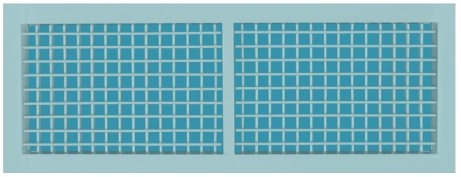
CHAPTER 2

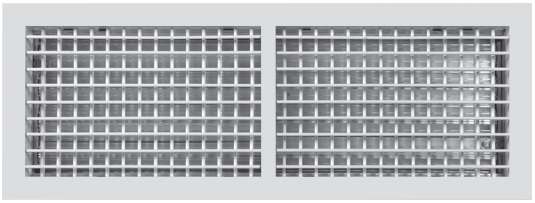


GRILLES AND REGISTERS

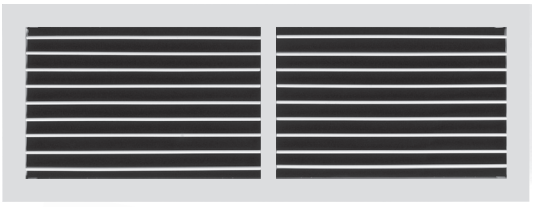
CHAPTER-2

GRILLES AND REGISTERS

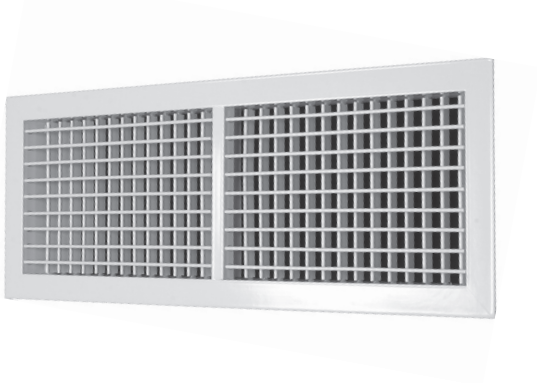
This type of air outlets are the most desirable for the side wall locations. Since they are available with both horizontal and vertical adjustable blades, minor air motion problems can be simply corrected by adjusting the vanes. They are distinguished by their high construction quality, low pressure drops and contained sound levels. Blades can be singularly oriented.

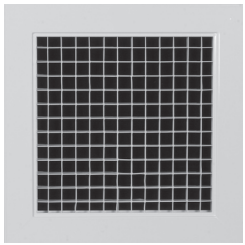


Features & Characteristics :



- Construction : Frame & blades are made of high quality Extruded Aluminium Profiles of 6063 Alloy.
- Frame Flange width : 30 mm.
- Blades : Aerofoil design with 20 mm center spacing as standard.
- The frame is assembled by punching it's four corners by means of G. I. Angles which together create a very robust construction.
- Available in wide variety of standard neck sizes ranging from 300 x 150 up to 1200 x 300 mm in 50 mm increments (other None-Standard sizes are available on request).
- Both the Grilles and Registers are available in single or double blades deflection on which provides air deflection in horizontal and / or vertical planes.
- Blades are individually adjustable to any degree of deflection by hand without the use of special tools.
- Maximum effective areas can be obtained when the blades are setted at 0 ° deflection.
- Blades are separated from it's frame by nylon bushes. This method of assembly provides maximum rattle-free performance and eliminates corrosion.
- A large free effective area grilles can be obtained by using an Eggcrate core with 90% Free Area, see page No. GR-09.
- Grilles combined with Opposed Blade Dampers are called Registers.
- Accessories : see page No. GR-10 & 11.
- Available Fixing Mounting : see page No. GR-12.
- Surface Finishes : see page No. GR-34.





Models Available :

TABLE GR - 01

Grilles / Registers Model	Single Deflection Blades	Double Deflection Blades	Horizontal or Vertical Blades	Horizontal or Vertical Front Blades	Opposed Blade Damper	Fixed Blades at 45° Angle
SAR		●		●	●	
SAG		●		●		
RAR , EAR	●		●		●	
RAG , EAG	●		●			●

● Available.

TABLE GR-02

OPERATING RANGE & QUICK SELECTION TABLE FOR DOUBLE DEFLECTION GRILLES/REGISTERS							
Nominal Size		CFM Range		Nominal Size		CFM Range	
Inch	mm			Inch	mm		
12" x 6"□	300 X 150	190	460	12"x10"□	300 X 250	315	725
16"x6"□	400 X 150	270	625	16"x10"□	400 X 250	425	970
18"x6"□	450 X 150	300	650	18"x10"□	450 X 250	480	1060
20"x6"□	500 X 150	315	725	20"x10"□	500 X 250	540	1200
24"x6"□	600 X 150	400	900	24"x10"□	600 X 250	610	1400
30"x6"□	750 X 150	450	1025	30"x10"□	750 X 250	850	2050
36"x6"□	900 X 150	550	1250	36"x10"□	900 X 250	1000	2200
40"x6"□	1000X150	610	1400	40"x10"□	1000X 250	1090	2350
48"x6"□	1200X150	700	1600	48"x10"□	1200X250	1200	2500
12"x8"□	300 X 200	325	725	12"x12"□	300 X 300	390	850
16"x8"□	400 X 200	350	760	16"x12"□	400 X 300	525	1160
18"x8"□	450 X 200	390	850	18"x12"□	450 X 300	560	1250
20"x8"□	500 X 200	425	950	20"x12"□	500 X 300	640	1440
24"x 8"□	600 X 200	500	1100	24"x12"□	600 X 300	675	1550
30"x8"□	750 X 200	610	1400	30"x12"□	750 X 300	870	2000
36"x8"□	900 X 200	675	1550	36"x12"□	900 X 300	1070	2350
40"x8"□	1000 X200	800	1900	40"x12"□	1000 X300	1200	2500
48"x8"□	1200X 200	900	2150	48"x12"□	1200 X300	1350	3100

- CFM Values are based on Noise Level ranging from 15-35 (dB).
- Tabulated data are for Double Deflection Grilles/Registers of Horizontal or Vertical Front Blades.

TABLE GR-03

RECOMMENDED OUTLET VELOCITIES		
APPLICATION	TERMINAL VELOCITY	
	FPM	m/s
Broadcast studios	300-500	1.5-2.5
Residences	500-750	2.5-3.7
Apartments	500-750	2.5-3.7
Mosques and Churches	500-750	2.5-3.7
Hotel bedrooms	500-750	2.5-3.7
Theaters	500-750	2.5-3.7
Private offices, acoustically treated	500-750	2.5-3.7
Private offices, not treated	500-800	2.5-4.0
Motion picture theaters	1000	5.0
General offices	1000-1250	5.0-6.2
Dept. stores, upper floors	1500	7.5
Dept. stores, main floors	2000	10

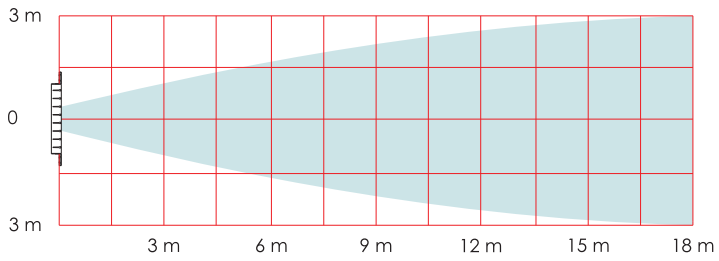
Important Principles to Know :

- **Throw** : is the horizontal distance that an air stream travels on leaving an outlet. This distance is measured from the outlet to a point at which the velocity of the air stream has reached a definite minimum value.
- **Drop** : is the vertical distance the air moves between the time it leaves the outlet and the time it reaches the end of its throw.
- **Spread** : is the angle of divergence of the air stream after it leaves the outlet. Horizontal spread is divergence in the horizontal plane and vertical spread is divergence in the vertical plane. Spread is the included angle measured in degrees.

