

# KOOLAIR

## series

# 20.2

## Return grilles

ISO 9001

BUREAU VERITAS  
Certification

Sistema de Gestión



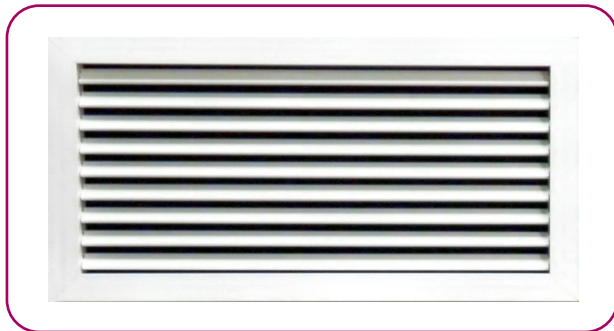
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## Return grilles (fixed blades at 45°)



### Description

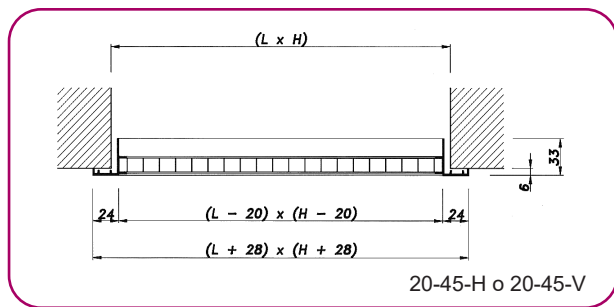
Type 20-45 aluminium grilles, fixed blades at 45° Type 21-45 steel sheet grilles, fixed blades at 45°.

### Finishes

Anodised aluminium in its natural colour.  
Steel sheet painted in white RAL 9010.  
Special finishes available upon request.

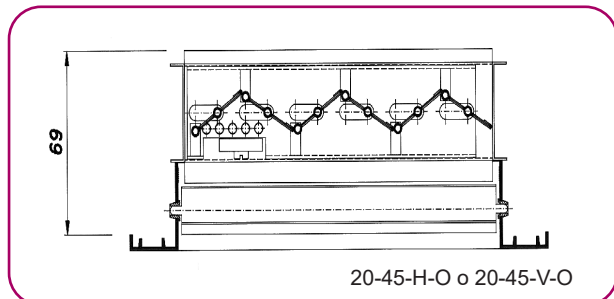
### Dimensions for use with mounting frame

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 5 mm in both length and height. For example, a grille of 500 x 300 would require an opening of 495 x 295.

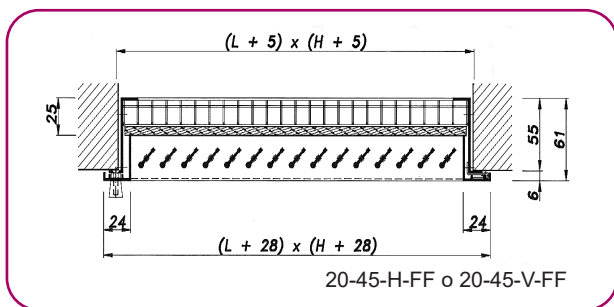


### Blade dimensions

The blade's maximum length is 490 mm, if the length is longer than that, necessary reinforcements will be added, so that the blade is never longer than the previously mentioned measurement.

### Volume control damper

The damper is actuated from the front by a screw driver.



### Filterholder

Upon request, the grille can be delivered with a filterholder. (Filter not included).

### Identification

In all descriptions of the grille dimensions, it is supposed that the first dimension is the length and the second the height. 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, except for type FF (filterholder) where this dimension will be L+5 mm x H+5 mm.

