KOOLAIR

series 40.1

Circular diffusers

ISO 9001
BUREAU VERITAS
Certification
Sistema de Gestión

www.koolair.com

CONTENTS

Circular diffusers 43 SF

Description

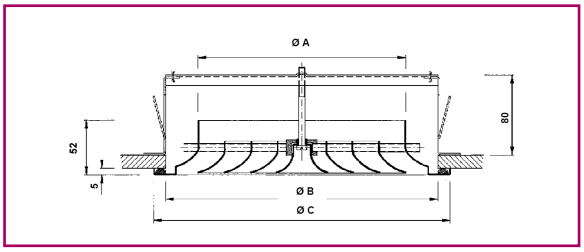
Type 43 SF with multiple cones, positioned in one plane aligned with the ceiling.

Finishes

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

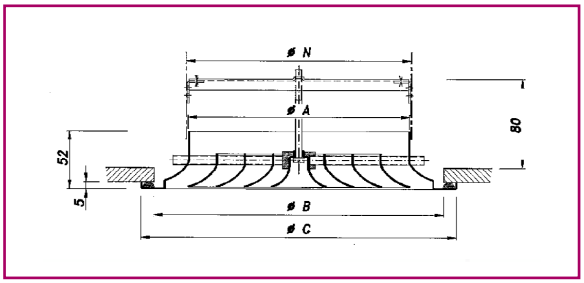
General dimensions

See page 4



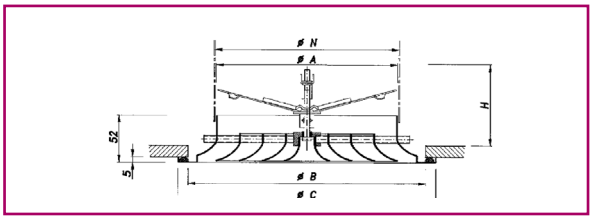
43 SF + PM

Circular diffuser with mounting bridge for fibre ducts.



43 SF + PMC

Circular diffuser with mounting bridge for sheet ducts.



43 SF + 49 MM + PM and 43 SF + 49 MM + PMC

Circular diffuser with flap damper and mounting bridge.
The volume control damper is operated through the diffuser.
H is the maximum height of the diffuser with the damper fully open.

43 SF	***Series, aluminium diffuser***
49 MM	***Volume control damper*** ***Without indication, not incorporated***
PM **PMC**	***Mounting bridge for fibre ducts*** ***Mounting bridge for sheet ducts***
Size	***From 6 to 16 according to table***
Ø Nom. mm.	***From 160 to 400 according to table***

Identification

With the mounting bridge the fixing to the ceiling is quick and easy.
The existing difference between exterior and neck diameters resolves space problems in certain installations.

Quick Selection Table

Notes:

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

- The diffuser is placed in the centre of a square room.

- The jet is adherent, i.e. the diffuser is mounted aligned with the ceiling.

- Room height is 3 ± 0,5 m.

- Sound index NR is based on sound power, without room attenuation and without damper (mounting according to ISO).

- To obtain the pressure loss or sound level of diffuser 43 SF with damper, see the corresponding graph on page 13.

- Throws given correspond to a terminal velocity (V_z) of 0,25 m/s in the occupied zone.

Symbols

V_k = Effective velocity in m/s
X = Throw in m
P_t = Total pressure in Pa
NR = Noise level index in dB
A_k = Effective area in m^2

Types

43 SF + PM
43 SF + PMC
43 SF + 49 MM + PM
43 SF + 49 MM + PMC

Q			Nominal ⌀ of diffuser in mm.					
			160	200	250	315	355	400
			Size					
			6	8	10	12	14	16
m³/h	l/s	A_k	0,0092	0,0138	0,0206	0,0312	0,0386	0,0477
100	27,8	V_k	3,0	2,0	1,3			
		X	0,9	0,8	0,6			
		P_t	3,6	1,6	0,7			
		NR						
120	33,3	V_k	3,6	2,4	1,6			
		X	1,1	0,9	0,7			
		P_t	5,1	2,3	1,0			
		NR	4					
140	38,9	V_k	4,2	2,8	1,9	1,2		
		X	1,3	1,1	0,9	0,7		
		P_t	7,0	3,1	1,4	0,6		
		NR	9					
160	44,4	V_k	4,8	3,2	2,2	1,4	1,2	
		X	1,5	1,2	1,0	0,8	0,7	
		P_t	9,1	4,0	1,8	0,8	0,5	
		NR	14	4				
180	50,0	V_k	5,4	3,6	2,4	1,6	1,3	
		X	1,7	1,4	1,1	0,9	0,8	
		P_t	11,5	5,1	2,3	1,0	0,7	
		NR	18	8				
200	55,6	V_k	6,0	4,0	2,7	1,8	1,4	1,2
		X	1,8	1,5	1,2	1,0	0,9	0,8
		P_t	14,2	6,3	2,8	1,2	0,8	0,5
		NR	22	12	2			
250	69,4	V_k	7,5	5,0	3,4	2,2	1,8	1,5
		X	2,3	1,9	1,5	1,2	1,1	1,0
		P_t	22,2	9,9	4,4	1,9	1,3	0,8
		NR	29	19	10			
300	83,3	V_k	9,1	6,0	4,0	2,7	2,2	1,7
		X	2,8	2,3	1,8	1,5	1,3	1,2
		P_t	32,0	14,2	6,4	2,8	1,8	1,2
		NR	36	26	16	6		
350	97,2	V_k	10,6	7,0	4,7	3,1	2,5	2,0
		X	3,2	2,6	2,1	1,7	1,6	1,4
		P_t	43,6	19,4	8,7	3,8	2,5	1,6
		NR	41	31	21	11	6	
400	111,1	V_k		8,1	5,4	3,6	2,9	2,3
		X		3,0	2,5	2,0	1,8	1,6
		P_t		25,3	11,3	4,9	3,2	2,1
		NR		36	26	16	11	6
450	125,0	V_k		9,1	6,1	4,0	3,2	2,6
		X		3,4	2,8	2,2	2,0	1,8
		P_t		32,0	14,4	6,3	4,1	2,7
		NR		40	30	20	15	10
500	138,9	V_k		10,1	6,7	4,5	3,6	2,9
		X		3,8	3,1	2,5	2,2	2,0
		P_t		39,5	17,7	7,7	5,0	3,3
		NR		44	34	24	19	13
600	166,7	V		12,1	8,1	5,3	4,3	3,5
		X		4,5	3,7	3,0	2,7	2,4
		P_t		56,9	25,5	11,1	7,3	4,8
		NR		50	40	30	25	20
700	194,4	V_k			9,4	6,2	5,0	4,1
		X			4,3	3,5	3,1	2,8
		P_t			34,7	15,1	9,9	6,5
		NR			46	35	30	25
800	222,2	V_k			10,8	7,1	5,8	4,7
		X			4,9	4,0	3,6	3,2
		P_t			45,4	19,8	12,9	8,5
		NR			50	40	35	30
900	250,0	V_k			12,1	8,0	6,5	5,2
		X			5,5	4,5	4,0	3,6
		P_t			57,4	25,0	16,4	10,7
		NR			54	44	39	34
1000	277,8	V_k				8,9	7,2	5,8
		X				5,0	4,5	4,0
		P_t				30,9	20,2	13,2
		NR				48	43	37
1200	333,3	V_k				10,7	8,6	7,0
		X				6,0	5,4	4,8
		P_t				44,5	29,1	19,0
		NR				54	49	44
1400	388,9	V_k				12,5	10,1	8,2
		X				7,0	6,3	5,7
		P_t				60,6	39,6	25,9
		NR				60	54	49
1600	444,4	V_k					11,5	9,3
		X					7,2	6,5
		P_t					51,7	33,9
		NR					59	54

NR 1C
VI
NR 3C
VI
NR > 30

General information

General dimensions

Diffuser size	Dimensions in mm				
	Ø N	Ø A	Ø B	Ø C	H
6	160	159	213	247	132
8	200	199	264	287	152
10	250	249	315	337	177
12	315	314	366	402	209
14	355	354	417	442	229
16	400	399	462	487	252

Symbols

Ø N = Duct diameter in mm
Ø A = Exterior neck diameter of diffuser in mm
Ø B = Diameter of opening in ceiling in mm
Ø C = Total exterior diameter of diffuser in mm
H = Maximum height of the diffuser with the volume control damper fully open

Example of selection

Requirements

Air flow rate: _____ 300 m^3/h
Throw: _____ 1,3 to 1,6 m
Sound level: _____ below 20 NR
Application: _____ Offices
Required pressure loss: _____ below 10 Pa

Solution

With the selection table for diffusers type 43 SF and following the general criterion that for comfort installations the recommended discharge velocity for this type of diffusers lies between 2 and 3 m/s, we obtain:

Q (Air flow rate) _____ 300 m^3/h
V_k (Effective velocity) _____ 2,7 m/s
X (Throw) _____ 1,5 m
P_t (Pressure loss) _____ 2,8 Pa
NR (Sound level) _____ 6

Diffuser 43 SF + PM or PMC size 12 (Ø 315 mm).

With optional delivery of damper 49 MM Observing the results, the data obtained fulfil the requirements of the project.

Throw correction factor for distance of diffuser to ceiling (C_h)

For adherent jets, i.e. diffuser aligned with ceiling:

$$C_h = 1$$

For free jets, with the diffuser separated from the ceiling:

$$C_h = 1{,}4$$

The corrected throw (X_c) is obtained by multiplying the throw (X) by the throw correction factor (C_h).

$$X_c = X \cdot C_h$$

Nützliche Hinweise

1. Maximum distance of diffuser to ceiling.
To obtain an adhering jet with cold air, it is advisable not to exceed the distance of the diffuser with respect to the ceiling (h max.) and the temperature difference Δt (difference between room and supply air temperature) according to the following table.

Δt	(°C)	0	6	9	12
h max	(m)	0,15	0,09	0,06	0,04

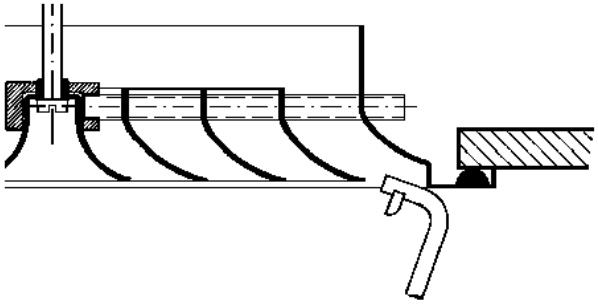
2. Minimum recommended velocity in occupied zone, V_z
Due to the difference in the temperature of the air in the room with respect to the cold supply air, the following velocities V_z are recommended:

Δt	(°C)	0	6	9	12
V_z	(m/s)	0,23	0,19	0,15	0,15

3. Flow rate measurement
The air flow rate (q_v) is obtained from the product of the effective area of the diffuser (A_k) and its effective velocity (V_k), measured with a probe type ALNOR 2220 or 6070P.