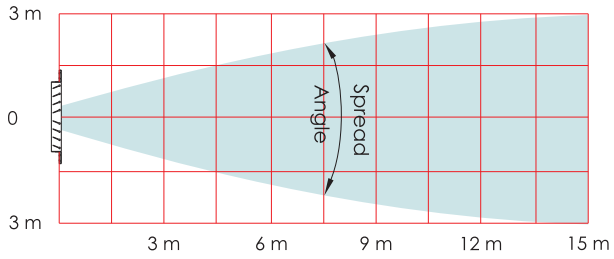
Engineering Notes :

- From the selection diagrams/tables the size of the Grille / Register can be selected taking into consideration the throw, velocity, pressure loss and noise level for it.
- Generally, to prevent over blow, throw should be selected 75 % of the distance to the wall opposite, or if the outlets are opposed to one another this should be one third of the distance between them.
- When the throw is more than 75 % of the distance to the wall opposite, divide the air flow over several outlets to reduce the throw.
- The minimum Grille / Register height from the floor level is determined by the drop of the selected outlet +1.8 mtr.
- Air passing through a properly selected Grille / Register will not add any appreciable noise to the sound level of the existing system.
- To obtain long throw and narrow air pattern, use a blades deflection between 0 ° & 15 ° angle. And for shorter throw and wide air pattern use up to 45 ° angle of deflection.
- Outlets with blades set at a straight angle result in a spread of approximately 19 ° in both the horizontal and vertical plane.
- Outlets with converging blades set to direct the discharge air result in approximately the same spread as when the blades are set straight. However the resulting throw is approximately 15 % longer than the same for straight blades setting.
- Diverging blades into 22 $^{1}/_{2}$ ° angle as shown below result in a throw with approximately 20 % less than the throw of straight blades setting. Also diverging blades into 45 ° angle as shown result in spread included angle of approximately 60 ° and a throw with approximately 50 % less than the throw of straight blades setting.
- To obtain better air mixing, decrease the throw and increase the spread and induction by deflecting the blades toward maximum recommended angle of deflection (Angle ≤ 45 °).
- The spread in Double Deflection Grilles / Registers can be adjusted in horizontal and vertical planes.
- If the Opposed Blade Damper is used with the grille outlet, the effective area will be reduced approximately by 5 % which it's effect on throw & pressure drop is negligible.

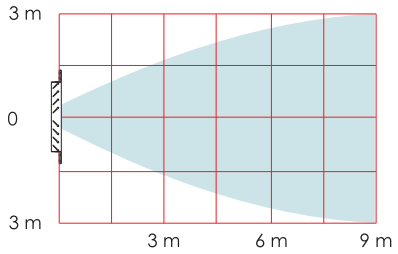
Influence of Blades Deflection on Outlet Performance :



0 ° Deflection
(Straight Blades)



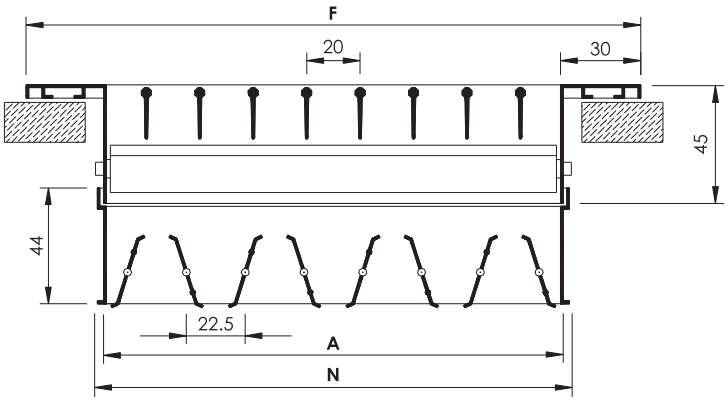
22 1/2 ° Deflection
(Diverging Blades)

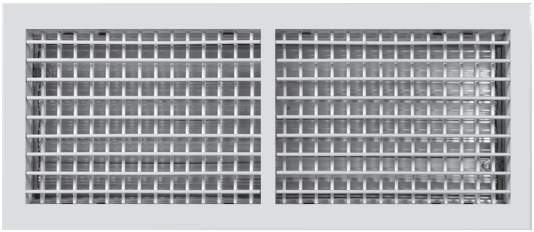


45 ° Deflection
(Diverging Blades)

Double Deflection Registers
Construction and Dimensional Details

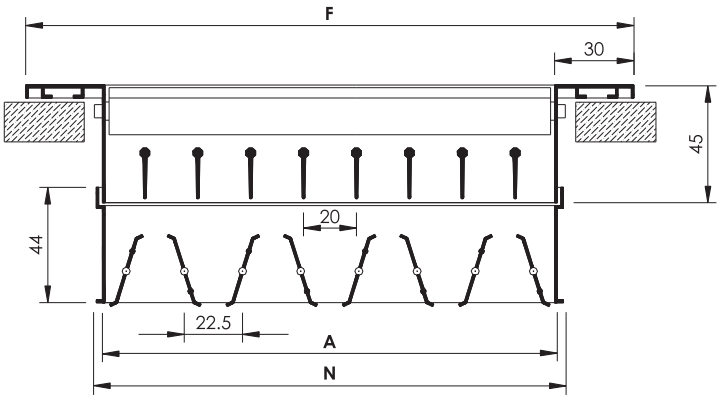
Model SAR HFB DD

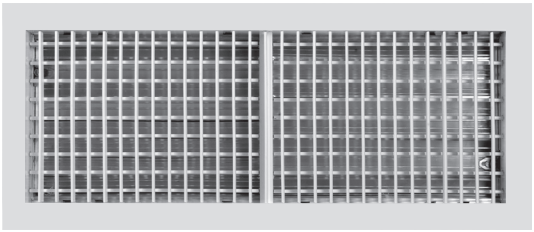




Front Blades Mounting : Horizontal

Model SAR VFB DD





Front Blades Mounting : Vertical

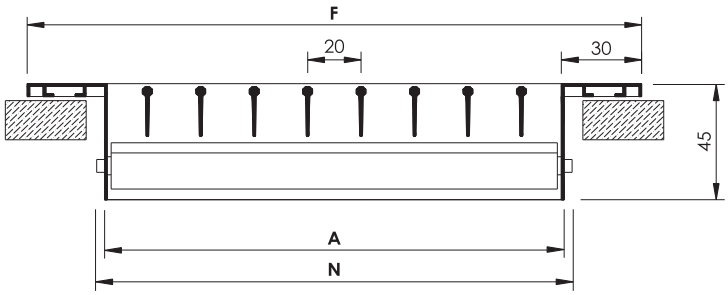
- **SAR** : is Supply Air Register, Double Deflection Blades c/w Opposed Blade Damper.
- Registers called Supply Air Register and coded as **SAR** are always equipped with Opposed Blade Damper (provided as standard).