## Quick Selection Table (Return grilles)

Q		D, mm	200 x 100	250 x 100	300 x 100 200 x 150	400 x 100 200 x 200	500 x 100 350 x 150 250 x 200	600 x 100 400 x 150 300 x 200	500 x 150 400 x 200 300 x 250	600 x 150 450 x 200 350 x 250	300 x 300	500 x 200 400 x 250 350 x 300	800 x 150 600 x 200 400 x 300	800 x 200 600 x 250 500 x 300	1000 x 200 800 x 250 600 x 300	1000 x 250 800 x 300 600 x 400	1000 x 300 750 x 400	1200 x 300 900 x 400 700 x 500 600 x 600	
m³/h	1/s	A <sub>v</sub>	0,0016	0,0096	0,0121	0,0166	0,0217	0,0258	0,0345	0,0404	0,0416	0,0470	0,0560	0,0721	0,0915	0,1173	0,1462	0,1759	
50	13,9	V <sub>e</sub> P <sub>s</sub> NR	1,8 3,5 12	1,4 2,1 7	1,1 1,5 7	0,8 0,8 7	0,6 0,5 7	0,5 0,3											
60	16,7	V <sub>e</sub> P <sub>s</sub> NR	2,2 5,0 17	1,7 3,1 12	1,4 2,1 7	1,0 1,1 7	0,8 0,7 7	0,6 0,4 7	0,5 0,3										
70	19,4	V <sub>e</sub> P <sub>s</sub> NR	2,5 6,8 21	2,0 4,2 16	1,6 2,8 11	1,2 1,5 5	0,9 1,0 5	0,8 0,6 5	0,6 0,2										
80	22,2	V <sub>e</sub> P <sub>s</sub> NR	2,9 8,9 24	2,3 5,5 19	1,8 3,7 15	1,3 2,0 8	1,0 1,3 8	0,9 0,8 8	0,6 0,5 8	0,6 0,3	0,5 0,2								
90	25,0	V <sub>e</sub> P <sub>s</sub> NR	3,3 11,3 27	2,6 7,0 22	2,1 4,7 18	1,5 2,5 11	1,2 1,6 7	1,0 1,0 7	0,7 0,6 7	0,6 0,4	0,6 0,2	0,5 0,2							
100	27,8	V <sub>e</sub> P <sub>s</sub> NR	3,6 13,9 30	2,8 8,6 25	2,3 5,8 21	1,7 3,1 14	1,3 2,0 9	1,1 1,2 9	0,8 0,8 9	0,7 0,5	0,7 0,3	0,6 0,3	0,5 0,2						
150	41,7	V <sub>e</sub> P <sub>s</sub> NR		4,3 19,3 36	3,4 13,1 31	2,5 7,0 25	1,9 4,5 20	1,6 2,8 22	1,2 1,7 9	1,0 1,0	1,0 0,7	0,9 0,6	0,7 0,4	0,6 0,2 -12	0,5 0,2 -17				
200	55,6	V <sub>e</sub> P <sub>s</sub> NR			4,6 23,2 39	3,3 12,4 32	2,6 8,1 27	2,2 4,9 22	1,6 3,0 17	1,4 1,8 11	1,3 1,2	1,2 1,1	1,0 0,8	0,8 0,4	0,6 0,3	0,5 0,2			
250	69,4	V <sub>e</sub> P <sub>s</sub> NR				4,2 19,4 38	3,2 12,6 33	2,7 7,7 28	2,0 4,7 22	1,7 2,9 17	1,7 1,9	1,5 1,7	1,2 1,2	1,0 0,7	0,8 0,4	0,6 0,2	0,5 0,2		
300	83,3	V <sub>e</sub> P <sub>s</sub> NR					3,8 18,2 36	3,2 11,0 32	2,4 6,8 27	2,1 4,1 22	2,0 2,8 17	1,8 2,4 16	1,5 1,7	1,2 0,9	0,9 0,6	0,7 0,4	0,6 0,2	0,5 0,1	
400	111,1	V <sub>e</sub> P <sub>s</sub> NR						4,3 19,6 40	3,2 12,1 35	2,8 7,3 29	2,7 4,9 25	2,4 4,4 24	2,0 3,0 20	1,5 1,7	1,2 1,1	0,9 0,6	0,8 0,4	0,6 0,2	
500	138,9	V <sub>e</sub> P <sub>s</sub> NR							4,0 18,9 41	3,4 11,5 35	3,3 7,7 31	3,0 6,8 29	2,5 4,7 25	1,9 2,6 19	1,5 1,7	1,2 1,0	0,9 0,6	0,8 0,4	
600	166,7	V <sub>e</sub> P <sub>s</sub> NR								4,1 16,5 40	4,0 11,1 36	3,5 9,8 34	3,0 6,8 30	2,3 3,8 24	1,8 2,5 19	1,4 1,4 13	1,1 0,9 8	0,9 0,5	
700	194,4	V <sub>e</sub> P <sub>s</sub> NR									4,7 15,1 40	4,1 13,3 38	3,5 9,3 34	2,7 5,2 28	2,1 3,4 17	1,7 1,9 12	1,3 1,2 6	1,1 0,7	
800	222,2	V <sub>e</sub> P <sub>s</sub> NR											4,7 17,4 42	4,0 12,1 38	3,1 6,7 31	2,4 4,4 27	1,9 2,5 21	1,5 1,6 16	1,3 0,9 10
900	250,0	V <sub>e</sub> P <sub>s</sub> NR												4,5 15,3 41	3,5 8,5 34	2,7 5,6 30	2,1 3,2 24	1,7 2,0 19	1,4 1,2 13
1000	277,8	V <sub>e</sub> P <sub>s</sub> NR													3,9 10,5 37	3,0 6,9 33	2,4 4,0 27	1,9 2,5 22	1,6 1,4 16
1500	416,7	V <sub>e</sub> P <sub>s</sub> NR														4,6 15,5 43	3,6 8,9 37	2,8 5,6 32	2,4 3,2 26
2000	555,6	V <sub>e</sub> P <sub>s</sub> NR															4,7 15,8 45	3,8 10,0 40	3,2 5,8 34
3000	833,3	V <sub>e</sub> P <sub>s</sub> NR																	4,7 13,0 44
4000	1111,1	V <sub>e</sub> P <sub>s</sub> NR																	6,3 23,0 82
5000	1388,9	V <sub>e</sub> P <sub>s</sub> NR																	7,9 36,0 88

NR < 10

NR 10 - 25

NR > 25

**Symbols:**  
*V<sub>e</sub>* = Effective velocity in m/s  
*P<sub>s</sub>* = Static pressure in Pa  
*A<sub>k</sub>* = Effective area in m²

**Note:**  
 - This selection table is based on full-scale laboratory tests according to standards ISO 5219 (UNE 100.710) and ISO 5135 and 3741.

## Selection example

Case 1. Grille mounted in wall, with duct.

Requirements

Return Air flow rate \_\_\_\_\_ 300 m<sup>3</sup>/h  
 Application \_\_\_\_\_ Offices  
 Sound level \_\_\_\_\_ Below 25 NR  
 Required pressure loss \_\_\_\_\_ Below 5 Pa  
 Maximum permitted effective velocity \_\_\_\_\_ 3 m/s

Solution:

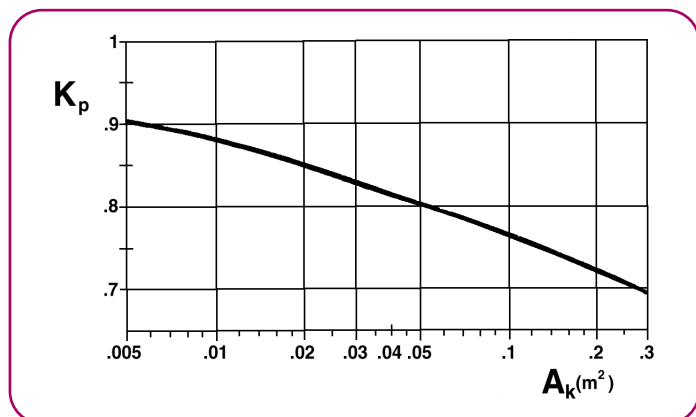
With the selection table for return grilles we obtain:  
 Q (Air flow rate) \_\_\_\_\_ 300 m<sup>3</sup>/h (or 83,3 l/s)  
 V<sub>k</sub> (Effective velocity) \_\_\_\_\_ 2,1 m/s  
 NR (Sound level) \_\_\_\_\_ 22  
 P<sub>s</sub> (Pressure loss) \_\_\_\_\_ 4,1 Pa

Grille type 20-45-H size 600 x 150, 450 x 200 or 350 x 250

Observing the results, the data obtained fulfil the requirements of the project.

Case 2. Grille mounted in wall, without duct (free air intake).

If in above example the grille would not have been connected to a duct, a correction factor (K<sub>p</sub>) should be applied, which can be obtained from the following figure:



With the effective area (A<sub>k</sub>) and static pressure (P<sub>s</sub>) from the selection table we obtain the following result:

$$A = 0,0404 \text{ m}^2$$

$$K_p = 0,81$$

$$P_s^p = 4,1 \text{ Pa}$$

$$P_s^s = P_s \cdot K_p \quad P_s = 4,1 \cdot 0,81 = 3,32 \text{ Pa}$$

Case 3. Grille mounted in wall, without duct, with filterholder and filter.

In this special case (grilles type 20-45-H-FF and 20-45-V-FF), two possibilities exist:

3.a. The grille incorporates a filterholder, but not a filter. In this case pressure loss and selection procedure are identical to those of case 2, as being a normal return grille.