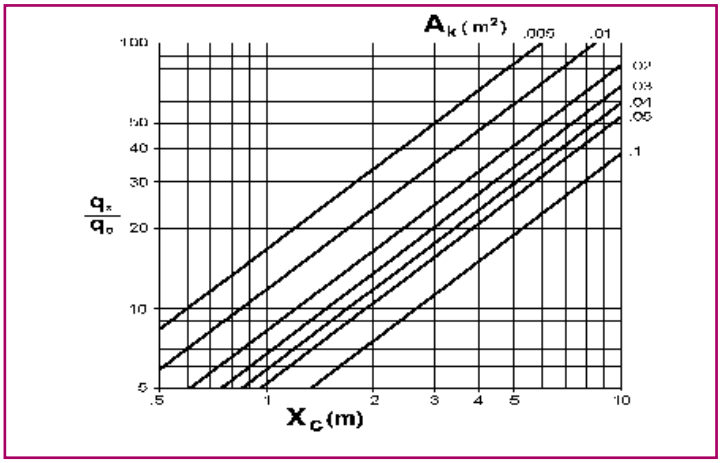
$$q_v(m^3/h) = A_k\ (m_2) \cdot V_k\ (m/s) \cdot 3600$$

If a hot-wire anemometer is used (e.g. type TSIVELOCICALC), the velocity obtained should be multiplied by 1,33.



Measurement with Alnor probe

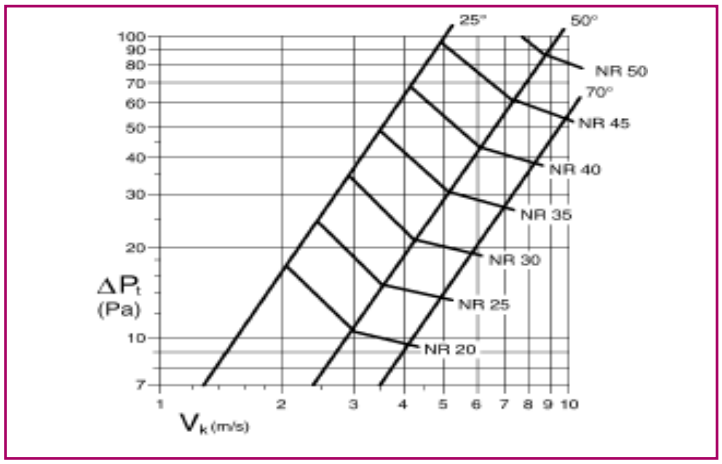
4. Induction effect
It is also possible to obtain the air flow rate induced in the room from the so-called induction factor (q_x/q_o) which is determined by the parameters X_c in m (corrected throw) and the effective discharge area A_k in m^2, according to the following figure.



5. Technical data on volume control damper 49 MM

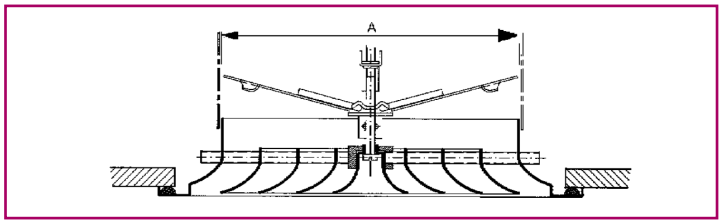
The volume control damper 49 MM modifies the values of sound level and pressure loss given in the selection table.

Hereafter, and in the corresponding graph sound levels and total pressure losses (ΔPt) are presented for the diffuser including the volume control damper as a function of the parameters Vk (effective velocity) and percentage of opening of the damper.



A correction factor should be applied to the sound level as a function of the nominal diameter of the diffuser according to the following table.

Ø	160	200	250	315	355	400
NR	-2	0	+3	+4	+5	+6



Circular diffusers 44 SF and 45 SF

Description

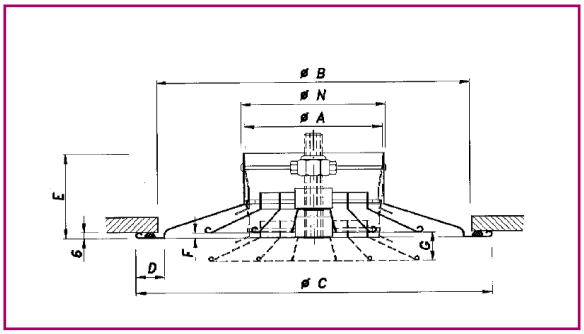
Type 44 SF with core adjustable by rotation.

Finishes

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

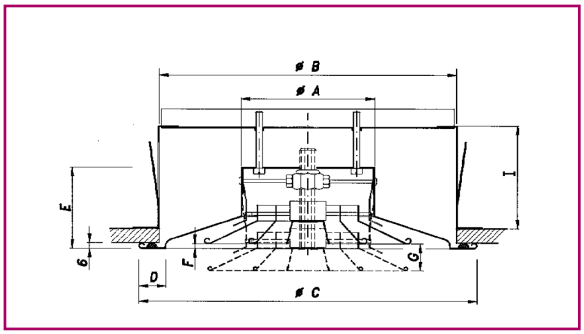
General dimensions

See page 11.



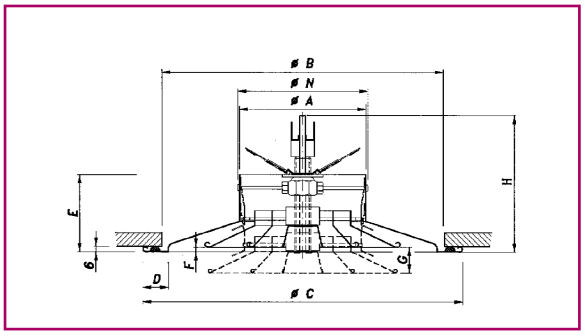
44 SF

Circular diffuser with core adjustable in height.



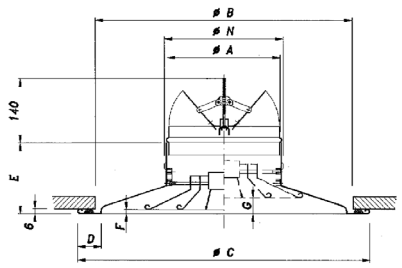
44 SF + PM

Circular diffuser with mounting bridge for sheet ducts.



44 SF + 49 ML + PM

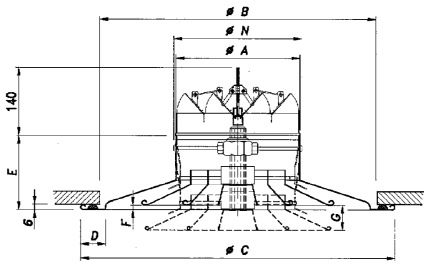
Circular diffuser with flap damper and mounting bridge.
The volume control damper is operated through the diffuser.



44 SF + 49 MO

(Sizes 4 to 12, Ø 100 to 315)

Circular diffuser with volume control damper with blades connected to the central axis. The volume control damper is operated through the diffuser.



44 SF + 49 MO

(Sizes 14 to 24, Ø 355 to 630)

Circular diffuser with volume control damper with multiple blades connected to the central axis. The volume control damper is operated through the diffuser.

44 SF	***Series, aluminium diffuser***
49 ML **49 MO**	***Without indication, not incorporated*** ***Volume control damper with blades*** ***Volume control damper with multiple blades***
PM **PMC** **SM**	***Without indication, not incorporated*** ***Mounting bridge for fibre ducts*** ***Mounting bridge for sheet ducts*** ***Mounting system***
Size	***From 4 to 24 according to table***
Ø Nom. mm.	***From 100 to 630 according to table***

Identification

This diffuser type is ideal for application in high ceilings. By manually rotating the central cone a good air distribution can be obtained.
The volume control damper can easily be operated by removing the central part of the diffuser.

Possible combinations of diffuser 44 SF with volume control dampers and mounting systems.

SIZE	NOMINAL ø in mm	DAMPER			MOUNTING SYSTEM			DAMPER + MOUNTING SYSTEM			
		49 ML	49 MM	49 MO	PM	PMC	SM	49 ML + PM	49 ML + PMC	49 ML + SM	49 MO + SM
4	100			●			●				●
6	160	●		●	●	●	●	●	●	●	●
8	200	●		●	●	●	●	●	●	●	●
10	250	●		●	●	●	●	●	●	●	●
12	315	●		●	●	●	●	●	●	●	●
14	355	●		●	●	●	●	●	●	●	●
16	400	●		●	●	●		●	●		
18	450			●							
21	500			●							
24	630			●							

Description

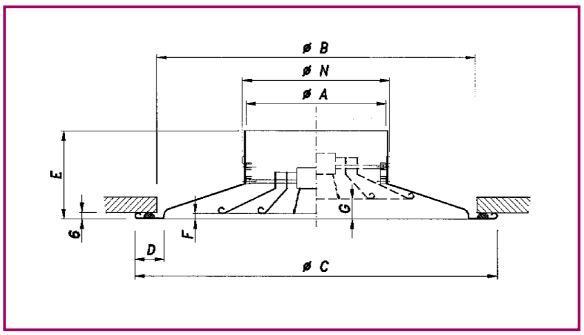
Type 45 SF with removable core, adjustable in two fixed positions.

Finishes

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

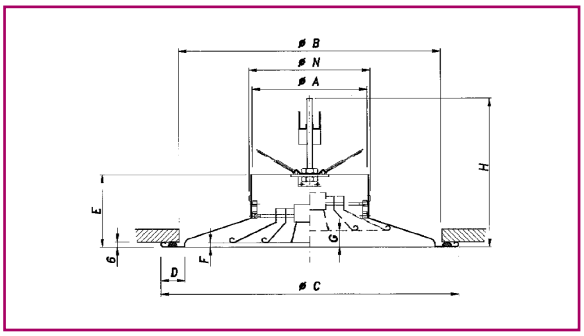
General dimensions

See page 11.



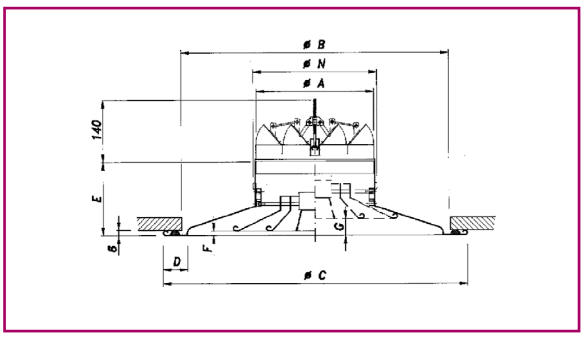
45 SF

Circular diffuser with removable core, adjustable in two fixed positions.



45 SF + 49 MM + PM

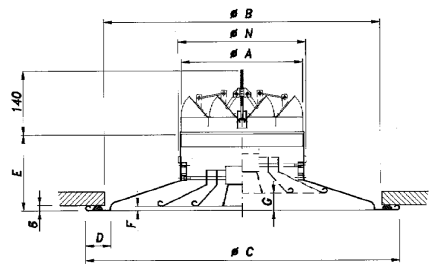
Circular diffuser with blade damper and mounting bridge. The volume control damper is operated through the diffuser.



45 SF + 49 MO

(Sizes 4 to 12, Ø 100 to 315)

Circular diffuser with volume control damper with blades connected to the central axis. The volume control damper is operated through the diffuser.



45 SF + 49 MO

(Sizes 14 to 24, Ø 355 to 630)

Circular diffuser with volume control damper with multiple blades connected to the central axis. The volume control damper is operated through the diffuser.