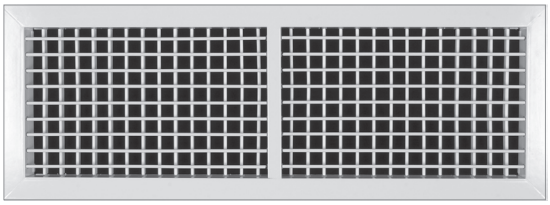
N : Nominal/Listed Size = Length (L) x Height (H)
A : Actual Size = (L-10) x (H-10)
F : Face Size = (L+50) x (H+50)

- Registers furnished approximately 10 mm less than the Nominal/Listed Size.
- All dimensions are in mm and subject to ±1 mm tolerance.

Double Deflection Grilles
Construction and Dimensional Details

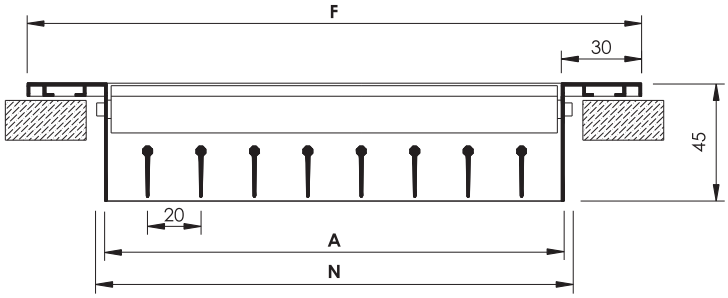
Model SAG HFB DD

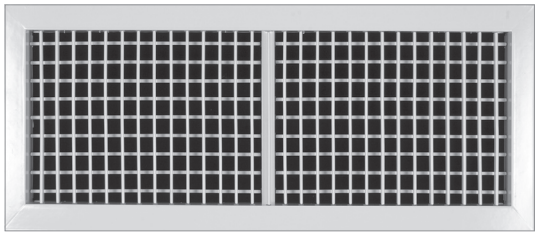




Front Blades Mounting : Horizontal

Model SAG VFB DD





Front Blades Mounting : Vertical

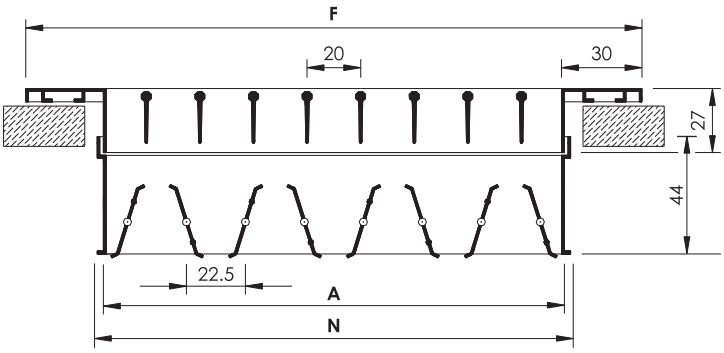
- **SAG** : is Supply Air Grille, Double Deflection Blades w/o Opposed Blade Damper.
- Grilles called Supply Air Grille and coded as **SAG** are usually supplied w/o Opposed Blade Damper.

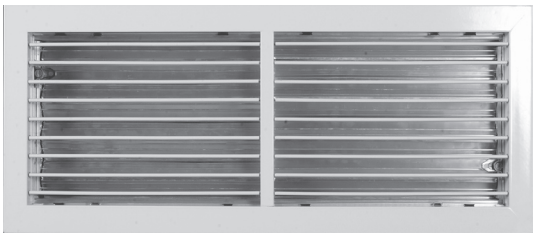
N : Nominal/Listed Size = Length (L) x Height (H)
A : Actual Size = (L-10) x (H-10)
F : Face Size = (L+50) x (H+50)

- Grilles furnished approximately 10 mm less than the Nominal/Listed Size.
- All dimensions are in mm and subject to ±1 mm tolerance.

Single Deflection Registers
Construction and Dimensional Details

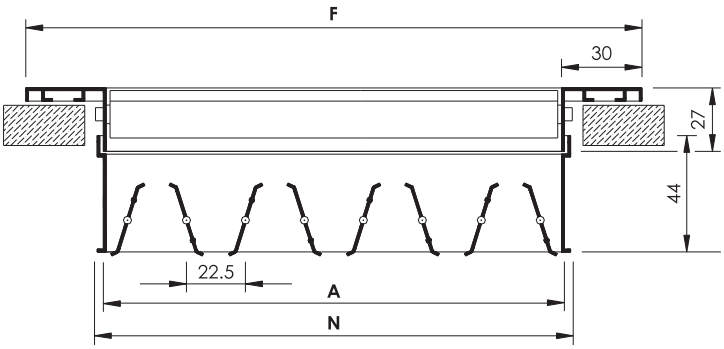
Model RAR HB SD or EAR HB SD

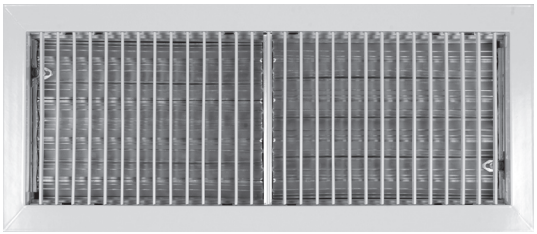




Blades Mounting : Horizontal

Model RAR VB SD or EAR VB SD





Blades Mounting : Vertical

- **RAR / EAR** : is Return, Extract or Exhaust Air Register, Single Deflection Blades c/w Opposed Blade Damper.
- Registers called Return, Extract or Exhaust Air Register and coded as **RAR / EAR** are always equipped with Opposed Blade Damper (provided as standard).

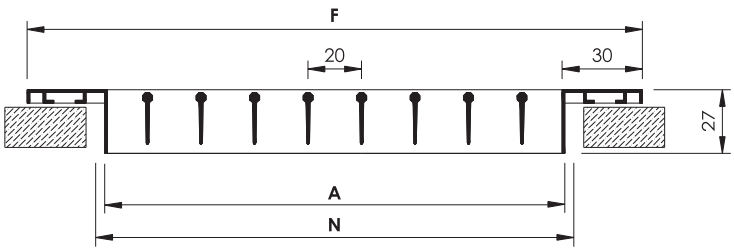
N : Nominal/Listed Size = Length (L) x Height (H)
A : Actual Size = (L-10) x (H-10)
F : Face Size = (L+50) x (H+50)

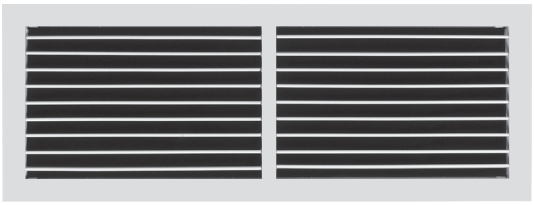
- Registers furnished approximately 10 mm less than the Nominal/Listed Size.
- All dimensions are in mm and subject to ±1 mm tolerance.