3.b. The grille incorporates both filterholder and filter.

Using the example of case 1 and the correction of case 2, the effective velocity (V<sub>k</sub>) should be determined from the selection table:

$$A_k = 0,0404 \text{ m} \quad V_k = 2,1 \text{ m/s}$$

Entering the following figure with the known effective velocity (V<sub>k</sub>) and the height of the grille (H), the pressure loss of the filter can be found to be about 12 Pa.

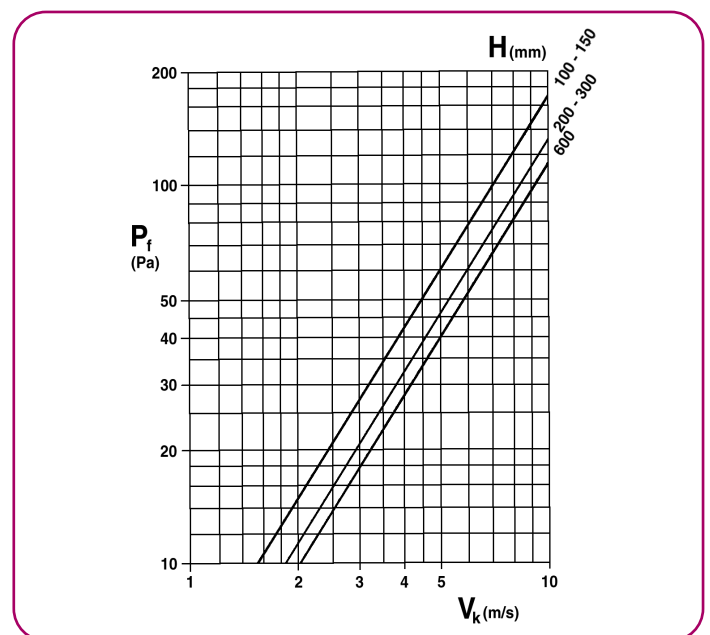
The final pressure loss will be the sum of grille and filter.

$$P_t \text{ (Total static pressure loss)}$$

$$P_s \text{ (Static pressure loss in wall)}$$

$$P_f \text{ (Static pressure loss in filter)}$$

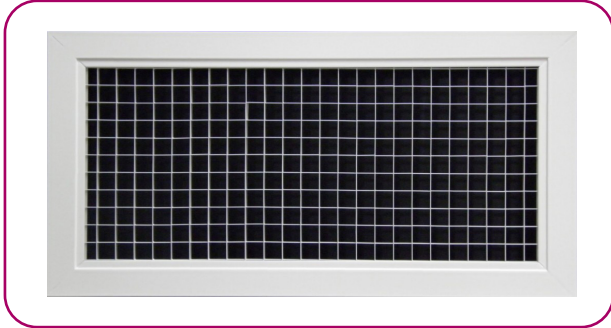
$$P_t = P_s + P_f \quad P_s = 3,32 + 12 = 15,32 \text{ Pa}$$



This graph is valid for a clean filter, type VILEDON P-15/150, S-EU-2 or similar.

For volume control damper and mounting frame, see ACCESSORIES AND MOUNTING.

## Egg crate grilles (return)



### Description

Type 22-5. Egg crate grilles, constructed in aluminium.

### Finishes

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

### Dimensions for use with mounting frame

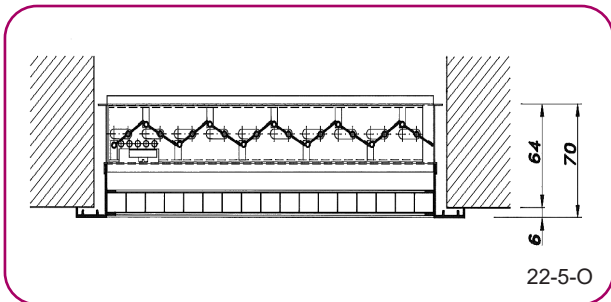
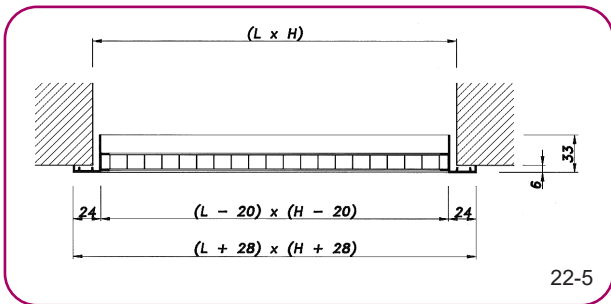
When the grilles are fixed with a metal frame, the size of the opening corresponds to the nominal size of the grilles. For example, a grille of 500 x 300 would require an opening of the same dimensions.

### 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.

### Volume control damper

The damper is actuated from the front by a screw driver.



## Identification

In all descriptions of the grille dimensions, it is supposed that the first dimension is the length and the second the height. 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.