45 SF	***Series, aluminium diffuser***
49 ML	***Without indication, not incorporated***
49 MO	***Volume control damper with blades***
	Volume control damper with multiple blades
PM	***Without indication, not incorporated***
PMC	***Mounting bridge for fibre ducts***
SM	***Mounting bridge for sheet ducts***
	Mounting system
Size	***From 4 to 24 according to table***
Nom. Ø mm.	***From 100 to 630 according to table***

Identification

This type of diffuser is ideal for installations with hot or cold air. For cold air the cones are placed in the lower position, while for hot air they are located in the upper position. The core can easily be removed by pressing the fixing clips.
The volume control damper can easily be operated by removing the central part of the diffuser.

Mögliche Kombinationen der Auslässe 45 SF mit Drosselklappe und Montagesystem

SIZE	NOMINAL ø in mm	DAMPER			MOUNTING SYSTEM			DAMPER + MOUNTING SYSTEM			
		49 ML	49 MM	49 MO	PM	PMC	SM	49 ML + PM	49 ML + PMC	49 ML + SM	49 MO + SM
4	100			●			●				●
6	160	●		●	●	●	●	●	●	●	●
8	200	●		●	●	●	●	●	●	●	●
10	250	●		●	●	●	●	●	●	●	●
12	315	●		●	●	●	●	●	●	●	●
14	355	●		●	●	●	●	●	●	●	●
16	400	●		●	●	●		●	●		
18	450			●							
21	500			●							
24	630			●							

Quick Selection Table (diffusers type 44 SF and 45 SF)

Q			Nominal ⌀ of diffuser in mm.									
			100	160	200	250	315	355	400	450	500	630
			Size									
			4	6	8	10	12	14	16	18	21	24
(m³/h)	(l/s)	Ak	0,0051	0,0144	0,0225	0,0338	0,0512	0,0679	0,0898	0,1029	0,1285	0,2079
100	27,8	V k X Pt NR	5,4 0,9 17,8 24	1,9 0,5 2,2	1,2 0,4 0,9							
160	44,4	V k X Pt NR	8,7 1,4 45,6 39	3,1 0,8 5,7 9	2,0 0,7 2,3	1,3 0,5 1,0						
200	55,6	V k X Pt NR	10,9 1,8 71,2 46	3,9 1,0 8,9 16	2,5 0,8 3,7	1,6 0,7 1,6	1,1 0,6 0,7					
300	83,3	V k X Pt NR		5,8 1,6 20,1 30	3,7 1,3 8,2 17	2,5 1,0 3,6 5	1,6 0,8 1,6	1,2 0,7 0,9				
400	111,1	V k X Pt NR		7,7 2,1 35,7 39	4,9 1,7 14,6 26	3,3 1,4 6,5 15	2,2 1,1 2,8	1,6 1,0 1,6	1,2 0,8 0,9			
500	138,9	V k X Pt NR		9,6 2,6 55,8 46	6,2 2,1 22,9 33	4,1 1,7 10,1 22	2,7 1,4 4,4 10	2,0 1,2 2,5	1,5 1,1 1,4	1,3 1,0 1,1		
600	166,7	V k X Pt NR			7,4 2,5 32,9 39	4,9 2,1 14,6 28	3,3 1,7 6,4 16	2,5 1,4 3,6 8	1,9 1,3 2,1	1,6 1,2 1,6	1,3 1,1 1,0	
700	194,4	V k X Pt NR			8,6 2,9 44,8 44	5,8 2,4 19,9 33	3,8 1,9 8,7 21	2,9 1,7 4,9 13	2,2 1,5 2,8 5	1,9 1,4 2,1	1,5 1,2 1,4	0,9 1,0 0,5
800	222,2	V k X Pt NR			9,9 3,4 58,5 49	6,6 2,7 25,9 37	4,3 2,2 11,3 25	3,3 1,9 6,4 17	2,5 1,7 3,7 9	2,2 1,6 2,8	1,7 1,4 1,8	1,1 1,1 0,7
900	250,0	V k X Pt NR				7,4 3,1 32,8 41	4,9 2,5 14,3 29	3,7 2,2 8,1 21	2,8 1,9 4,7 13	2,4 1,8 3,5 9	1,9 1,6 2,3	1,2 1,2 0,9
1000	277,8	V k X Pt NR				8,2 3,4 40,5 44	5,4 2,8 17,7 32	4,1 2,4 10,0 24	3,1 2,1 5,7 16	2,7 2,0 4,4 12	2,2 1,8 2,8 6	1,3 1,4 1,1
1200	333,3	V k X Pt NR				9,9 4,1 58,4 50	6,5 3,3 25,4 38	4,9 2,9 14,5 30	3,7 2,5 8,3 22	3,2 2,4 6,3 18	2,6 2,1 4,0 12	1,6 1,7 1,5
1400	388,9	V k X Pt NR					7,6 3,9 34,6 43	5,7 3,4 19,7 35	4,3 2,9 11,3 27	3,8 2,7 8,6 23	3,0 2,5 5,5 17	1,9 1,9 2,1
1600	444,4	V k X Pt NR					8,7 4,5 45,2 48	6,5 3,9 25,7 40	4,9 3,4 14,7 32	4,3 3,1 11,2 28	3,5 2,8 7,2 21	2,1 2,2 2,7 8
1800	500,0	V k X Pt NR					9,8 5,0 57,2 52	7,4 4,3 32,5 44	5,6 3,8 18,6 36	4,9 3,5 14,2 32	3,9 3,2 9,1 25	2,4 2,5 3,5 11
2000	555,6	V k X Pt NR					10,9 5,6 70,6 55	8,2 4,8 40,2 47	6,2 4,2 23,0 39	5,4 3,9 17,5 35	4,3 3,5 11,2 29	2,7 2,8 4,3 15
2500	694,4	V k X Pt NR						10,2 6,0 62,8 54	7,7 5,3 35,9 46	6,7 4,9 27,3 42	5,4 4,4 17,5 36	3,3 3,5 6,7 22
3000	833,3	V k X Pt NR							9,3 6,3 51,7 52	8,1 5,9 39,4 48	6,5 5,3 25,2 42	4,0 4,1 9,6 28
3500	972,2	V k X Pt NR								9,4 6,9 53,6 53	7,6 6,1 34,3 47	4,7 4,8 13,1 33
4000	1111,1	V k X Pt NR								10,8 7,9 70,0 58	8,6 7,0 44,9 51	5,3 5,5 17,1 37
4500	1250,0	V k X Pt NR									9,7 7,9 56,8 55	6,0 6,2 21,7 41
5000	1388,9	V k X Pt NR									10,8 8,8 70,1 59	6,7 6,9 26,8 45
6000	1666,7	V k X Pt NR										8,0 8,3 38,6 51
7000	1944,4	V k X Pt NR										9,4 9,7 52,5 56
8000	2222,2	V k X Pt NR										10,7 11,0 68,6 60

NR 20 | NR 40 | NR > 40

Symbols:

V_k = Effective velocity in m/s
X = Throw in m
P_t = Total pressure in Pa
NR = Noise level index in dB
A_k = Effective area in m²

Notes:

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

The diffuser is placed in the centre of a square room.

The jet is adherent, i.e. the diffuser is mounted aligned with the ceiling.

The diffuser tested was of type 44 SF with the cones in intermediate position.

Room height is 3 ± 0,5 m.

Sound index NR is based on sound power, without room attenuation and without damper (mounting according to ISO).

Throws given correspond to a terminal velocity (Vz) of 0,25 m/s in the occupied zone.

To obtain the pressure loss or sound level of diffusers 44 SF and 45 SF with damper, see the corresponding graph on page 13.

General information

General dimensions

Diffuser size	Dimensions in mm									
	Ø N	Ø A	Ø B	Ø C	D	E	F	G	H	I
4	100	099	220	240	15	74	0	12	-	-
6	160	159	286	316	20	80	6	18	160	72
8	200	199	385	415	20	92	8	20	192	92
10	250	249	468	498	20	105	10	22	230	92
12	315	314	566	606	25	119	6	28	277	92
14	355	354	664	714	30	134	12	34	312	137
16	400	399	754	814	35	145	12	34	345	137
18	450	449	850	920	40	158	20	42	-	-
21	500	499	985	1055	40	180	20	42	-	-
24	630	629	1108	1188	45	196	25	47	-	-

Example of selection

Requirements

Air flow rate _____ 2000 m^3/h
Throw _____ 3 to 4 m
Sound level _____ below 30 NR
Application _____ Public building hall
Required pressure loss_____ below 15 Pa

Symbols

Ø N = Duct diameter in mm
Ø A = Exterior neck diameter of diffuser in mm
Ø B = Diameter of opening in ceiling in mm
Ø C = Total exterior diameter of diffuser in mm
D = Width of the exterior ring of the diffuser in mm
E = Height of the diffuser in mm
F = Distance from core in lower position to the reference level in mm
G = Distance from core in upper position to the reference level in mm
H = Maximum height of the diffuser with the volume control damper fully open
I = Height of mounting bridge

Solution:

With the selection table for diffusers type 44 SF and 45 SF and following the general criterion that for comfort installations the recommended discharge velocity for this type of diffusers lies between 2,5 and 4,5 m/s, we obtain:

Q (Air flow rate) _____2000 m^3/h
V_k (Effective velocity) _____4,3 m/s
X (Throw) _____ 3,5 m
P_t (Pressure loss) _____ 11,2 Pa
NR (Sound level) _____29

Diffuser 44 SF or 45 SF size 21 (Ø 500 mm)

With optional delivery of damper and mounting system.

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

Throw correction factor for distance of diffuser to ceiling (C_h)

For adherent jets, i.e. diffuser aligned with ceiling:

$$C_h = 1$$

For free jets, with the diffuser separated from the ceiling:

$$C_h = 1{,}4$$

The corrected throw (X_c) is obtained by multiplying the throw (X) by the throw correction factor (C_h).

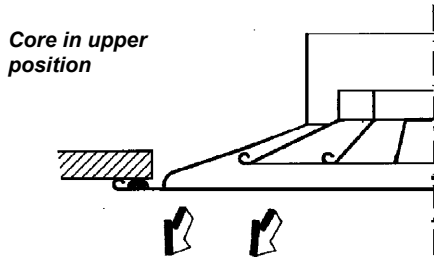
$$X_c = X \cdot C_h$$

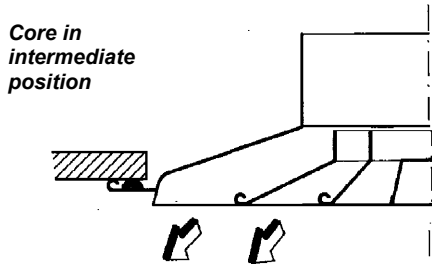
Useful recommendations

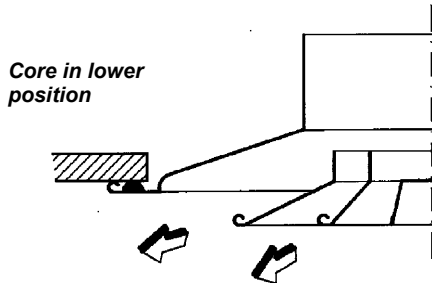
1. Core position

1.a. In the 44 SF series the core is adjusted by rotation, allowing distribution of the air in different directions. In the upper position, with the core “G” mm above the reference level (i.e. the exterior ring) a vertical flow is obtained. In intermediate position, with the core aligned with the exterior ring, a horizontal flow is achieved, with data according to the selection table. In lower position, with the central part 20 mm below the exterior ring, a horizontal distribution is obtained, resulting in a 20% increase in throw, the same pressure loss and a 4 dB lower noise level.