Single Deflection Grilles

Construction and Dimensional Details

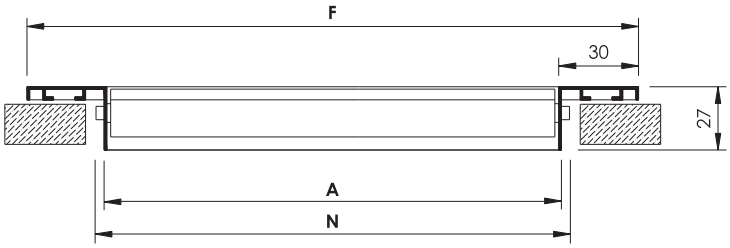
Model RAG HB SD or EAG HB SD

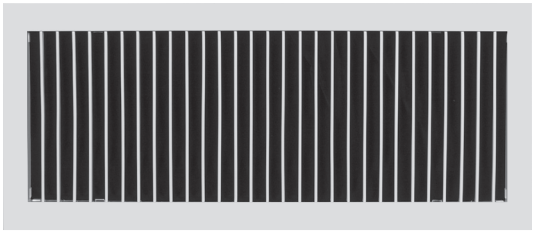




Blades Mounting : Horizontal

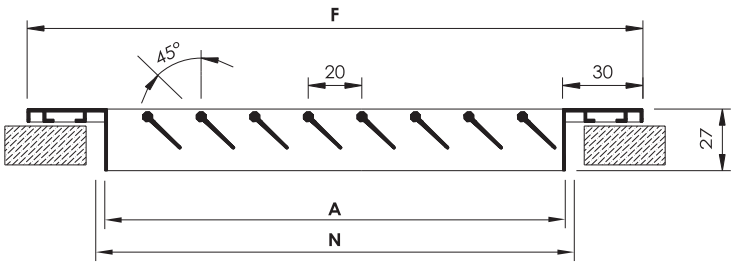
Model RAG VB SD or EAG VB SD





Blades Mounting : Vertical

Model RAG HB SD or EAG HB SD, Fixed Blades 45 °



Blades Mounting : Horizontal, set in a fixed position at an angle of 45°

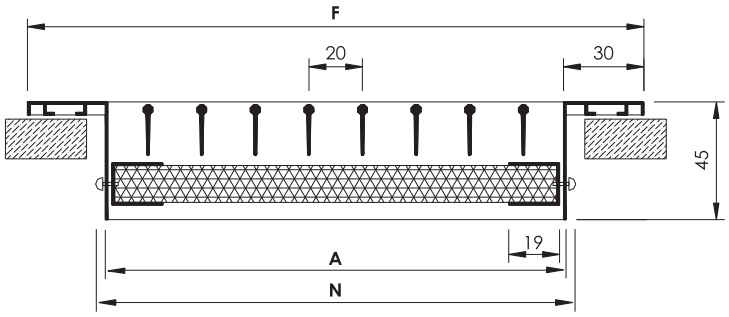
- **RAG / EAG** : is Return, Extract or Exhaust Air Grille, Single Deflection Blades w/o Opposed Blade Damper.
- Grilles called Return, Extract or Exhaust Air Grille and coded as **RAG / EAG** are usually supplied w/o Opposed Blade Damper.

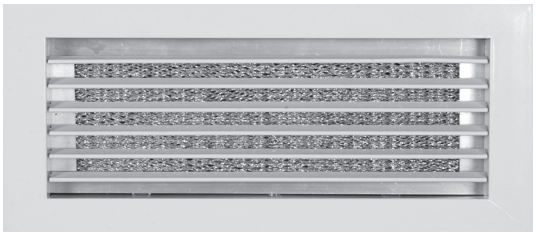
N : Nominal/Listed Size = Length (L) x Height (H)
A : Actual Size = (L-10) x (H-10)
F : Face Size = (L+50) x (H+50)

- Grilles furnished approximately 10 mm less than the Nominal/Listed Size.
- All dimensions are in mm and subject to ±1 mm tolerance.

Fresh Air Grilles and Registers
Construction and Dimensional Details

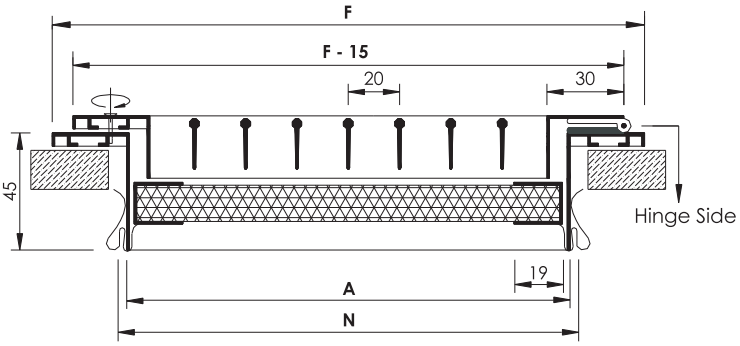
Model FAG C/W FILTER





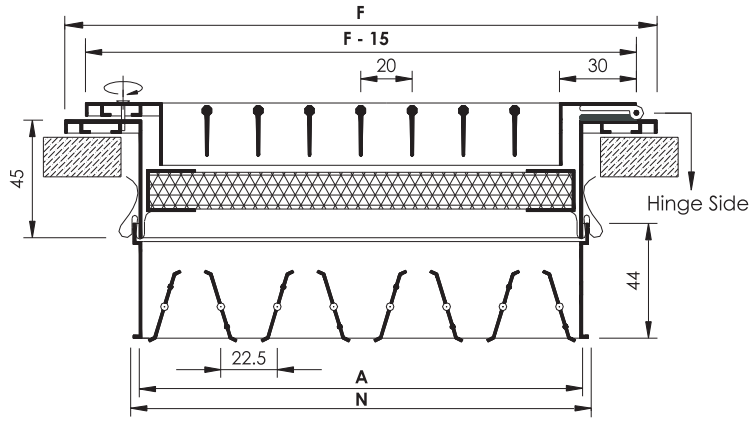
Blades Mounting : Horizontal (Adjustable or Fixed at 45 ° Angle).

Model FAG C/W FILTER (DOUBLE FRAME)



Blades Mounting : Horizontal (Adjustable or Fixed at 45 ° Angle).
Filter : easily removable after the grille fixed.

Model FAG + D C/W FILTER or FAR C/W FILTER (DOUBLE FRAME)



Blades Mounting : Horizontal (Adjustable or Fixed at 45 ° Angle).
Filter : easily removable after the grille fixed.
OBD : adjustable after removal of the filter.

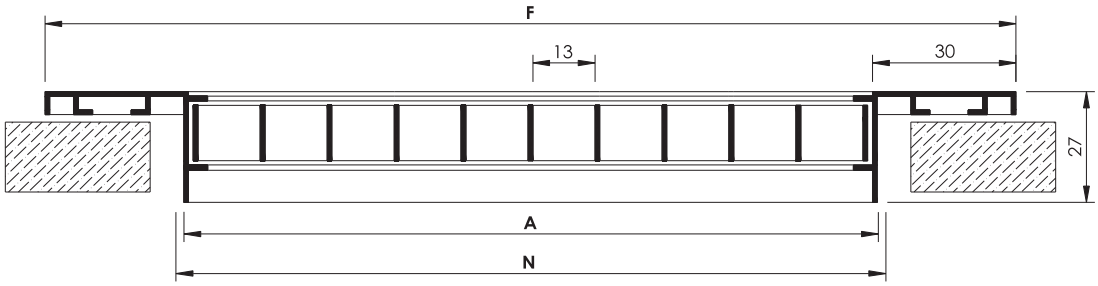
- **FAG / FAR** : is Fresh Air Grille / Register, Single Deflection Blades c/w Aluminium Washable Filter Media 1/2 " thickness.
- Double Frame Grilles / Registers are provided with door hinge from one side and screw from other side allowing the second frame (inner one) to act as an access door to the Filter and/or Oppossed Blade Damper.