# Quick Selection Table (Egg crate grilles for return)

Q		Dim. (mm)	400x100 200x200	400x150 300x200 250x250	600x200 400x300 350x350	700x300 500x400 450x450	1000x350 900x400 600x600	1000x500 800x600 700x700	1300x500 1100x600 800x800	1600x500 1350x600 900x900	1650x600 1250x800 1000x1000
m <sup>3</sup> /h	l/s	A <sub>k</sub>	0,0314	0,0489	0,1032	0,1769	0,3263	0,4485	0,5901	0,7512	0,9316
200	55,6	V <sub>k</sub>	1,8	1,1	0,5						
		P <sub>s</sub>	3,8	1,5	0,3						
250	69,4	V <sub>k</sub>	2,2	1,4	0,7	<b>Note:</b> - This selection table is based on full-scale laboratory tests according to standards ISO 5219 (UNE 100.710) and ISO 5135 and 3741.					
		P <sub>s</sub>	5,9	2,4	0,5						
300	83,3	V <sub>k</sub>	2,7	1,7	0,8						
		P <sub>s</sub>	8,5	3,5	0,8						
350	97,2	V <sub>k</sub>	3,1	2,0	0,9	0,5					
		P <sub>s</sub>	11,5	4,7	1,1	0,4					
400	111,1	V <sub>k</sub>	3,5	2,3	1,1	0,6					
		P <sub>s</sub>	15,0	6,2	1,4	0,5					
450	125,0	V <sub>k</sub>	4,0	2,6	1,2	0,7					
		P <sub>s</sub>	19,0	7,8	1,8	0,6					
500	138,9	V <sub>k</sub>	4,4	2,8	1,3	0,8	0,4				
		P <sub>s</sub>	23,5	9,7	2,2	0,7	0,2				
600	166,7	V <sub>k</sub>	5,3	3,4	1,6	0,9	0,5				
		P <sub>s</sub>	33,8	13,9	3,1	1,1	0,3				
700	194,4	V <sub>k</sub>	6,2	4,0	1,9	1,1	0,6				
		P <sub>s</sub>	46,0	19,0	4,3	1,4	0,4				
800	222,2	V <sub>k</sub>		4,5	2,2	1,3	0,7				
		P <sub>s</sub>		24,8	5,6	1,9	0,6				
900	250,0	V <sub>k</sub>		5,1	2,4	1,4	0,8	0,6			
		P <sub>s</sub>		31,4	7,0	2,4	0,7	0,4			
1000	277,8	V <sub>k</sub>		5,7	2,7	1,6	0,9	0,6			
		P <sub>s</sub>		38,7	8,7	3,0	0,9	0,5			
1100	305,6	V <sub>k</sub>			3,0	1,7	0,9	0,7			
		P <sub>s</sub>			10,5	3,6	1,1	0,6			
1200	333,3	V <sub>k</sub>			3,2	1,9	1,0	0,7			
		P <sub>s</sub>			12,5	4,3	1,3	0,7			
1300	361,1	V <sub>k</sub>			3,5	2,0	1,1	0,8	0,6		
		P <sub>s</sub>			14,7	5,0	1,5	0,8	0,4		
1500	416,7	V <sub>k</sub>			4,0	2,4	1,3	0,9	0,7		
		P <sub>s</sub>			19,6	6,7	2,0	1,0	0,6		
1750	486,1	V <sub>k</sub>			4,7	2,7	1,5	1,1	0,8		
		P <sub>s</sub>			26,6	9,1	2,7	1,4	0,8		
2000	555,6	V <sub>k</sub>			5,4	3,1	1,7	1,2	0,9	0,7	
		P <sub>s</sub>			34,8	11,8	3,5	1,8	1,1	0,7	
2500	694,4	V <sub>k</sub>				3,9	2,1	1,5	1,2	0,9	0,7
		P <sub>s</sub>				18,5	5,4	2,9	1,7	1,0	0,7
3000	833,3	V <sub>k</sub>				4,7	2,6	1,9	1,4	1,1	0,9
		P <sub>s</sub>				26,6	7,8	4,1	2,4	1,5	1,0
3500	972,2	V <sub>k</sub>				5,5	3,0	2,2	1,6	1,3	1,0
		P <sub>s</sub>				36,2	10,7	5,6	3,3	2,0	1,3
4000	1111,1	V <sub>k</sub>					3,4	2,5	1,9	1,5	1,2
		P <sub>s</sub>					13,9	7,4	4,3	2,6	1,7
4500	1250,0	V <sub>k</sub>					3,8	2,8	2,1	1,7	1,3
		P <sub>s</sub>					17,6	9,3	5,4	3,3	2,2
5000	1388,9	V <sub>k</sub>					4,3	3,1	2,4	1,8	1,5
		P <sub>s</sub>					21,7	11,5	6,6	4,1	2,7
6000	1666,7	V <sub>k</sub>					5,1	3,7	2,8	2,2	1,8
		P <sub>s</sub>					31,3	16,6	9,6	5,9	3,8
7000	1944,4	V <sub>k</sub>						4,3	3,3	2,6	2,1
		P <sub>s</sub>						22,6	13,0	8,0	5,2

**Symbols:**  
 V<sub>k</sub> = Effective velocity in m/s  
 P<sub>s</sub> = Static pressure in Pa  
 A<sub>k</sub> = Effective area in m<sup>2</sup>

## Selection example

Return grille mounted in ceiling, without volume control damper.

Requirements:

Return Air flow rate \_\_\_\_\_ 600 m<sup>3</sup>/h  
 Application \_\_\_\_\_ Library  
 Required pressure loss \_\_\_\_\_ Below 5 Pa  
 Maximum permitted effective velocity \_\_\_\_\_ 2 m/s

Solution:

With the selection table for egg crate grilles for return air we obtain:

Q (Air flow rate) \_\_\_\_\_ 600 m<sup>3</sup>/h (166,7 l/s)  
 Vk (Effective velocity) \_\_\_\_\_ 1,6 m/s  
 Ps (Pressure loss) \_\_\_\_\_ 3,1 Pa

Grille type 22-5 size 600 x 200, 400 x 300 or 350 x 350

Observing the results, the data obtained fulfil the requirements of the project.

Special dimensions

In addition to the normalised dimensions indicated in the selection table, this type of grille can be easily adapted to a modular false ceiling system by simply replacing one of the elements (600 x 600, 900 x 600, 600 x 300, etc.)

General information

The egg crate core is formed by 15 x 15 mm squares.  
 The high useful area makes it possible to return elevated air flow rates with a minimum pressure loss.  
 Its design adapts perfectly to that of illuminations.



## Door grilles (return)



### Description

Type 24-S1. Aluminium grille with counterframe.  
 Type 24-S2. Aluminium grille without counterframe.

### Finishes

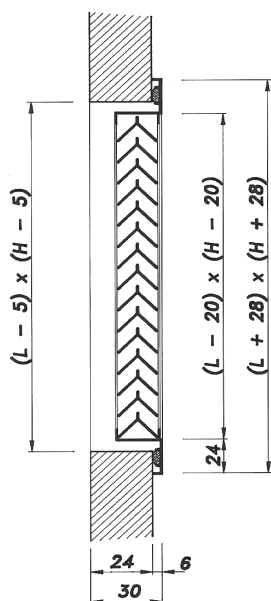
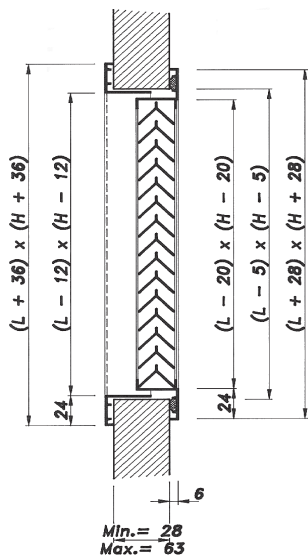
Anodised aluminium in its natural colour.  
 Special finishes available upon request.

### 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.

### Identification

In all descriptions of the grille dimensions, it is supposed that the first dimension is the length and the second the height.



