225		625x225		825x225		625x325		825x325				
(m³/h)	(l/s)	α (°)	0	30	0	30	0	30	0	30	0	30	0	30	0	30	0	30	0	30			
100	27,8	X (m)	1,2	1,0																			
		L _w - dB(A)	<	<																			
		P _{st} (Pa)	1	1																			
150	41,7	X (m)	1,8	1,5	1,6	1,3																	
		L _w - dB(A)	<	<	<	<																	
		P _{st} (Pa)	2	3	1	2																	
200	55,6	X (m)	2,5	2,0	2,1	1,7	1,9	1,5															
		L _w - dB(A)	<	17	<	<	<	<															
		P _{st} (Pa)	4	5	2	3	1	2															
250	69,4	X (m)	3,1	2,5	2,7	2,1	2,4	1,9	2,2	1,8	1,9	1,5											
		L _w - dB(A)	19	23	<	17	<	<	<	<	<	<	<										
		P _{st} (Pa)	6	8	4	5	2	3	2	2	1	1											
300	83,3	X (m)	3,7	2,9	3,2	2,6	2,9	2,3	2,7	2,1	2,3	1,8	2,1	1,7	1,9	1,5							
		L _w - dB(A)	24	28	18	22	<	18	<	<	<	<	<	<	<	<	<						
		P _{st} (Pa)	9	11	5	7	3	4	2	3	1	2	1	1	1	1	1						
400	111,1	X (m)	4,9	3,9	4,3	3,4	3,9	3,1	3,5	2,8	3,1	2,4	2,8	2,2	2,5	2,0	2,2	1,8	2,1	1,7			
		L _w - dB(A)	32	36	27	31	22	26	18	22	<	<	<	<	<	<	<	<	<	<	<		
		P _{st} (Pa)	15	20	9	12	6	8	4	5	2	3	1	2	1	1	1	1	1	1	1		
500	138,9	X (m)	6,1	4,9	5,4	4,3	4,8	3,9	4,4	3,5	3,8	3,1	3,4	2,8	3,2	2,5	2,7	2,2	2,6	2,1	2,3	1,8	
		L _w - dB(A)	39	43	33	37	28	32	25	29	17	21	<	16	<	<	<	<	<	<	<	<	
		P _{st} (Pa)	24	31	14	18	9	12	6	8	3	5	2	3	2	2	1	1	1	1	1	0	1
600	166,7	X (m)	7,4	5,9	6,4	5,1	5,8	4,6	5,3	4,2	4,6	3,7	4,1	3,3	3,8	3,0	3,3	2,6	3,1	2,5	2,7	2,2	
		L _w - dB(A)	44	48	38	42	34	38	30	34	22	26	18	22	<	18	<	<	<	<	<	<	
		P _{st} (Pa)	34,6	44,9	20	26	13	17	9	12	5	6	3	4	2	3	1	2	1	1	1	1	1
750	208,3	X (m)			8,0	6,4	7,2	5,8	6,6	5,3	5,7	4,6	5,2	4,1	4,7	3,8	4,1	3,3	3,9	3,1	3,4	2,7	
		L _w - dB(A)			44	48	40	44	36	40	29	33	24	28	20	24	<	16	<	<	<	<	
		P _{st} (Pa)			31,6	41,1	21	27	15	19	8	10	5	7	4	5	2	3	2	2	1	1	
1000	277,8	X (m)					9,7	7,7	8,9	7,1	7,7	6,1	6,9	5,5	6,3	5,0	5,5	4,4	5,2	4,2	4,6	3,7	
		L _w - dB(A)					48	52	44	48	37	41	32	36	28	32	20	24	18	22	<	16	
		P _{st} (Pa)					36,8	47,8	26	34	14	18	9	12	6	8	4	5	3	4	2	2	
1250	347,2	X (m)							11,1	8,8	9,6	7,6	8,6	6,9	7,9	6,3	6,9	5,5	6,6	5,2	5,7	4,6	
		L _w - dB(A)																					
		P _{st} (Pa)																					
1500	416,7	X (m)										11,5	9,2	10,3	8,3	9,5	7,6	8,2	6,6	7,9	6,3	6,9	5,5
		L _w - dB(A)																					
		P _{st} (Pa)																					
1750	486,1	X (m)												12,0	9,6	11,0	8,8	9,6	7,7	9,2	7,3	8,0	6,4
		L _w - dB(A)																					
		P _{st} (Pa)																					
2000	555,6	X (m)																					
		L _w - dB(A)																					
		P _{st} (Pa)																					
2500	694,4	X (m)																					
		L _w - dB(A)																					
		P _{st} (Pa)																					
3000	833,3	X (m)																					
		L _w - dB(A)																					
		P _{st} (Pa)																					

Symbols

- α (°) Second deflection angle
- X (m) Throw for a terminal air velocity of 0,25 m/s within the occupied area.
- L_w - dB(A) Sound power noise level.
- P_{st} (Pa) Pressure drop.
- < Sound power noise level less than 15 dB(A).

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