N : Nominal/Listed Size = Length (L) x Height (H)
A : Actual Size = (L-10) x (H-10)
F : Face Size = (L+50) x (H+50)

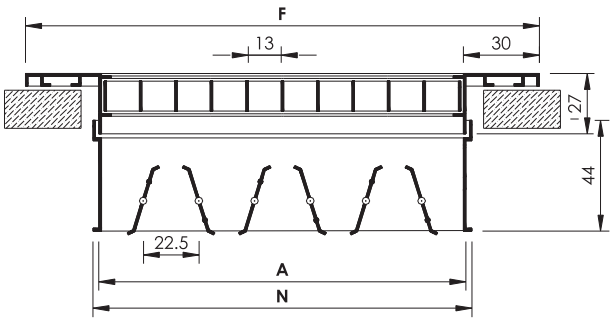
- Grilles / Registers furnished approximately 10 mm less than the Nominal/Listed Size.
- All dimensions are in mm and subject to ±1 mm tolerance.

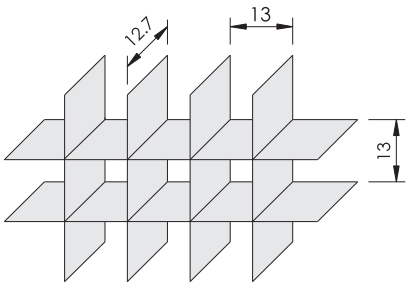
Eggcrate Grilles and Registers
Construction and Dimensional Details

Model ECG



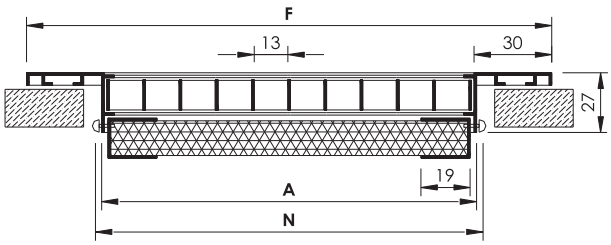
Model ECG + D or ECR

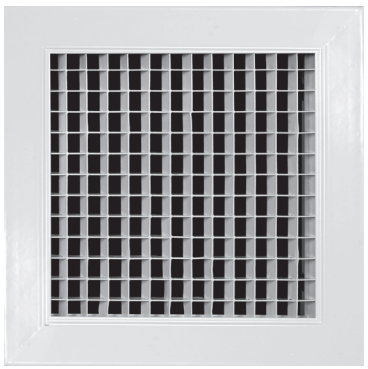




Eggcrate Core Design

Model ECG + F





- The Eggcrate grilles with Aluminium Eggcrate mesh are normally used for the return and recirculation of air inside offices, living areas, commercial centres,..... etc.
- The Particular design of the Eggcrate central core of 13 x 13 mm opening permits the use of a large free surface area (90 % Free Area) without turbulance.
- The Eggcrate grille frame with the channel border is used to fix the central core.
- In respect to traditional grilles with inclined or fixed blades, it's possible to reduce the grilles dimensions while maintaining equal performances, or reduce noise level and pressure drop while maintaining equal dimensions and air flow.
- Eggcrate grilles can be mounted either horizontally or vertically (ceiling or side wall) without affecting their aesthetic form or performance.
- The Eggcrate grilles are available with standard accessories such as Opposed Blade Damper or Aluminium Washable Filter Media of 1/2 " thickness.

N : Nominal/Listed Size = Length (L) x Height (H)

A : Actual Size = (L-10) x (H-10)

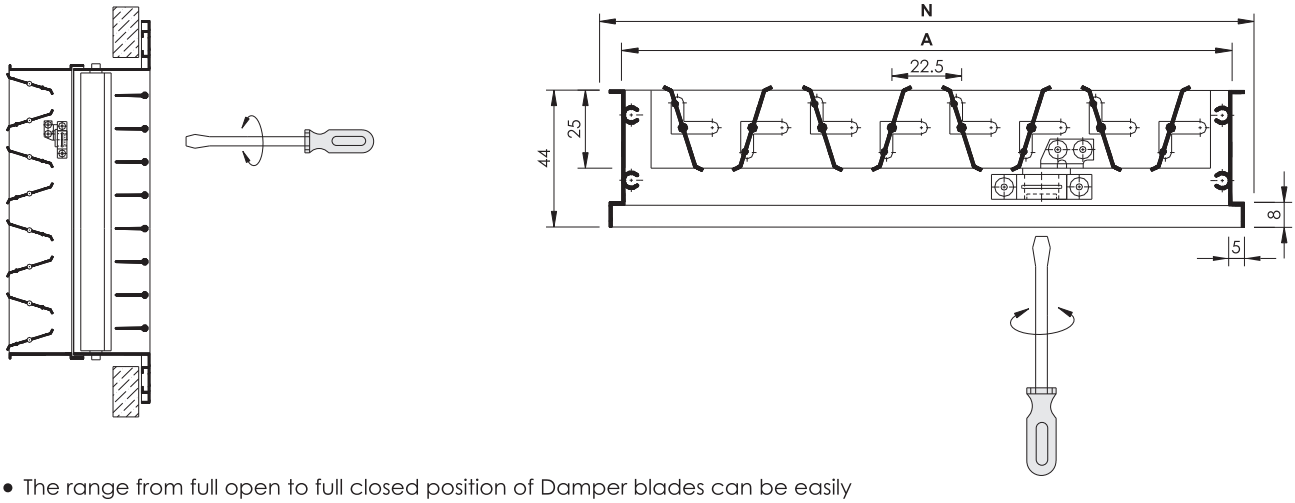
F : Face Size = (L+50) x (H+50)

- Eggcrate Grilles / Registers furnished approximately 10 mm less than the Nominal/Listed Size.
- All dimensions are in mm and subject to ±1 mm tolerance.

Grilles and Registers Accessories

A. Opposed Blade Damper

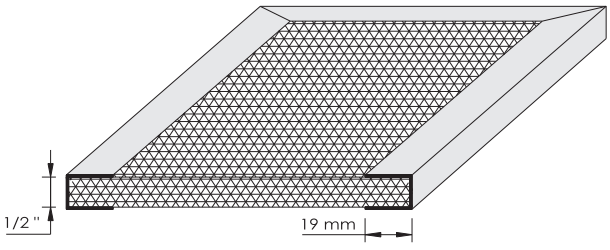
- Frame and Blades are of high quality Extruded Aluminium Profiles construction.
- Blades are designed to rotate opposite to each other.
- The specially designed blades have an overlapping lip which assures a tight closure.
- Generally, the opposed blade damper is attached to the grille and fixed to it by means of " S " clips.
- Blades are separated from it's frame by nylon bushes. This method of assembly provides maximum rattle - free performance and eliminates corrosion.
- Usually Damper standard surface finish is Aluminium in Mill Finish. Matt black powder coating color is also available on request (as an option).
- Screw type operation.



- The range from full open to full closed position of Damper blades can be easily adjusted by a screw driver accessable from the face of the register as shown in the figure.
- All dimensions are in mm and subject to ±1 mm tolerance.

B. Aluminium Washable Filter

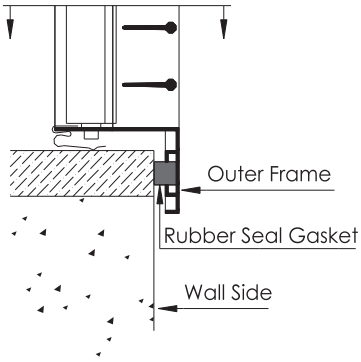
- Construction : Consists of expanded metal Aluminium mesh with unique pattern.
- Application : For collection of big particles of dust. It's used for corrosive atmospheres.
- Features : High dust holding capacity, low resistance filters. It can be cleaned with regular water and live longer live.
- Filter Thickness : Standard 1/2 " thickness provided with Aluminium Profiled U - Channel Frame of 19 mm width.