## Quick Selection Table (Door grilles)

Q		Dim. (mm)	300x100 200x150	400x100 200x200	500x150 350x200	400x200 300x250	500x200 400x250	600x200 500x250 400x300	600x250 500x300	600x350 500x400	700x400 600x500
m <sup>3</sup> /h	l/s	A <sub>e</sub>	0,0156	0,0208	0,0390	0,0448	0,0560	0,0684	0,0855	0,1218	0,1652
50	13,9	V <sub>e</sub> P <sub>s</sub>	0,9 3,6	0,7 2,0	0,4 0,6						
60	16,7	V <sub>e</sub> P <sub>s</sub>	1,1 5,1	0,8 2,9	0,4 0,8						
70	19,4	V <sub>e</sub> P <sub>s</sub>	1,2 7,0	0,9 3,9	0,5 1,1	0,4 0,8					
80	22,2	V <sub>e</sub> P <sub>s</sub>	1,4 9,1	1,1 5,1	0,6 1,5	0,5 1,1	0,4 0,7				
90	25,0	V <sub>e</sub> P <sub>s</sub>	1,6 11,6	1,2 6,5	0,6 1,8	0,6 1,4	0,4 0,9				
100	27,8	V <sub>e</sub> P <sub>s</sub>	1,8 14,3	1,3 8,0	0,7 2,3	0,6 1,7	0,5 1,1	0,4 0,7			
120	33,3	V <sub>e</sub> P <sub>s</sub>	2,1 20,5	1,6 11,6	0,9 3,3	0,7 2,5	0,6 1,6	0,5 1,1	0,4 0,7		
140	38,9	V <sub>e</sub> P <sub>s</sub>	2,5 28,0	1,9 15,7	1,0 4,5	0,9 3,4	0,7 2,2	0,6 1,5	0,5 0,9		
160	44,4	V <sub>e</sub> P <sub>s</sub>		2,1 20,5	1,1 5,8	1,0 4,4	0,8 2,8	0,6 1,9	0,5 1,2		
180	50,0	V <sub>e</sub> P <sub>s</sub>		2,4 26,0	1,3 7,4	1,1 5,6	0,9 3,6	0,7 2,4	0,6 1,5	0,4 0,8	
200	55,6	V <sub>e</sub> P <sub>s</sub>			1,4 9,1	1,2 6,9	1,0 4,4	0,8 3,0	0,6 1,9	0,5 0,9	
250	69,4	V <sub>e</sub> P <sub>s</sub>			1,8 14,3	1,6 10,8	1,2 6,9	1,0 4,6	0,8 3,0	0,6 1,5	0,4 0,8
300	83,3	V <sub>e</sub> P <sub>s</sub>			2,1 20,5	1,9 15,6	1,5 10,0	1,2 6,7	1,0 4,3	0,7 2,1	0,5 1,1
350	97,2	V <sub>e</sub> P <sub>s</sub>			2,5 28,0	2,2 21,2	1,7 13,6	1,4 9,1	1,1 5,8	0,8 2,9	0,6 1,6
400	111,1	V <sub>e</sub> P <sub>s</sub>				2,5 27,7	2,0 17,7	1,6 11,9	1,3 7,6	0,9 3,7	0,7 2,0
500	138,9	V <sub>e</sub> P <sub>s</sub>					2,5 27,7	2,0 18,6	1,6 11,9	1,1 5,9	0,8 3,2
600	166,7	V <sub>e</sub> P <sub>s</sub>						2,4 26,7	1,9 17,1	1,4 8,4	1,0 4,6
700	194,4	V <sub>e</sub> P <sub>s</sub>							2,3 23,3	1,6 11,5	1,2 6,2
800	222,2	V <sub>e</sub> P <sub>s</sub>							2,6 30,4	1,8 15,0	1,3 8,1
900	250,0	V <sub>e</sub> P <sub>s</sub>								2,1 19,0	1,5 10,3
1000	277,8	V <sub>e</sub> P <sub>s</sub>								2,3 23,4	1,7 12,7
1200	333,3	V <sub>e</sub> P <sub>s</sub>									2,0 18,3
1400	388,9	V <sub>e</sub> P <sub>s</sub>									2,4 24,9
1600	444,4	V <sub>e</sub> P <sub>s</sub>									2,7 32,6

## Symbols:

V = Effective velocity in m/s  
P = Static pressure in Pa  
A<sub>e</sub> = Effective area in m<sup>2</sup>

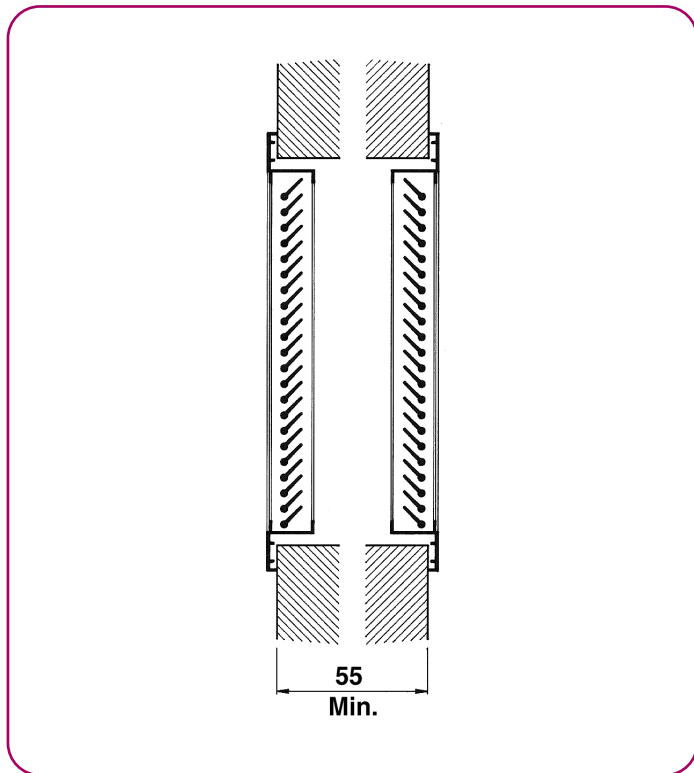
## NOTE:

- This selection table is based on full-scale laboratory tests according to standard ISO 5219 (UNE 100.710).

## Selection example

### General information

- This type of grille is always delivered with a mounting frame, provided with holes for screwing.
- The arrangement of the S-24 blades in inverted "V", impedes vision through it when applied in doors, partition walls, etc.
- Recommended transfer velocity for selection is from 0,75 to 1,25 m/s
- For grille type 24-S1 (with counterframe) installation is recommended in walls with upto 55 mm thickness. For walls with a higher thickness, use is recommended of two grilles type 20-45-H as detailed in the following drawing:



### Details:

Grille mounted in door for air transfer.