1.b. In the 45 SF series the central part can be placed in two fixed positions. In the upper position a vertical flow is obtained, while in the lower position a horizontal flow is achieved with a throw equal to the 44 SF series, a 20% higher pressure loss and a 2 dB higher noise level.







2. Maximum distance of diffuser to ceiling.

To obtain an adhering jet with cold air, it is advisable not to exceed the distance of the diffuser with respect to the ceiling (h max.) and the temperature difference Δt (difference between room and supply air temperature) according to the following table.

Δt	(°C)	0	6	9	12
h max	(m)	0,70	0,40	0,27	0,20

3. Minimum recommended velocity in occupied zone, V_z

Due to the difference in the temperature of the air in the room with respect to the cold supply air, the following velocities V_z are recommended:

Δt	(°C)	0	6	9	12
V_z	(m/s)	0,23	0,19	0,15	0,15

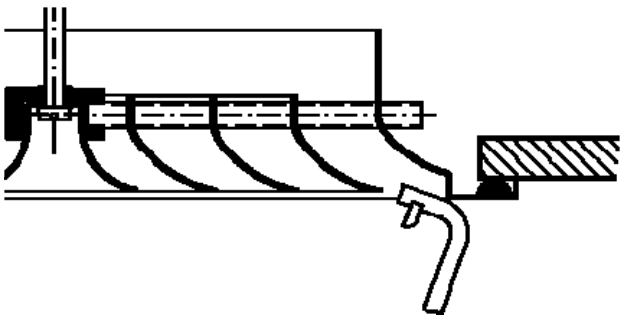
4. Flow rate measurement

The air flow rate (q_v) is obtained from the product of the effective area of the diffuser (A_k) and its effective velocity (V_k), measured with a probe type ALNOR 2220 or 6070P and with the cones in intermediate position:

$$q_v(m^3/h) = A_k(m^2) \cdot V_k\ (m/s) \cdot 3600$$

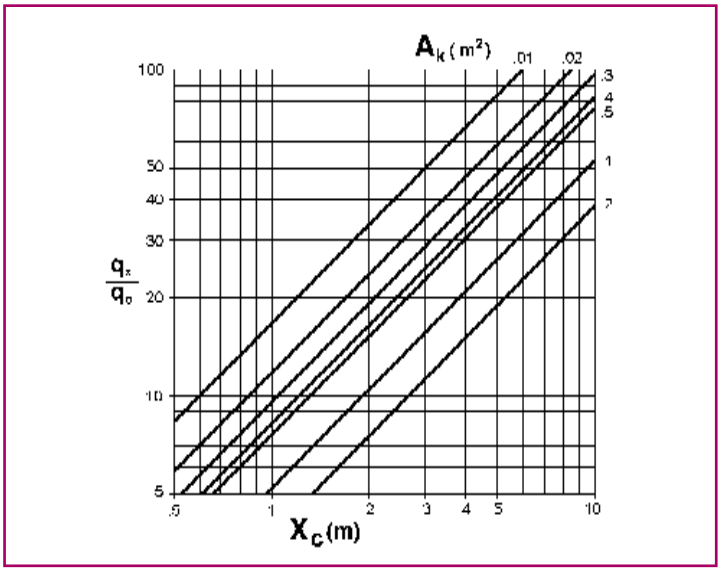
If a hot-wire anemometer is used (e.g. type TSIVELOCICALC), the velocity obtained should be multiplied by 1,33.

Measurement with Alnor probe



5. Induction effect

It is also possible to obtain the air flow rate induced in the room from the so-called induction factor (q_x/q_o) which is determined by the parameters X_c in m (corrected throw) and the effective discharge area A in m^2, according to the following figure.

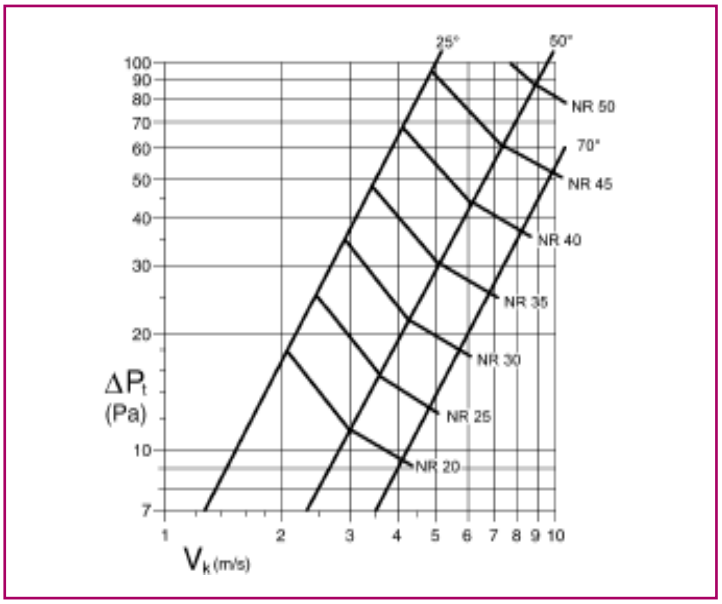


6. Volume control dampers 49 MM, 49 ML and 49 MO

Technical data

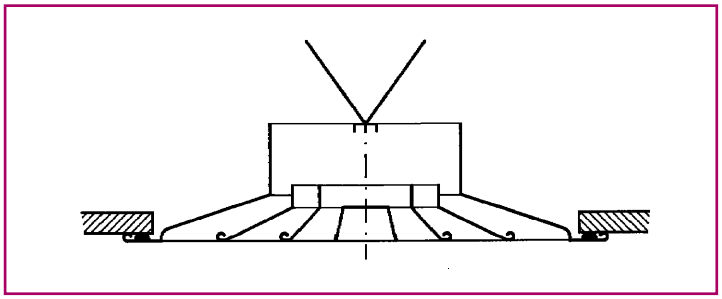
The volume control dampers modify the values of sound level and pressure loss given in the selection table. Hereafter, and in the corresponding graphs sound levels and total pressure losses (ΔP_t) are presented for the diffuser including the volume control damper as a function of the parameters V_k (effective velocity) and position of the damper.

6.a. Dampers 49 MM and 49 ML (position in degrees)

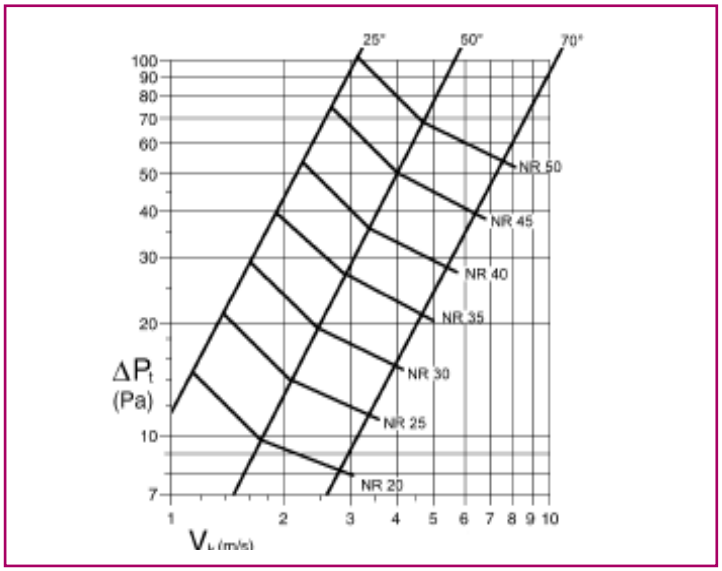


A correction factor should be applied to the sound level as a function of the nominal diameter of the diffuser according to the following table.

Ø	160	200	250	315	355	400
NR	-2	0	+3	+4	+5	+6



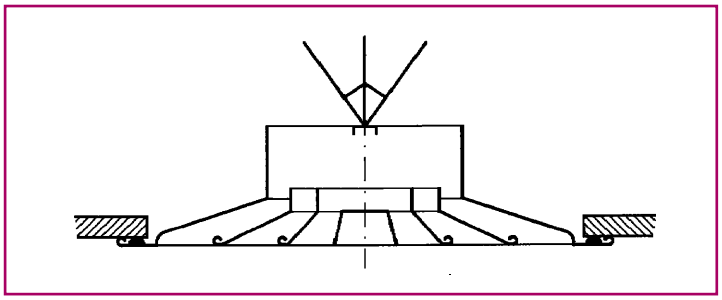
6.b. Damper 49 MO (position in degrees)



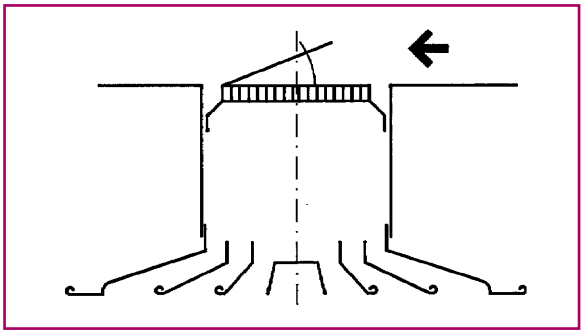
A correction factor should be applied to the sound level as a function of the nominal diameter of the diffuser according to the following table:

Ø	100	160	200	250	315
NR	-5	-2	-1	0	+1

Ø	355	400	450	500	630
NR	+2	+2	+3	+3	+4

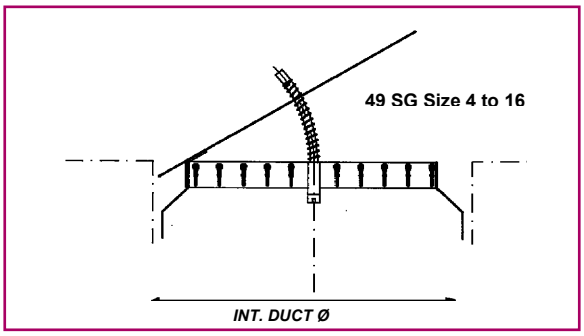


Other accessories and mounting systems

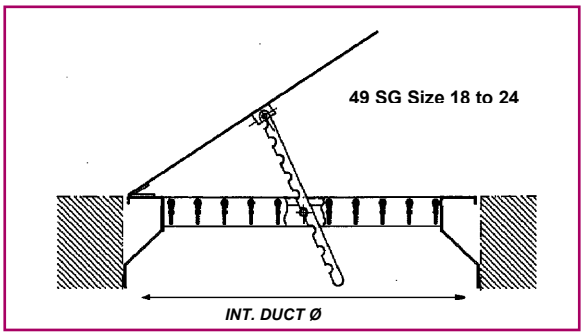


Damper 49 SG

This damper consists basically of a disc and a directional grille. It is ideal for installation in “T”-pieces of duct and is compatible with any supply air terminal unit, i.e. it will not be directly connected to it.

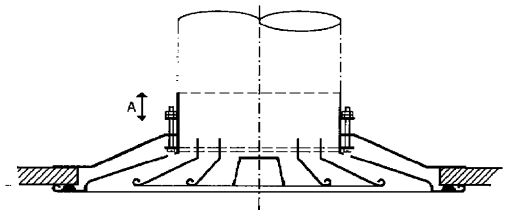


From size 4 to 16 (Ø 100 to 400 mm) the damper is actuated by rotating the “worm” with a screwdriver.