Grilles and Registers Accessories

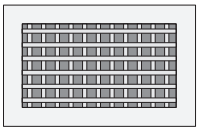
C. Foam Type Rubber Gasket (Optional)

- Gasket type : Single Sided Self - Adhesive Foam.
- Gasket Function : Sealing.
- Gasket Benefits :
  - Stops Grille / Register rattling.
  - Minimize air infiltration.
  - Stops leaks and pressure losses.
  - Takes up unevenness of ceiling.
  - Easy to apply on site or in factory.
- To be applied around the perimeter of the back side of the Grille / Register to act as an air seal to prevent pressurised air from escaping from the sides of the outer frame when fixed to the wall.



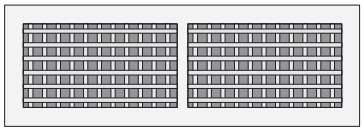
Mullion Arrangement

Without Mullion



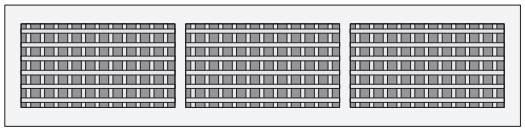
L ⩽ 500 mm

1 Mullion



L > 500 mm
& L ⩽ 1000 mm

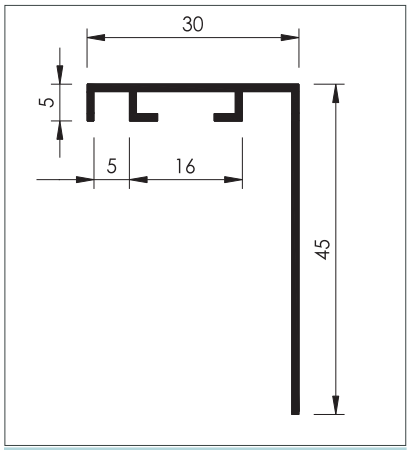
2 Mullions or more



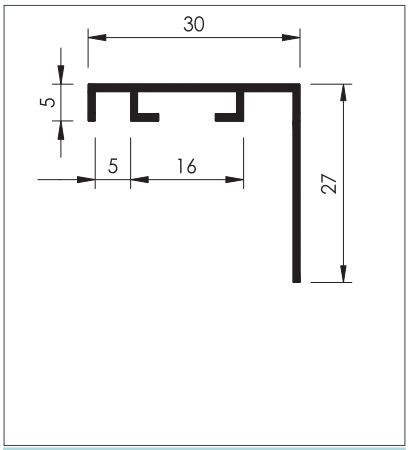
L > 1000 mm

- When the length of the Grille / Register is exceeding 500 mm but not more than 1000 mm, the horizontal blades are supported by a mullion. Fixed at the centre of the Grille / Register for more stability.
- When the length of the Grille / Register is exceeding 1000 mm, two or more mullions (depending on length) are required to support the horizontal blades at equal intervals.
- Mullion Construction : Aluminium Profiled U - Channel of 15 mm width.

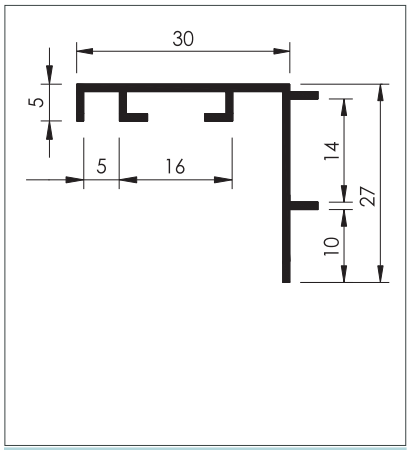
Cross Sectional Drawings for Profiles used in Grilles / Registers



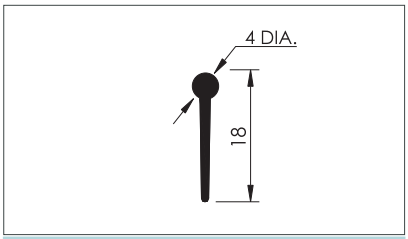
Frame Profile Section
Double Deflection Grilles and Registers



Frame Profile Section
Single Deflection Grilles and Registers



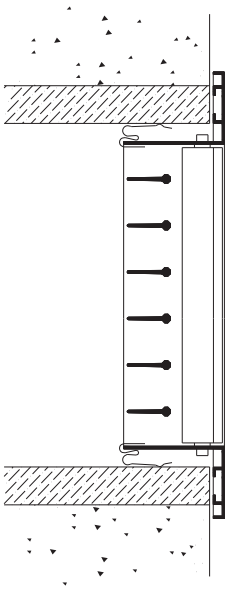
Frame Profile Section
Eggcrate Grilles and Registers



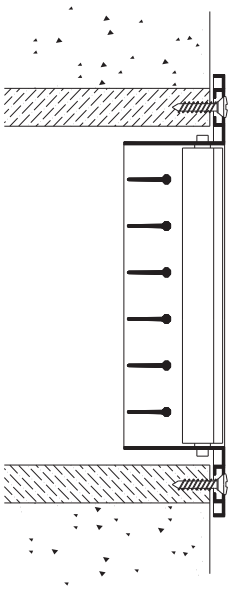
Aerofoil Blade Profile Section
Grilles and Registers

- All dimensions are in mm and subject to ± 0.2 mm tolerance.

Available Fixing Mounting



A. Concealed Fixing (Spring Clip Mounting)
The Grille / Register is fixed by means of spring clips to the wall or partition where no screws are visible.