### Requirements

Transfer Air flow rate \_\_\_\_\_ 140 m<sup>3</sup>/h  
 Application \_\_\_\_\_ Offices  
 Required pressure loss \_\_\_\_\_ Below 8 Pa  
 Maximum transfer velocity \_\_\_\_\_ 1 m/s

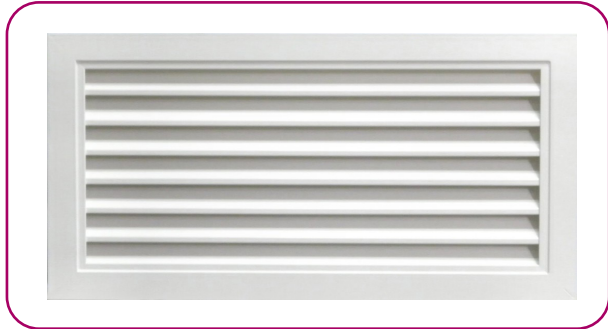
### Solution:

With the selection table for door grilles for air transfer we obtain:  
 Q (Air flow rate) \_\_\_\_\_ 140 m<sup>3</sup>/h (38,9 l/s)  
 V<sub>k</sub> (Effective velocity) \_\_\_\_\_ 1 m/s  
 P<sub>s</sub> (Pressure loss) \_\_\_\_\_ 4,5 Pa

Grille type 24-S1 or 24-S2 size 500 x 150 or 350 x 200

Observing the results, the data obtained fulfil the requirements of the project.

## Louvres for exterior air intake or exhaust

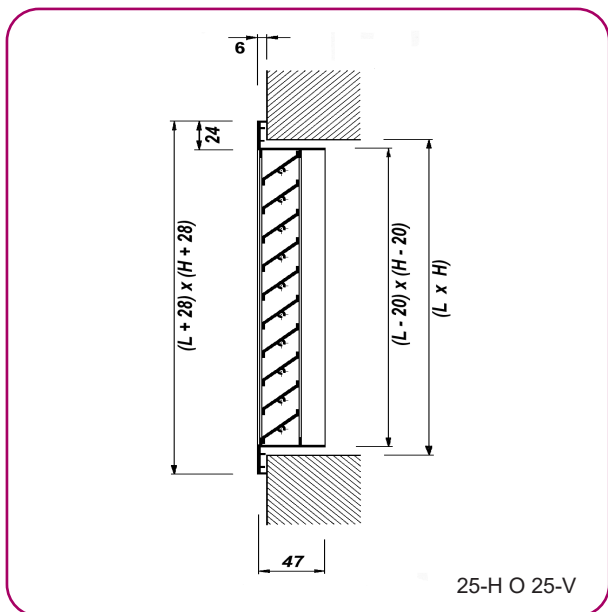


### Description

Type 25. Aluminium grille.

### Finishes

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

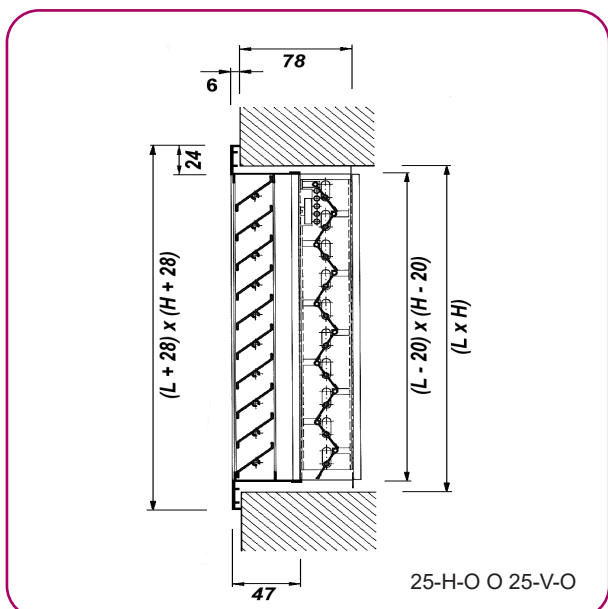


### Dimensions for use with mounting frame

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.



### Volume control damper

The damper is actuated from the front by a screw driver.

### Identification

In all descriptions of the grille dimensions, it is supposed that the first dimension is the length and the second the height. 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.