From size 18 to 24 (Ø 450 to 630 mm) the damper is kept in position by a fixation lever.

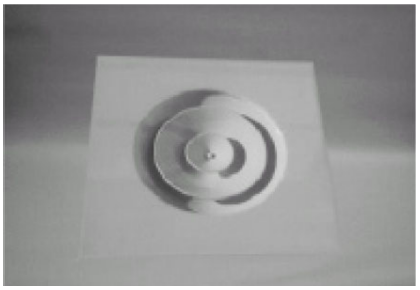
NOMINAL	A
100 - 160	15
200 - 250	20
315 - 355	30



Mounting system SM

The mounting system SM consists of various fasteners with a ring around the diffuser neck, which press the exterior diffuser ring to the false ceiling. They are adjustable in height by means of screws, when taking off the core.

40.4-SF circular diffuser



Description

40.4 SF circular diffuser with central core (2 inner rings), height adjustable by rotating.

Since the central core can be turned manually, the air can be distributed in any direction.

The diffusers are manufactured in anodised aluminium with a natural finish. The diffusers can be painted to fit different decorative needs upon request. A connection plenum can be added, enhancing air pressurisation and distribution in the diffuser.

Adjustments are made by accessing the mechanism of the damper directly from the room, with or without removing the central core.

The 40.4-SF-Q diffuser can be manufactured in a panel integrated in a modular drop ceiling panel of 595 x 595 mm.

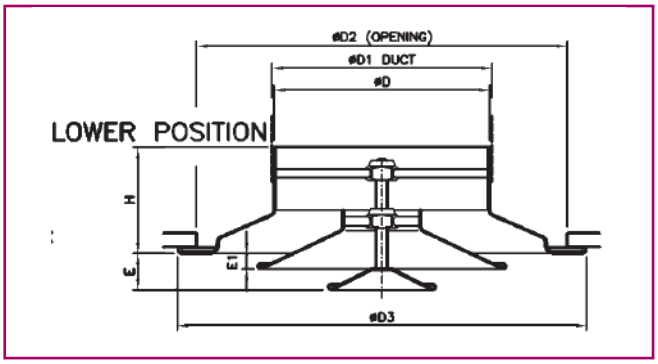
Applications

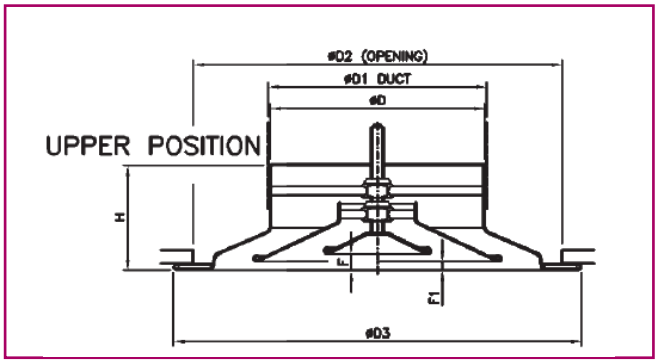
This type of diffuser is ideal for use in low and high ceilings.
The recommended installation height to supply cold and heat air, with the inner rings in lower position (no change in ring position), is 2.7 to 3.5 m.
If it is possible to change the inner ring position manually in order to switch from cooling to heating and vice versa, the recommended installation height for these diffusers is 2.7 to 6 metres. This last solu tion avoids potential problems with hot air stratification, for high installation heights.

The diffuser is easy to assemble, easy to adjust as well as great looking, making it an ideal choice for HVAC in areas such as offices, banks, schools, auditoriums, public premises, etc.

Dimensions

See page 19.



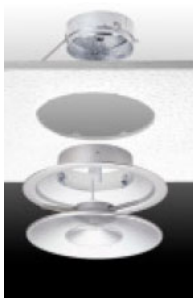


40.4-SF + 49 ML

40.4-SF circular diffuser with butterfly volume control damper. Adjustments are made in the diffuser itself, removing the central rings.

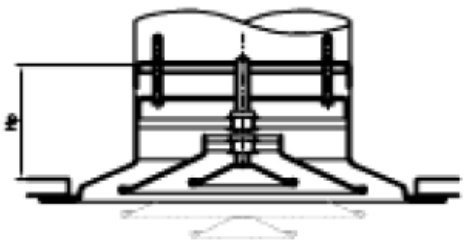
40.4-SF + 49 MO

40.4-SF circular diffuser with butterfly volume control damper, with fin attachment to central axis. Adjustments are made in the diffuser itself, removing the central rings.



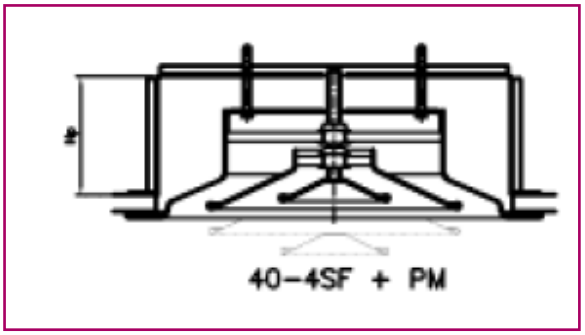
40.4-SF + 49 CML

40.4-SF circular diffuser with mounting shoulder for continuous ceilings. Includes butterfly volume control damper.



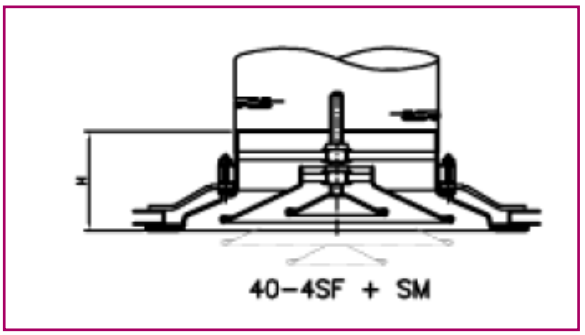
40.4-SF + PMC

40.4-SF circular diffuser with mounting bridge for sheet duct. Diffuser-bridge attachment with screws.



40.4-SF + PM

40.4-SF circular diffuser with mounting bridge for fibre duct. Diffuser bridge attachment with screws.



40.4-SF + SM

40.4-SF circular diffuser with hidden mounting system. Includes tabs,with mounting ring, adjacent to the diffuser shoulder. Height-adjustable.

Possible combinations of 40.4 SF diffusers, with volume control damper and fixing method

40–4SF	DAMPERS				FIXING (METHOD)				40–4SF+49CML	40–4SF+49MO	40–4SF+49MO+SM	40–4SF+49ML	40–4SF+49ML+SM	40–4SF+49ML+PM	40–4SF+49ML+PMC	40–4SF	40–4SF+SM	40–4SF+PM	40–4SF+PMC
NOMINAL	49CML	49ML	49MO	PLENUM	PLATE	SM	PM	PMC											
100			⊠	⊠		⊠				⊠	⊠					⊠	⊠		
160	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠
200	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠
250	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠
315	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠
355	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠
400	⊠	⊠	⊠	⊠		⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠
450			⊠	⊠						⊠						⊠			
500			⊠	⊠						⊠						⊠			
630			⊠	⊠						⊠						⊠			
710			⊠	⊠						⊠						⊠			
800			⊠	⊠						⊠						⊠			
900			⊠	⊠						⊠						⊠			

Product codes

40.4-SF Aluminium diffuser series

-	Volume contro damper not included, unless otherwise indicated
49 ML	Butterfly volume control damper
49 MO	Butterfly volume control damper with attachment to central shaft

-	Bridge not included, unless otherwise indicated
PM	Mounting bridge for fibre duct
PMC	Mounting bridge for sheet duct
SM	Hidden mounting system
CML	Mounting shoulder with damper

Size From 4 to 24 as per table

Ø Nom. From 100 mm to 630 mm, as per table

Q Mounted in modular drop ceiling panel of 595x595

PCFL	With connection plenum
PCFL-A	With insulated connection plenum
PE-45	Polystyrene plenum box for diffusers with plate of 595 x 595 mm

Identification

The identification of the diffuser with the respective fitings will come coded according to the nomenclature in dicated in the adjacent table.

Coding example:

40.4-SF-8” + 49 ML + PMC

40.4-SF circular diffuser of nominal diameter 200 mm, with butterfly volume control damper and mounting bridge for sheet duct.

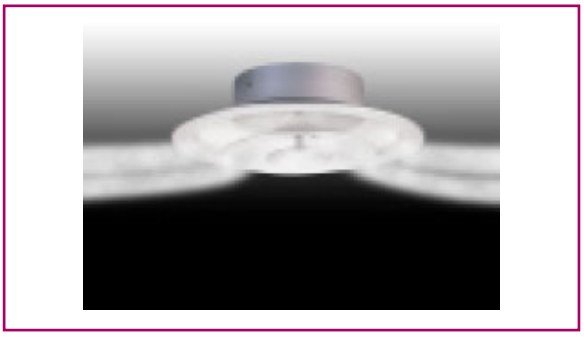
Calculation example:

Required needs:
Air flow rate per diffuser: 300 m^3/h
Room height (offices): 4 m
Required pressure drop for the diffuser: below 25 Pa

Solution (see Tables 1 and 2, pages 26 and 27):
Diffuser selection: 40.4-SF-8”

- Heated supply (ΔT = 10ºC)
Y_{max} (maximum penetration in upper cone position): 3.2 m
ΔP_t (pressure drop of the diffuser): 20 Pa, without volume control damper
L_{WA} = (sound power of the diffuser): 26 dB(A), without volume control damper

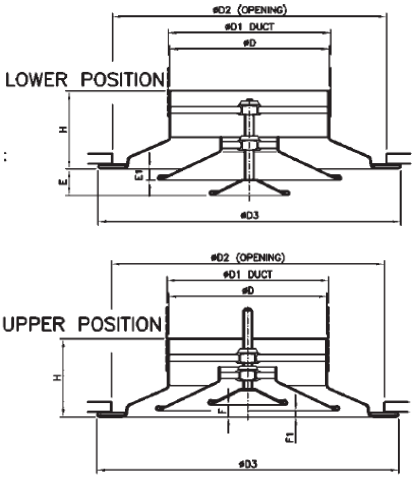
- Cooled supply (ΔT = -10ºC)
X (horizontal throw, with middle cone position): 2.6 m
ΔP_t (pressure drop of the diffuser): 10 Pa, without volume control damper
L_{WA} = (sound power of the diffuser): < 20 dB(A), without volume control damper



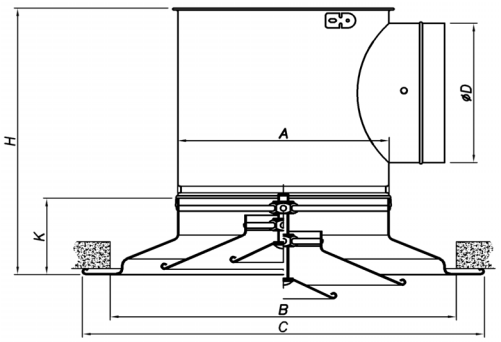
Overall dimensions

40.4 SF diffuser

NOMINAL	øD	øD1	øD2	øD3	H	E	E1	F	F1
100	99	100	187	225	75	18	8	13	
160	159	160	245	291	86				
200	199	200	324	378	95	33.5	14.5	15	8
250	249	250	390	454	104				
315	314	315	468	537	121				
355	354	355	545	624	134			29	9
400	399	400	614	704	172			40	20
450	449	450	689	788	187			50	25
500	499	500	764	872	200	33.5	14.5	54	30
630	629	630	955	1063	222			56	37
710	710	710	1070	1180	217	0	0	0	0
800	799	800	1200	1323	248	0	0	0	0
900	899	900	1350	1470	281	0	0	0	0