B. Face Screw Fixing
The Grille / Register is fixed to the wooden Frame by means of visible screws.

Engineering and Performance Data

TABLE GR - 04

EFFECTIVE AREA VALUES FOR DOUBLE BLADES DEFLECTION GRILLES AND REGISTERS IN (m^2)
MODEL SAR and SAG (HFB or VFB) DD

L \ H	100	150	200	250	300	350	400	450	500	550	600
100	0.005										
150	0.008	0.013									
200	0.011	0.017	0.022								
250	0.014	0.022	0.029	0.037							
300	0.016	0.026	0.034	0.043	0.052						
350	0.019	0.030	0.039	0.050	0.060	0.069					
400	0.022	0.035	0.046	0.058	0.069	0.080	0.093				
450	0.025	0.039	0.051	0.065	0.077	0.090	0.104	0.116			
500	0.028	0.043	0.057	0.073	0.087	0.101	0.116	0.130	0.146		
550	0.029	0.046	0.060	0.077	0.092	0.106	0.123	0.137	0.154	0.169	
600	0.032	0.051	0.067	0.085	0.101	0.117	0.135	0.151	0.170	0.186	0.204
650	0.035	0.055	0.072	0.092	0.109	0.127	0.146	0.164	0.184	0.201	0.221
700	0.038	0.059	0.078	0.100	0.119	0.137	0.159	0.178	0.199	0.218	0.240
750	0.040	0.063	0.084	0.107	0.127	0.147	0.170	0.190	0.213	0.233	0.256
800	0.043	0.068	0.090	0.115	0.136	0.158	0.183	0.204	0.229	0.251	0.275
850	0.046	0.072	0.095	0.121	0.144	0.167	0.194	0.217	0.243	0.266	0.292
900	0.049	0.077	0.101	0.129	0.154	0.178	0.206	0.231	0.259	0.283	0.311
950	0.052	0.081	0.107	0.136	0.162	0.188	0.217	0.243	0.272	0.298	0.328
1000	0.055	0.086	0.113	0.144	0.171	0.199	0.230	0.257	0.288	0.315	0.347
1050	0.056	0.088	0.116	0.148	0.176	0.204	0.236	0.264	0.296	0.324	0.356
1100	0.059	0.093	0.122	0.156	0.185	0.215	0.249	0.278	0.312	0.341	0.375
1150	0.062	0.097	0.128	0.163	0.194	0.224	0.260	0.290	0.326	0.356	0.392
1200	0.065	0.102	0.134	0.171	0.203	0.235	0.272	0.305	0.341	0.374	0.411
1250	0.067	0.106	0.139	0.178	0.211	0.245	0.283	0.317	0.355	0.389	0.427
1300	0.070	0.110	0.145	0.186	0.221	0.256	0.296	0.331	0.371	0.406	0.446
1350	0.073	0.114	0.151	0.192	0.229	0.265	0.307	0.343	0.385	0.421	0.463
1400	0.076	0.119	0.157	0.200	0.238	0.276	0.319	0.357	0.401	0.439	0.482
1450	0.078	0.123	0.162	0.207	0.246	0.286	0.330	0.370	0.414	0.454	0.498
1500	0.081	0.128	0.169	0.215	0.256	0.297	0.343	0.384	0.430	0.471	0.517

- L & H dimensions are in mm .
- Values above are based on 0 ° Blades Deflection.
- Damper at full open position.

Engineering and Performance Data

TABLE GR-05

EFFECTIVE AREA VALUES FOR SINGLE BLADES DEFLECTION GRILLES AND REGISTERS IN (m^2)
MODEL RAR, RAG (HB or VB) SD, FAG and FAR

L \ H	100	150	200	250	300	350	400	450	500	550	600
100	0.007										
150	0.010	0.016									
200	0.014	0.022	0.029								
250	0.018	0.028	0.037	0.047							
300	0.021	0.034	0.045	0.057	0.068						
350	0.025	0.039	0.052	0.067	0.080	0.092					
400	0.029	0.045	0.060	0.076	0.091	0.106	0.122				
450	0.033	0.051	0.068	0.086	0.103	0.120	0.138	0.155			
500	0.036	0.057	0.075	0.096	0.115	0.133	0.154	0.172	0.193		
550	0.039	0.061	0.081	0.103	0.123	0.143	0.165	0.185	0.207	0.227	
600	0.043	0.067	0.089	0.113	0.135	0.156	0.181	0.202	0.227	0.248	0.273
650	0.046	0.073	0.096	0.123	0.146	0.170	0.196	0.220	0.246	0.270	0.296
700	0.050	0.078	0.104	0.132	0.158	0.184	0.212	0.238	0.266	0.292	0.320
750	0.054	0.084	0.112	0.142	0.170	0.197	0.228	0.255	0.286	0.313	0.344
800	0.057	0.090	0.119	0.152	0.181	0.211	0.243	0.273	0.305	0.335	0.367
850	0.061	0.096	0.127	0.162	0.193	0.224	0.259	0.290	0.325	0.356	0.391
900	0.065	0.102	0.135	0.172	0.205	0.238	0.275	0.308	0.345	0.378	0.415
950	0.068	0.107	0.142	0.181	0.216	0.252	0.290	0.326	0.364	0.400	0.438
1000	0.072	0.113	0.150	0.191	0.228	0.265	0.306	0.343	0.384	0.421	0.462
1050	0.075	0.117	0.156	0.198	0.236	0.275	0.317	0.356	0.398	0.436	0.479
1100	0.078	0.123	0.163	0.208	0.248	0.288	0.337	0.373	0.418	0.458	0.502
1150	0.082	0.129	0.171	0.218	0.260	0.302	0.349	0.391	0.437	0.480	0.526
1200	0.086	0.135	0.179	0.227	0.271	0.316	0.364	0.408	0.457	0.501	0.550
1250	0.090	0.140	0.186	0.237	0.283	0.329	0.380	0.426	0.477	0.523	0.574
1300	0.093	0.146	0.194	0.247	0.295	0.343	0.396	0.444	0.496	0.544	0.597
1350	0.097	0.152	0.202	0.257	0.307	0.356	0.411	0.461	0.516	0.566	0.621
1400	0.101	0.158	0.209	0.267	0.318	0.370	0.427	0.479	0.536	0.588	0.645
1450	0.104	0.164	0.217	0.276	0.330	0.384	0.443	0.496	0.556	0.609	0.668
1500	0.108	0.169	0.225	0.286	0.342	0.397	0.458	0.514	0.575	0.631	0.692

- L & H dimensions are in mm .
- Values above are based on 0 ° Blades Deflection.
- Damper at full open position.