# Quick Selection Table (Louvres for exterior air intake or exhaust)

Q		Dim. (mm)	200x100	250x100	300x100 200x150	400x100 200x200	500x100 250x200	600x100 400x150 300x200	500x150 400x200 300x250	600x150 450x200	300x300	800x150	600x200 400x300	800x200 400x400	1000x200 800x250	1000x300 750x400	900x400 600x600	1000600		
(m <sup>3</sup> /h)	(l/s)	A <sub>eff</sub> (m <sup>2</sup> )	0,0054	0,0068	0,0081	0,0108	0,0135	0,0215	0,0269	0,0323	0,0360	0,0480	0,0480	0,0640	0,0800	0,1380	0,1801	0,3002		
50	13,9	V <sub>eff</sub> (m/s) p <sub>s</sub> (Pa) dB(A)	2,6 11 24	2,1 7 <20	1,7 5 <20	1,3 3 <20	1,0 2 <20													
60	16,7	V <sub>eff</sub> (m/s) p <sub>s</sub> (Pa) dB(A)	3,1 15 29	2,5 10 24	2,1 7 20	1,5 4 14	1,2 2 9													
70	19,4	V <sub>eff</sub> (m/s) p <sub>s</sub> (Pa) dB(A)	3,6 21 33	2,9 13 28	2,4 9 24	1,8 5 <20	1,4 3 <20	0,9 1 <20												
80	22,2	V <sub>eff</sub> (m/s) p <sub>s</sub> (Pa) dB(A)	4,1 27 36	3,3 18 31	2,7 12 27	2,1 7 21	1,6 4 <20	1,0 2 <20												
90	25,0	V <sub>eff</sub> (m/s) p <sub>s</sub> (Pa) dB(A)	4,6 35 39	3,7 22 34	3,1 15 30	2,3 9 24	1,9 6 <20	1,2 2 <20	0,9 1 <20											
100	27,8	V <sub>eff</sub> (m/s) p <sub>s</sub> (Pa) dB(A)	5,1 43 41	4,1 27 37	3,4 19 33	2,6 11 27	2,1 7 22	1,3 3 <20	1,0 2 <20											
160	44,4	V <sub>eff</sub> (m/s) p <sub>s</sub> (Pa) dB(A)	8,2 110 53	6,8 70 48	5,5 49 44	4,1 27 38	3,3 18 34	2,1 7 24	1,7 4 <20	1,4 3 <20	1,2 2 <20									
200	55,6	V <sub>eff</sub> (m/s) p <sub>s</sub> (Pa) dB(A)		8,2 110 54	6,9 76 50	5,1 43 44	4,1 27 39	2,8 11 29	2,1 7 24	1,7 5 21	1,5 4 <20									
250	69,4	V <sub>eff</sub> (m/s) p <sub>s</sub> (Pa) dB(A)			8,6 119 55	6,4 67 49	5,1 43 45	3,2 17 35	2,6 11 30	2,2 8 26	1,9 6 24	1,4 3 <20	1,4 3 <20	1,1 2 <20						
300	83,3	V <sub>eff</sub> (m/s) p <sub>s</sub> (Pa) dB(A)				7,7 96 54	6,2 62 49	3,9 24 39	3,1 16 34	2,8 11 31	2,3 9 28	1,7 5 22	1,7 5 22	1,3 3 <20	1,0 2 <20					
400	111,1	V <sub>eff</sub> (m/s) p <sub>s</sub> (Pa) dB(A)					8,2 110 56	5,2 43 46	4,1 28 42	3,4 19 38	3,1 15 35	2,3 9 29	2,3 9 29	1,7 5 23	1,4 3 <20					
500	138,9	V <sub>eff</sub> (m/s) p <sub>s</sub> (Pa) dB(A)						6,5 88 52	5,2 43 47	4,3 30 43	3,9 24 41	2,9 14 35	2,9 14 35	2,2 8 29	1,7 5 24	1,0 2 <20				
600	166,7	V <sub>eff</sub> (m/s) p <sub>s</sub> (Pa) dB(A)							6,2 62 52	5,2 43 48	4,6 35 45	3,5 20 39	3,5 20 39	2,8 11 33	2,1 7 28	1,2 2 <20				
700	194,4	V <sub>eff</sub> (m/s) p <sub>s</sub> (Pa) dB(A)								6,0 59 52	5,4 47 49	4,1 27 43	4,1 27 43	3,0 15 37	2,4 10 32	1,4 3 21	1,1 2 <20			
800	222,2	V <sub>eff</sub> (m/s) p <sub>s</sub> (Pa) dB(A)									6,9 77 55	6,2 62 53	4,6 35 46	4,6 35 46	3,5 20 36	2,8 13 24	1,8 4 21	1,2 2 <20		
900	250,0	V <sub>eff</sub> (m/s) p <sub>s</sub> (Pa) dB(A)										6,9 78 55	5,2 44 49	5,2 44 49	3,9 25 38	3,1 16 27	1,8 5 21	1,4 3 21		
1000	277,8	V <sub>eff</sub> (m/s) p <sub>s</sub> (Pa) dB(A)											5,8 54 52	5,8 54 52	4,3 31 46	3,5 20 41	2,0 7 29	1,5 4 24		
1600	444,4	V <sub>eff</sub> (m/s) p <sub>s</sub> (Pa) dB(A)														5,6 50 53	3,2 17 41	2,5 10 35	1,5 4 25	
2000	555,6	V <sub>eff</sub> (m/s) p <sub>s</sub> (Pa) dB(A)															4,0 26 41	3,1 15 41	1,9 6 30	
3000	833,3	V <sub>eff</sub> (m/s) p <sub>s</sub> (Pa) dB(A)																4,8 35 51	2,8 12 40	
3500	972,2	V <sub>eff</sub> (m/s) p <sub>s</sub> (Pa) dB(A)																	5,4 47 55	3,2 17 44
4000	1111,1	V <sub>eff</sub> (m/s) p <sub>s</sub> (Pa) dB(A)																		3,7 22 47

**Symbols:**

V<sub>e</sub> = Effective velocity in m/s  
 P<sub>s</sub> = Static pressure in Pa  
 A<sub>e</sub> = Effective area in m<sup>2</sup>  
 dB(A) = Sound power level.

**Note:**

- This selection table is based on full-scale laboratory tests according to standards ISO 5219 (UNE 100.710) and ISO 5135 and 3741.

Types: 25-H, 25-V, 25-H-O, 25-V-O

## Selection example

### Details

Grille mounted in wall, for exterior air intake, without duct.

### Requirements

Air flow rate \_\_\_\_\_ 400 m<sup>3</sup>/h  
Application \_\_\_\_\_ Store  
Sound level \_\_\_\_\_ Below 25 NR  
Required pressure loss \_\_\_\_\_ Below 5 Pa  
Maximum permitted effective velocity \_\_\_\_\_ 2 m/s

### Solution:

With the selection table for grilles type 25 we obtain:

Q (Air flow rate) \_\_\_\_\_ 400 m<sup>3</sup>/h (111,1 l/s)  
V<sub>k</sub> (Effective velocity) \_\_\_\_\_ 1,7 m/s  
NR (Sound level) \_\_\_\_\_ 22  
P<sub>s</sub> (Pressure loss) \_\_\_\_\_ 4,5 Pa

Grille type 25-H size 800 x 200, 600 x 250 or 500 x 300.

Observing the results, the data obtained fulfil the requirements of the project.



## Accessories and mounting



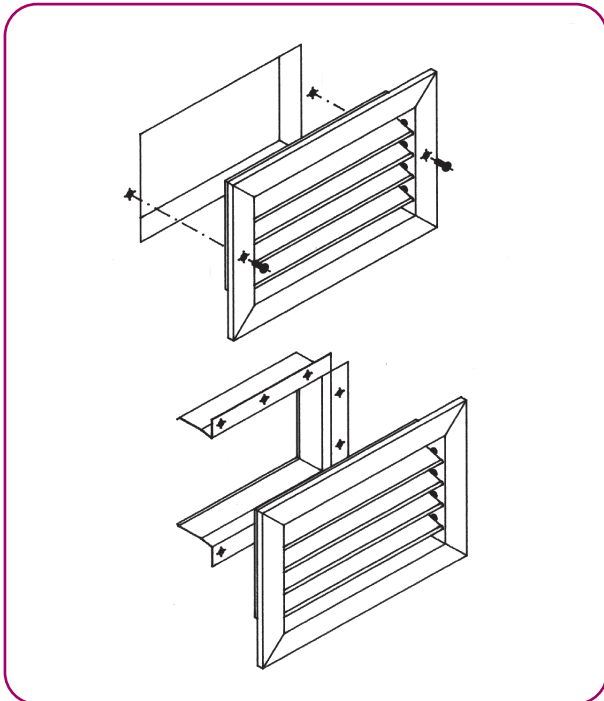
### Type MM

Metallic frame for grille mounting.