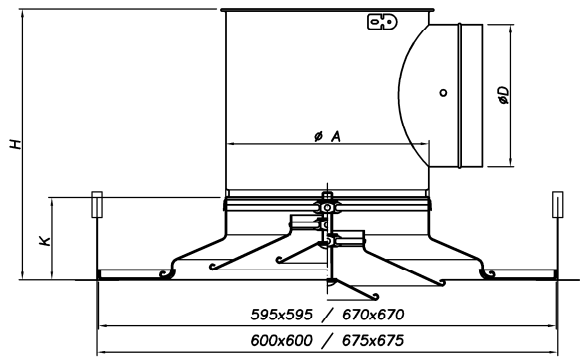


Connection plenum. Standard dimensions. 40-4-SF-PCFL



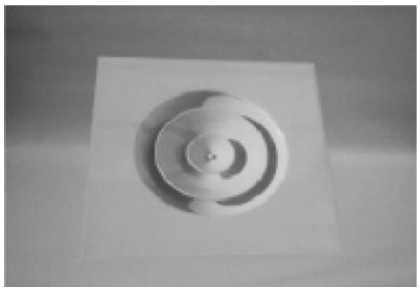
DIFFUSER	Ø A	Ø B	Ø C	K	Ø D	H
100	99	187	225	74,5	99	228
160	159	245	291	86	159	300
200	199	324	378	94,5	199	348
250	249	390	454	103,5	249	407
315	314	468	537	120,5	314	489
355	354	545	624	133,5	354	542
400	399	614	704	171,5	399	625
450	449	689	788	187,5	449	691
500	499	764	872	200	499	754
630	629	955	1063	222	629	906
710	709	1070	1180	217	-	-
800	799	1200	1323	248	-	-
900	899	1350	1470	281	-	-

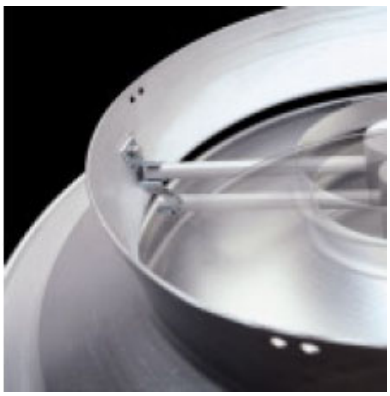
Connection plenum. Standard dimensions. 40-4-SF-Q-PCFL



DIFFUSER	Ø A	Ø C	K	Ø D	H
160	159	291	86	159	300
200	199	378	94,5	199	348
250	249	454	103,5	249	407
315	314	537	120,5	314	489
355	354	624	133,5	354	542

40.5-SF circular diffuser





Description

40.5 SF circular diffuser with central core (2 inner rings), detachable in two positions; lower and upper, with clips.

Since the central core can be manually positioned in lower and upper position, the air can be distributed in any direction.

The diffusers are manufactured in anodised aluminium with a natural finish. The diffusers can be painted to fit different decorative needs upon request.

Adjustments are made by accessing the mechanism of the damper directly from the premises, with or without removing the central core.

This diffuser can be manufactured in a panel, using the 40.5-SF-Q model, integrated in a modular drop ceiling panel of 595 x 595 mm.

Applications

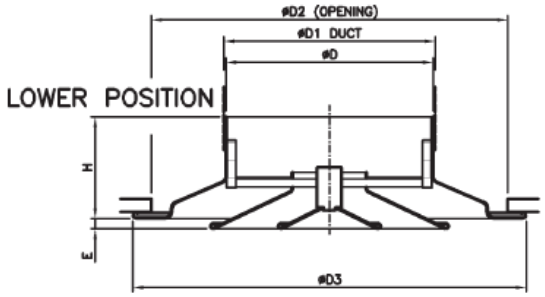
This type of diffuser is ideal for use in low and high ceilings. The recommended installation height to supply cold and heat air, with the inner rings in lower position (no change in ring position), is 2.7 to 3.5 m.

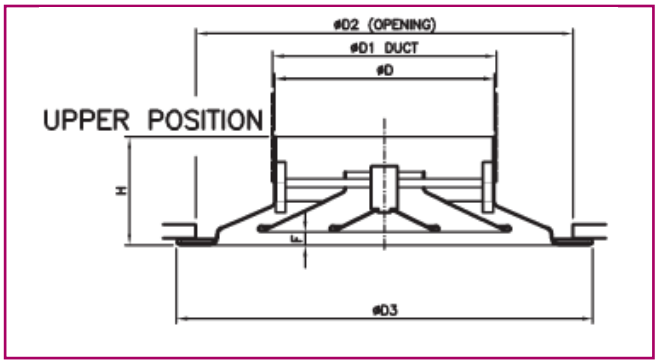
If it is possible to change the inner ring position manually in order to switch from cooling to heating and vice versa, the recommended installation height for these diffusers is 2.7 to 6 metres. This last solution avoids potential problems with hot air stratification, for high installation heights.

The diffuser is easy to assemble, easy to adjust as well as great looking, making it an ideal choice for HVAC in areas such as offices, banks, schools, auditoriums, public premises, etc.

Dimensions

See page 24.



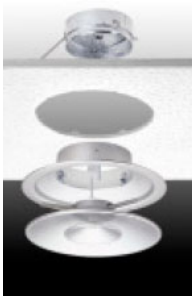


40.5-SF + 49 ML

40.5-SF circular diffuser with butterfly volume control damper. Adjustments are made in the diffuser itself, removing the central rings.

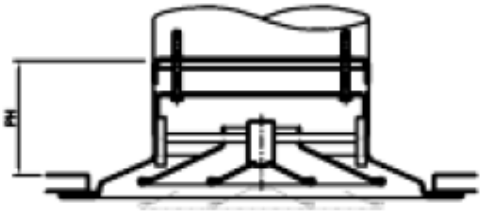
40.5-SF + 49 MO

40.5-SF circular diffuser with butterfly volume control damper, with fin attachment to central axis. Adjustments are made in the diffuser itself, removing the central rings.



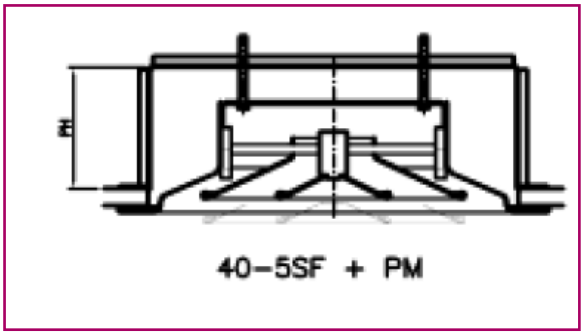
40.5-SF + 49 CML

40.5-SF circular diffuser with mounting shoulder for continuous ceilings. Includes butterfly volume control damper.



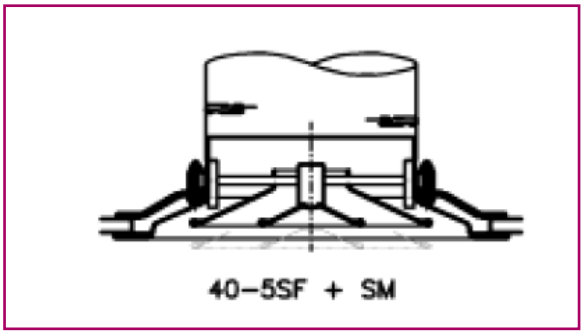
40.5-SF + PMC

40.5-SF circular diffuser with mounting bridge for sheet duct. Diffuser-bridge attachment with screws.



40.5-SF + PM

40.5-SF circular diffuser with mounting bridge for fibre duct. Diffuser bridge attachment with screws.



40.5-SF + SM

40.5-SF circular diffuser with hidden mounting system. Includes tabs,with mounting ring, adjacent to the diffuser shoulder. Height-adjustable.

Possible combinations of 40.5-SF diffusers, with volume control damper and fixing method

40–5SF	DAMPERS					FIXING (METHOD)			40–5SF+49CMK	40–5SF+49MO	40–5SF+49MO+SM	40–5SF+49MM	40–5SF+49MM+SM	40–5SF+49MM+PM	40–5SF+49MM+PMC	40–5SF	40–5SF+SM	40–5SF+PM	40–5SF+PMC
NOMINAL	49CMK	49MM	49MO	PLENUM	PLATE	SM	PM	PMC											
100			⊠	⊠		⊠				⊠	⊠					⊠	⊠		
160	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠
200	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠
250	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠
315	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠
355	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠
400	⊠	⊠	⊠	⊠		⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠
450			⊠	⊠						⊠						⊠			
500			⊠	⊠						⊠						⊠			
630			⊠	⊠						⊠						⊠			

Product codes

40.5-SF Aluminium diffuser series

-	Volume contro damper not included, unless otherwise indicated
49 ML	Butterfly volume control damper
49 MO	Butterfly volume control damper with attachment to central shaft

-	Bridge not included, unless otherwise indicated
PM	Mounting bridge for fibre duct
PMC	Mounting bridge for sheet duct
SM	Hidden mounting system
CMK	Mounting shoulder with damper

Size From 4 to 24 as per table

Ø Nom. From 100 mm to 630 mm, as per table

Q Mounted in modular drop ceiling panel of 595x595

PCFL	With connection plenum
PCFL-A	With insulated connection plenum
PE-45	Polystyrene plenum box for diffusers with plate of 595 x 595 mm

Identification

The identification of the diffuser with the respective fitings will come coded according to the nomenclature in dicated in the adjacent table.

Coding example:

40.5-SF-12" + CMK

40.5-SF circular diffuser of nominal diameter 315 mm, with mounting shoulder for continuous ceilings and volume control damper.

Calculation example:

Required needs:
Air flow rate per diffuser: 500 m^3/h
Room height (offices): 5 m
Required pressure drop for the diffuser: below 35 Pa

Solution (see Tables 1 and 2, pages 26 and 27):
Diffuser selection: 40.5-SF-10"

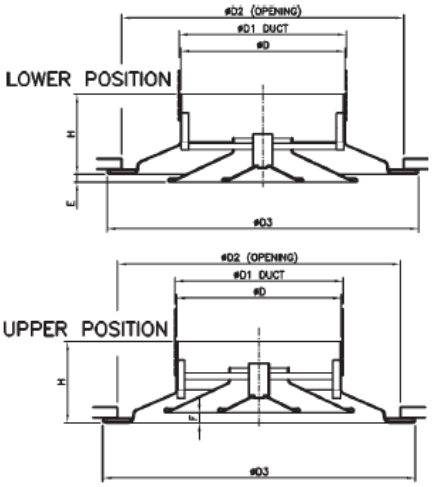
- Heated supply (ΔT = 10ºC)
Y_{max} (maximum penetration in upper cone position): 4.2 m
ΔP_t (pressure drop of the diffuser): 29 Pa, without volume control damper
L_{WA} = (sound power of the diffuser): 34 dB(A), without volume control damper

- Cooled supply (ΔT = -10ºC)
X (horizontal throw, with lower cone position): 3.5 m
ΔP_t (pressure drop of the diffuser): 12 Pa, without volume control damper
L_{WA} = (sound power of the diffuser): 21 dB(A), without volume control damper

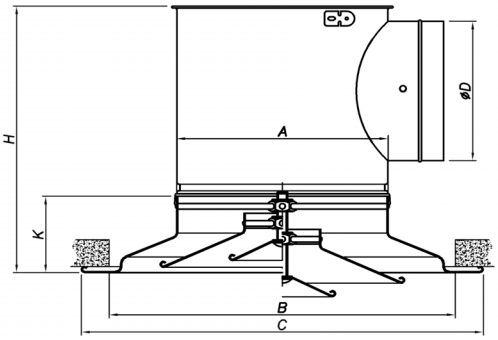
Overall dimensions

40.5 SF diffuser

NOMINAL	øD	øD1	øD2	øD3	H	E	F
100	99	100	187	225	75	3	7
160	159	160	245	291	86	10	12
200	199	200	324	378	95		
250	249	250	390	454	104		
315	314	315	468	537	121		24
355	354	355	545	624	134		30
400	399	400	614	704	172	14.5	35
450	449	450	689	788	187	16.5	41
500	499	500	764	872	200	20	42
630	629	630	955	1063	222		45

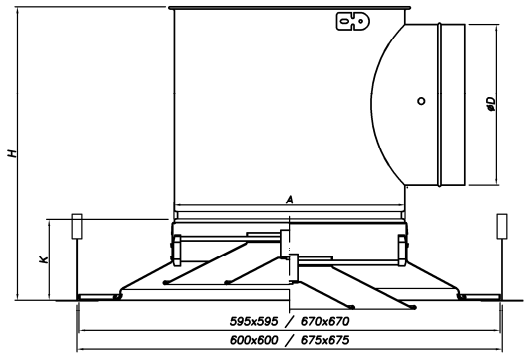


Connection plenum. Standard dimensions. 40-5-SF-PCFL



DIFFUSER	Ø A	Ø B	Ø C	K	Ø D	H
100	99	187	225	74,5	99	228
160	159	245	291	86	159	300
200	199	324	378	94,5	199	348
250	249	390	454	103,5	249	407
315	314	468	537	120,5	314	489
355	354	545	624	133,5	354	542
400	399	614	704	171,5	399	625
450	449	689	788	187,5	449	691
500	499	764	872	200	499	754
630	629	955	1063	222	629	906
710	709	1070	1180	217	-	-
800	799	1200	1323	248	-	-
900	899	1350	1470	281	-	-

Connection plenum. Standard dimensions. 40-5-SF-Q-PCFL



DIFFUSER	Ø A	K	Ø D	H
160	159	86	159	295
200	199	94,5	199	343,5
250	249	103,5	249	402,5
315	314	120,5	314	484,5
355	354	133,5	354	537,5

Technical data. General considerations. Symbols

Table 1 and 3 contains the technical data on the effective velocity, throw, total pressure drop and noise level for the 40.4 SF and 40.5 SF diffuser, with the cone position in the middle position, the central core at the same height as the outer ring, achieving horizontal air discharge (air jet adjacent to the ceiling, adhering jet).

A horizontal supply is achieved, with 20% increase in throw, the same pressure drop and 4 dB(A) less noise level, when in lower position (for the 40.4 SF diffuser), with the core of inner rings located 20 mm below the outer ring.

Table 2 and 4 contains the technical data on the effective velocity, maximum vertical penetration, total pressure drop and noise level for the 40.4 SF and 40.5 SF diffuser, with the cone position in upper position, with the core of inner rings in its top position, obtaining vertical air discharge.

General notes

Tables 1, 2, 3 and 4

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

- To calculate the total pressure drop and total noise level of the 40.4 SF and 40.5 SF diffusers with volume control damper, refer to the respective charts for the volume control dampers.

Table 1 and 3

- An adhering jet is used, i. e., the diffuser is mounted flush with the ceiling for horizontal air supply.

- The room height is 3 m.

- The ΔT is equal to 0ºC (difference between supply air temperature and room air temperature).

- Throws correspond to a maximum velocity in the occupied zone (V_Z) of 0.25 m/s.

Table 2 and 4

- The ΔT is equal to 10ºC (difference between supply air temperature and room air temperature)

- The maximum vertical penetration data correspond to an air jet velocity of 0 m/s.

Symbols

A_K:	Effective diffuser area, in m^2
V_K:	Effective velocity in m/s
ΔPt :	Total pressure drop (static + dynamic pressure), in Pa
L_{WA}-dB(A):	Sound power level, in dB(A)
X:	Throw of the air jet for a maximum velocity in occupied area of 0.25 m/s, in m
Y_{max}:	Maximum vertical throw, in m

Technical data. Selection tables. 40.4 SF – 40.5 SF diffusers

Table 1

40-4 AND 40-5 HORIZONTAL SERIES												
Q		Size	4" Ø100	6" Ø160	8" Ø200	10" Ø250	12" Ø315	14" Ø355	16" Ø400	18" Ø450	21" Ø500	24" Ø500
(m^3/h)	(l/s)	A_k (m^2)	0.0070	0.0104	0.0187	0.0289	0.0461	0.0614	0.0734	0.0846	0.0947	0.1166
100	27.8	V_k (m/s)	3.9	2.7	1.5							
		X (m)	1.4	1.2	0.9							
		ΔP_t (Pa)	16	3	1							
		dB(A)	27	<20	<20							
150	41.7	V_k (m/s)	5.9	4.0	2.2	1.4						
		X (m)	2.1	1.7	1.3	1.0						
		ΔP_t (Pa)	36	7	3	1						
		dB(A)	37	24	<20	<20						
200	55.6	V_k (m/s)	7.9	5.3	3.0	1.9	1.2					
		X (m)	2.8	2.3	1.7	1.4	1.1					
		ΔP_t (Pa)	63	13	5	2	1					
		dB(A)	45	32	<20	<20	<20					
300	83.3	V_k (m/s)		8.0	4.5	2.9	1.8					
		X (m)		3.5	2.6	2.1	1.7					
		ΔP_t (Pa)		29	10	4	2					
		dB(A)		43	<20	<20	<20					
400	111.1	V_k (m/s)		10.7	6.0	3.8	2.4	1.8				
		X (m)		4.6	3.5	2.8	2.2	1.9				
		ΔP_t (Pa)		52	18	7	3	2				
		dB(A)		50	28	<20	<20	<20				
500	138.9	V_k (m/s)			7.4	4.8	3.0	2.3				
		X (m)			4.3	3.5	2.8	2.4				
		ΔP_t (Pa)			29	12	5	3				
		dB(A)			34	21	<20	<20				
600	166.7	V_k (m/s)			8.9	5.8	3.6	2.7	2.3			
		X (m)			5.2	4.2	3.3	2.9	2.6			
		ΔP_t (Pa)			41	17	7	4	3			
		dB(A)			39	26	<20	<20	<20			
800	222.2	V_k (m/s)				7.7	4.8	3.6	3.0	2.6		
		X (m)				5.6	4.4	3.8	3.5	3.3		
		ΔP_t (Pa)				30	12	7	5	3		
		dB(A)				34	24	<20	<20	<20		
1000	277.8	V_k (m/s)				9.6	6.0	4.5	3.8	3.3	2.9	
		X (m)				7.0	5.5	4.8	4.4	4.1	3.8	
		ΔP_t (Pa)				47	18	11	7	5	4	
		dB(A)				41	30	22	<20	<20	<20	
1200	333.3	V_k (m/s)					7.2	5.4	4.5	3.9	3.5	
		X (m)					6.6	5.7	5.2	4.9	4.6	
		ΔP_t (Pa)					26	16	10	7	5	
		dB(A)					36	28	21	<20	<20	
1600	444.4	V_k (m/s)					9.6	7.2	6.1	5.3	4.7	3.8
		X (m)					8.8	7.6	7.0	6.5	6.1	5.5
		ΔP_t (Pa)					47	28	19	13	10	6
		dB(A)					45	37	31	25	20	<20
2000	555.6	V_k (m/s)						9.1	7.6	6.6	5.9	4.8
		X (m)						9.5	8.7	8.1	7.7	6.9
		ΔP_t (Pa)						43	29	20	15	9
		dB(A)						44	38	33	28	<20
2500	694.4	V_k (m/s)						11.3	9.5	8.2	7.3	6.0
		X (m)						11.9	10.9	10.2	9.6	8.7
		ΔP_t (Pa)						67	46	32	24	14
		dB(A)						51	45	41	36	23
3000	833.3	V_k (m/s)							11.4	9.8	8.8	7.1
		X (m)							13.1	12.2	11.5	10.4
		ΔP_t (Pa)							66	46	34	19
		dB(A)							51	47	42	30
3500	972.2	V_k (m/s)								11.5	10.3	8.3
		X (m)								14.2	13.4	12.1
		ΔP_t (Pa)								62	46	26
		dB(A)								52	48	36
4000	1111.1	V_k (m/s)									11.7	9.5
		X (m)									15.4	13.8
		ΔP_t (Pa)									61	35
		dB(A)									53	41
5000	1388.9	V_k (m/s)										11.9
		X (m)										17.3
		ΔP_t (Pa)										54
		dB(A)										50