### 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 to use the metallic mounting frame MM.



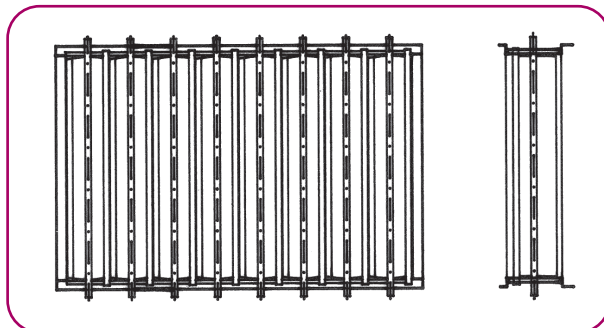
### Fixing with mounting frame

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 grilles of bigger size or weight 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-O

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

They can be applied to any type of grille (except filter holders and door grilles).

It can easily be operated from outside by a screwdriver.

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

The corrections to be applied to the table values (for the same effective velocity  $V_k$ ) depend on the percentage of opening of the damper, as indicated in the following table:

OPENING	$P_s$	NR
max	x 1,3	+ 2
1/2	x 4,0	+ 12
min	x 27,5	+ 24

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 <sup>2</sup> )	0,01	0,02	0,03	0,05	0,1	0,2
NR	-5,2	-1,9	0	+2,4	+5,8	+9,1

Normalised dimensions of the grilles (in mm)

Length (L) 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000

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

Special dimensions can be supplied upon request

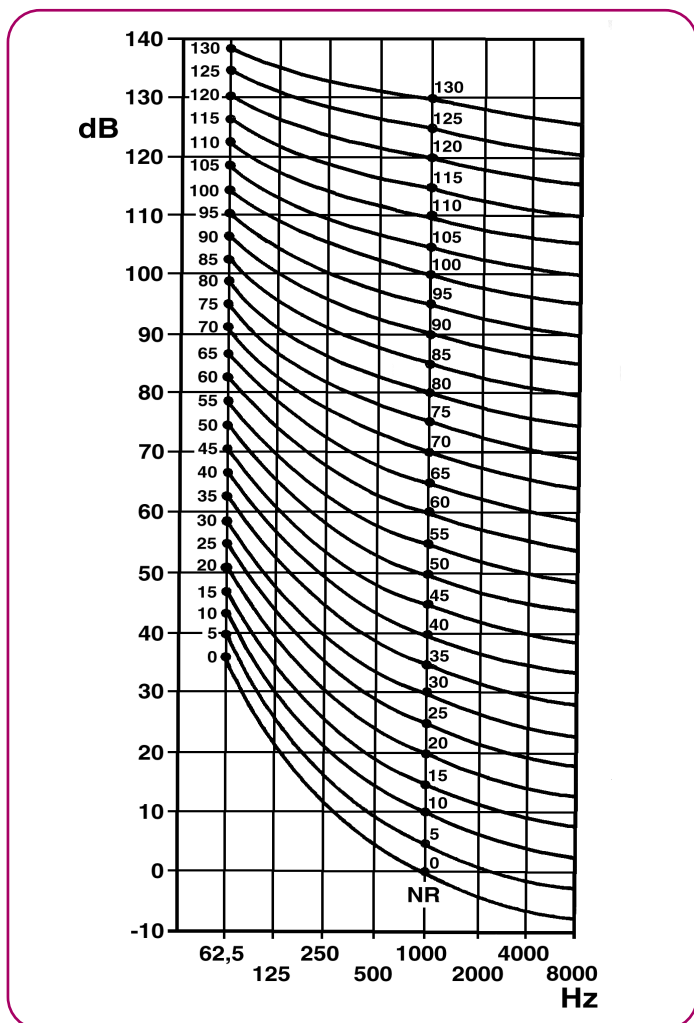
## Information of general interest

### Sound levels, NR curves

Hereafter, recommended sound levels for each type of installation are given.

Application	NR
Recording/television studios .....	15
Concert halls, operation rooms, libraries .....	20
Conference rooms, churches, residences, hotels, private offices .....	25-30
Banks, cafeterias, theatres, schools, restaurants, public buildings .....	35-40
Supermarkets, shopping malls, gyms .....	45-55
Shops, light industry .....	65

The NR system, which gradually will replace the NC system, has the advantage of including corrections which apply to the specified criterions, taking into account the type of noise, its duration and its location (see graph and following corrections).



### Corrections

dB

a) Pure tone, easily audible .....	-5
b) Variable duration or intermittent .....	-5
c) Noise only during working hours .....	+5
d) Noise during 25% of the time .....	+5
5% .....	+10
1,5% .....	+15
0,5% .....	+20
0,1% .....	+25
0,02% .....	+30
e) Residential suburbs .....	-5
Suburbs .....	0
Urban residential areas .....	+5
Urban areas close to light industry .....	+10
Industrial areas .....	+15

### Recommended velocities for air distribution units

The values given below are approximate and refer to comfort installations, since for industrial applications they may be higher.

In any case these data should be treated as orientative.

Type of terminal unit	Use	(m/s)
Grilles with single and double deflection	supply	2-3,5
Grilles with blades fixed at 45°	return	1,5-2,5
Grilles with filter holder	return	1,5-2,5
Grilles for circular ducts with single and double deflection	supply	2-4
Grilles for circular ducts with single deflection	return	1,5-3
Egg crate grilles	return	2-3
Door grilles	air transfer	0,75-1,25
Louvres supply or	return	2,5-4,5
Linear grilles, wall or ceiling	supply	2-3,5
Linear grilles, wall or ceiling	return	1,5-2,5
Linear grilles, floor	supply	1,5-2,5
Linear grilles, floor	return	1,5-2,5
Linear grilles for fan-coils or induction units	supply	2,5-4
Linear grilles for fan-coils or induction units	return	1,5-2,5
Linear grilles for air curtains	supply	3-6
Linear grilles for air curtains	return	2,5-4
Circular diffusers with fixed cones	supply	2-3
Circular diffusers with movable cones	supply	2,5-4,5
Extract valves	return	1-1,5
Ball diffusers	supply	3-9
Square and rectangular diffusers	supply	2-3,5
Linear diffusers	supply	2,5-4,5
Linear diffusers	return	1,5-2,5

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**KOOLAIR, S.A.**

Calle Urano, 26

Poligono industrial nº 2 – La Fuensanta

28936 Móstoles - Madrid - (España)

Tel: +34 91 645 00 33

e-mail: [info@koolair.com](mailto:info@koolair.com)

[www.koolair.com](http://www.koolair.com)