Technical data. Selection tables. 40.4 SF – 40.5 SF diffusers

Table 2

40-4 AND 40-5 VERTICAL SERIES												
Q		Size	4" Ø100	6" Ø160	8" Ø200	10" Ø250	12" Ø315	14" Ø355	16" Ø400	18" Ø450	21" Ø500	24" Ø500
(m^3/h)	(l/s)	A_k (m^2)	0.00784	0.0103	0.01493	0.02065	0.02877	0.04161	0.0571	0.07741	0.10177	0.18338
100	27.8	V_k (m/s)	3.5	2.7	1.9							
		Y_{max} (m)	1.8	1.4	1.1							
		ΔP_t (Pa)	14	5	2							
		dB(A)	36	<20	<20							
150	41.7	V_k (m/s)	5.3	4.0	2.8	2.0						
		Y_{max} (m)	2.6	2.1	1.6	1.3						
		ΔP_t (Pa)	32	11	5	3						
		dB(A)	46	25	<20	<20						
200	55.6	V_k (m/s)	7.1	5.4	3.7	2.7	1.9					
		Y_{max} (m)	3.5	2.9	2.2	1.7	1.3					
		ΔP_t (Pa)	56	19	9	5	4					
		dB(A)	53	32	<20	<20	<20					
300	83.3	V_k (m/s)		8.1	5.6	4.0	2.9	2.0				
		Y_{max} (m)		4.3	3.2	2.5	2.0	1.5				
		ΔP_t (Pa)		43	20	10	9	7				
		dB(A)		43	26	<20	<20	<20				
400	111.1	V_k (m/s)		10.8	7.4	5.4	3.9	2.7	1.9			
		Y_{max} (m)		5.7	4.3	3.4	2.6	2.0	1.6			
		ΔP_t (Pa)		77	36	18	15	13	8			
		dB(A)		51	34	27	27	25	22			
500	138.9	V_k (m/s)			9.3	6.7	4.8	3.3	2.4	1.8		
		Y_{max} (m)			5.4	4.2	3.3	2.5	2.0	1.6		
		ΔP_t (Pa)			56	29	24	21	12	7		
		dB(A)			40	34	33	31	27	23		
600	166.7	V_k (m/s)			11.2	8.1	5.8	4.0	2.9	2.2		
		Y_{max} (m)			6.5	5.1	4.0	3.0	2.4	1.9		
		ΔP_t (Pa)			80	42	35	30	17	10		
		dB(A)			46	39	38	36	32	28		
800	222.2	V_k (m/s)				10.8	7.7	5.3	3.9	2.9	2.2	1.2
		Y_{max} (m)				6.8	5.3	4.0	3.2	2.5	2.1	1.3
		ΔP_t (Pa)				74	62	53	31	18	11	4
		dB(A)				48	46	43	39	34	29	22
1000	277.8	V_k (m/s)					9.7	6.7	4.9	3.6	2.7	1.5
		Y_{max} (m)					6.6	5.0	4.0	3.2	2.6	1.7
		ΔP_t (Pa)					96	83	48	28	17	6
		dB(A)					53	49	45	40	34	27
1200	333.3	V_k (m/s)						8.0	5.8	4.3	3.3	1.8
		Y_{max} (m)						6.0	4.8	3.8	3.1	2.0
		ΔP_t (Pa)						120	69	40	25	9
		dB(A)						54	50	44	38	30
1600	444.4	V_k (m/s)								5,7	4,4	2,4
		Y_{max} (m)								5,0	4,1	2,6
		ΔP_t (Pa)								72	44	15
		dB(A)								51	44	36
2000	555.6	V_k (m/s)									5.5	3.0
		Y_{max} (m)									5.1	3.3
		ΔP_t (Pa)									69	24
		dB(A)									49	40
2500	694.4	V_k (m/s)									6.8	3.8
		Y_{max} (m)									6.4	4.1
		ΔP_t (Pa)									107	37
		dB(A)									54	44
3000	833.3	V_k (m/s)										4.5
		Y_{max} (m)										5.0
		ΔP_t (Pa)										54
		dB(A)										48
4000	1111.1	V_k (m/s)										6.1
		Y_{max} (m)										6.6
		ΔP_t (Pa)										96
		dB(A)										53

Technical data. Selection tables. Oversized. 40.4 SF diffusers

Table 3

S 40-4 HORIZONTAL					
Q		Size	710	800	900
(m^3/h)	(l/s)	A_n (m^2)	0,3893	0,4951	0,6277
1000	277,8	Vn (m/s)	0,7		
		X (m)	1,6		
		Pt (Pa)	2		
		dB(A)	<20		
1500	416,7	Vn (m/s)	1,1	0,8	
		X (m)	2,4	2,2	
		Pt (Pa)	6	3	
		dB(A)	<20	<20	
2000	555,6	Vn (m/s)	1,4	1,1	0,9
		X (m)	3,2	2,9	2,5
		Pt (Pa)	10	6	4
		dB(A)	<20	<20	<20
2500	694,4	Vn (m/s)	1,8	1,4	1,1
		X (m)	4,0	3,6	3,2
		Pt (Pa)	15	10	6
		dB(A)	<20	<20	<20
3000	833,3	Vn (m/s)	2,1	1,7	1,3
		X (m)	4,9	4,3	3,8
		Pt (Pa)	22	14	9
		dB(A)	23	<20	<20
3500	972,2	Vn (m/s)	2,5	2,0	1,5
		X (m)	5,7	5,0	4,5
		Pt (Pa)	30	19	12
		dB(A)	28	22	<20
4000	1111,1	Vn (m/s)	2,9	2,2	1,8
		X (m)	6,5	5,7	5,1
		Pt (Pa)	40	24	15
		dB(A)	31	26	20
4500	1250,0	Vn (m/s)	3,2	2,5	2,0
		X (m)	7,3	6,5	5,7
		Pt (Pa)	50	31	19
		dB(A)	35	29	23
5000	1388,9	Vn (m/s)	3,6	2,8	2,2
		X (m)	8,1	7,2	6,4
		Pt (Pa)	62	38	24
		dB(A)	38	32	26
6000	1666,7	Vn (m/s)	4,3	3,4	2,7
		X (m)	9,7	8,6	7,6
		Pt (Pa)	89	55	34
		dB(A)	43	37	31
7000	1944,4	Vn (m/s)		3,9	3,1
		X (m)		10,0	8,9
		Pt (Pa)		75	47
		dB(A)		41	35
8000	2222,2	Vn (m/s)		4,5	3,5
		X (m)		11,5	10,2
		Pt (Pa)		98	61
		dB(A)		45	39
9000	2500,0	Vn (m/s)			4,0
		X (m)			11,5
		Pt (Pa)			77
		dB(A)			42
10000	2777,8	Vn (m/s)			4,4
		X (m)			12,7
		Pt (Pa)			95
		dB(A)			45
11000	3055,6	Vn (m/s)			4,9
		X (m)			14,0
		Pt (Pa)			115
		dB(A)			48
12000	3333,3	Vn (m/s)			5,3
		X (m)			15,3
		Pt (Pa)			137
		dB(A)			51

Table 4

S 40-4 VERTICAL					
Q		Size	710	800	900
(m^3/h)	(l/s)	A_n (m^2)	0,3893	0,4951	0,6277
1000	277,8	Vn (m/s)	0,7		
		Y (m)	2,5		
		Pt (Pa)	5		
		dB(A)	<20		
1500	416,7	Vn (m/s)	1,1		
		Y (m)	3,7		
		Pt (Pa)	12		
		dB(A)	<20		
2000	555,6	Vn (m/s)	1,4	1,1	
		Y (m)	5,0	4,4	
		Pt (Pa)	21	13	
		dB(A)	28	23	
2500	694,4	Vn (m/s)	1,8	1,4	1,1
		Y (m)	6,2	5,5	4,9
		Pt (Pa)	33	20	13
		dB(A)	35	30	25
3000	833,3	Vn (m/s)	2,1	1,7	1,3
		Y (m)	7,4	6,6	5,8
		Pt (Pa)	47	29	18
		dB(A)	40	36	31
3500	972,2	Vn (m/s)	2,5	2,0	1,5
		Y (m)	8,7	7,7	6,8
		Pt (Pa)	65	40	25
		dB(A)	45	40	35
4000	1111,1	Vn (m/s)	2,9	2,2	1,8
		Y (m)	9,9	8,8	7,8
		Pt (Pa)	84	52	32
		dB(A)	49	44	40
4500	1250,0	Vn (m/s)	3,2	2,5	2,0
		Y (m)	11,1	9,9	8,8
		Pt (Pa)	107	66	41
		dB(A)	53	48	43
5000	1388,9	Vn (m/s)	3,6	2,8	2,2
		Y (m)	12,4	11,0	9,7
		Pt (Pa)	132	81	51
		dB(A)	56	51	46
6000	1666,7	Vn (m/s)		3,4	2,7
		Y (m)		13,2	11,7
		Pt (Pa)		117	73
		dB(A)		57	52
7000	1944,4	Vn (m/s)		3,9	3,1
		Y (m)		15,4	13,6
		Pt (Pa)		160	99
		dB(A)		61	56
8000	2222,2	Vn (m/s)			3,5
		Y (m)			15,6
		Pt (Pa)			130
		dB(A)			60
9000	2500,0	Vn (m/s)			4,0
		Y (m)			17,5
		Pt (Pa)			164
		dB(A)			64

Symbols

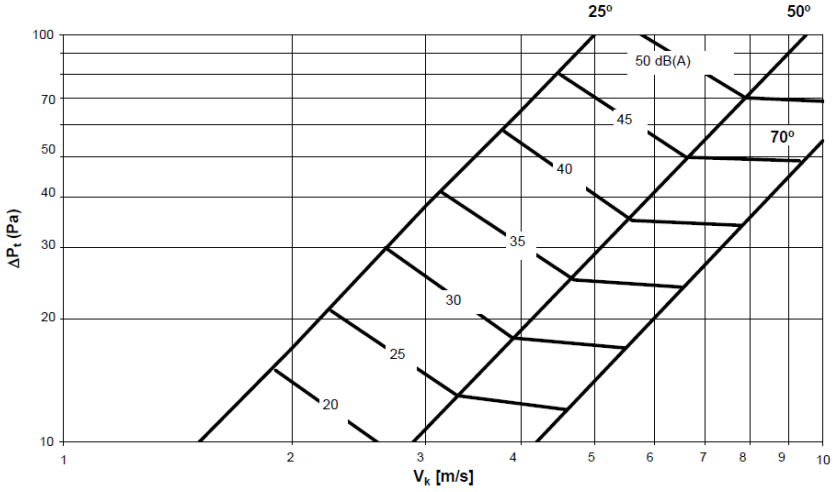
A_n:	Geometry area, in m^2
V_n:	Velocity in duct in m/s
ΔPt :	Total pressure drop (static + dynamic pressure), in Pa
L_{WA}-dB(A):	Sound power level, in dB(A)
X:	Throw of the air jet for a maximum velocity in occupied area of 0.25 m/s, in m
Y_{max}:	Maximum vertical throw, in m

Recommendations

49 MM, 49 ML and 49 MO volume control dampers

The volume control dampers modify the noise level and pressure drop values expressed in the selection table. The pressure drops and sound power in dB(A) (without attenuation of the room) for the diffuser + damper combination are shown below and in the respective charts, based on the degree of damper opening.

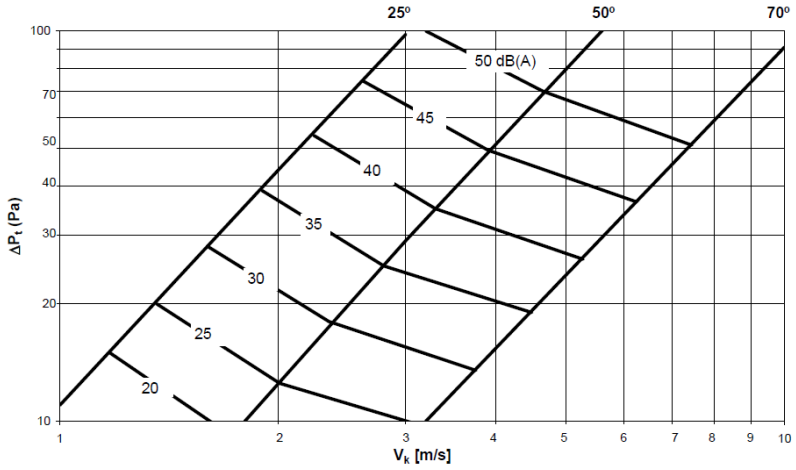
- 49 MM and 49 ML damper (opening by degrees)



A size correction must be added to the sound power value from the chart (Ønominal dimension, in mm) according to the following table:

∅	160	200	250	315	355	400
dB(A)	-2	0	+3	+4	+5	+6

- 49 MO damper (opening by degrees)



A size correction must be added to the sound power value from the chart (Ønominal dimension, in mm) according to the following table:

∅	100	160	200	250	315	355	400	450	500	630
dB(A)	-5	-2	-1	0	+1	+2	+2	+3	+3	+4

KOOLAIR, S.L.
Calle Urano, 26
Poligono industrial nº 2 – La Fuensanta
28936 Móstoles - Madrid - (España)
Tel: +34 91 645 00 33
Fax: +34 91 645 69 62
e-mail: info@koolair.com

www.koolair.com