Engineering and Performance Data

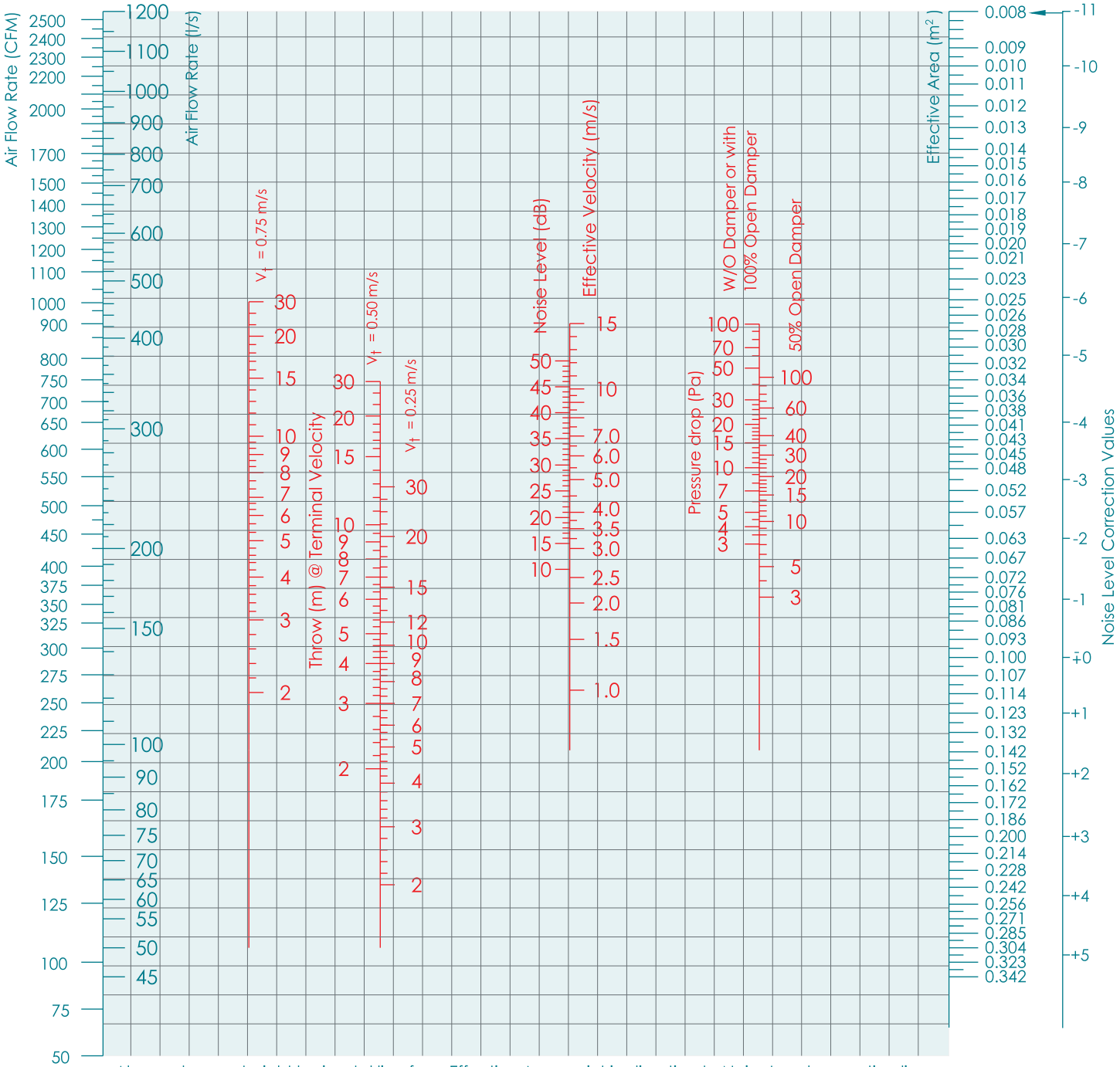
TABLE GR - 06

EFFECTIVE AREA VALUES FOR EGGCRATE GRILLES AND REGISTERS IN (m^2)
MODEL ECG, ECR and ECG + F

L \ H	100	150	200	250	300	350	400	450	500	550	600
100	0.007										
150	0.011	0.018									
200	0.015	0.024	0.032								
250	0.019	0.030	0.041	0.052							
300	0.023	0.037	0.050	0.063	0.076						
350	0.028	0.043	0.058	0.073	0.089	0.104					
400	0.032	0.049	0.067	0.084	0.102	0.119	0.137				
450	0.036	0.055	0.075	0.095	0.115	0.135	0.154	0.174			
500	0.040	0.062	0.084	0.106	0.128	0.150	0.172	0.194	0.216		
550	0.044	0.068	0.092	0.117	0.141	0.165	0.196	0.214	0.238	0.262	
600	0.048	0.074	0.101	0.127	0.154	0.181	0.207	0.234	0.260	0.287	0.313
650	0.052	0.081	0.109	0.138	0.167	0.196	0.225	0.253	0.282	0.311	0.340
700	0.056	0.087	0.118	0.149	0.180	0.211	0.242	0.273	0.304	0.335	0.366
750	0.060	0.093	0.127	0.160	0.193	0.226	0.260	0.293	0.326	0.360	0.393
800	0.064	0.100	0.135	0.171	0.206	0.242	0.277	0.313	0.348	0.384	0.419
850	0.068	0.106	0.144	0.181	0.219	0.257	0.295	0.333	0.370	0.408	0.446
900	0.072	0.112	0.152	0.192	0.232	0.272	0.312	0.352	0.392	0.433	0.473
950	0.076	0.118	0.161	0.203	0.245	0.288	0.330	0.372	0.415	0.457	0.499
1000	0.080	0.125	0.169	0.214	0.258	0.303	0.347	0.392	0.437	0.418	0.526
1050	0.084	0.131	0.178	0.225	0.271	0.318	0.365	0.412	0.459	0.505	0.552
1100	0.088	0.137	0.186	0.235	0.284	0.334	0.383	0.432	0.481	0.530	0.579
1150	0.092	0.144	0.195	0.246	0.298	0.349	0.400	0.451	0.503	0.554	0.605
1200	0.096	0.150	0.203	0.257	0.311	0.364	0.418	0.471	0.525	0.578	0.632
1250	0.100	0.156	0.212	0.268	0.324	0.379	0.435	0.491	0.547	0.603	0.658
1300	0.104	0.163	0.221	0.279	0.337	0.395	0.453	0.511	0.569	0.627	0.685
1350	0.109	0.169	0.229	0.289	0.350	0.410	0.470	0.531	0.591	0.651	0.712
1400	0.113	0.175	0.238	0.300	0.363	0.425	0.488	0.550	0.613	0.676	0.738
1450	0.117	0.181	0.246	0.311	0.376	0.441	0.505	0.570	0.635	0.700	0.765
1500	0.121	0.188	0.255	0.322	0.389	0.456	0.523	0.590	0.657	0.724	0.791

- L & H dimensions are in mm .
- Damper at full open position.

Engineering and Performance Data
General Selection Diagram



- Always draw a straight horizontal line from Effective Area point in direction to Noise Level correction line on right side to obtain it's correction value.

Correction Multipliers / Values :

Blades Deflection	22 1/2 °	45 °
Velocity	x 1.20	x 1.40
Pressure Drop	x 1.30	x 1.60
Throw	x 0.80	x 0.60
Noise Level	+ 2.0	+ 3.0

How to use this Diagram?

Case I : Size and Air Flow Rate are given.

Illustrative Example :

Given Data : Required Model : SAR HFB DD
Nominal Size : 1000 x 150 mm
Air Flow Rate : 550 CFM

Assume Blades setting at 0° Deflection and the Damper at full open position.

See Page No. GR-13 Table No. GR-04, Effective Area = 0.086 m ^{2},

Apply the CFM and Effective Area values to the diagram and draw a straight line connecting both of them, easily from the intersection you can read all the related data as below :-

$V_{eff.}$ =2.8 m/s (intersection point of drawn line with $V_{eff.}$ vertical line).

Noise Level <15 dB (the value where the drawn line intersecting the Noise Level Vertical line after checking Noise Level correction values).

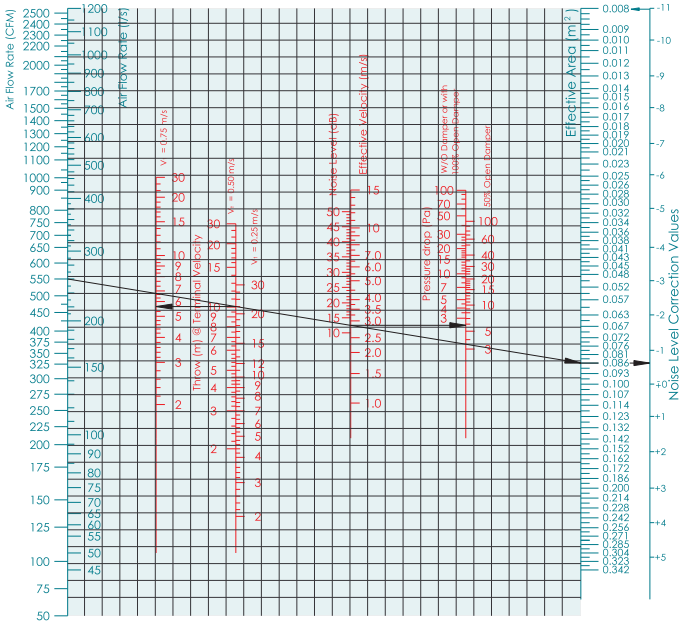
Pressure Drop =2.5 Pa (from the same $V_{eff.}$ point draw a horizontal line intersecting the opposite Pressure Drop vertical line and read this value).

Throw @ V_t=0.25 m/s = 23.0 m (Intersection point of drawn line with Throw vertical line @ V_t = 0.25 m/s).

@ V_t=0.50 m/s = 10.0 m (Intersection point of drawn line with Throw vertical line @ V_t= 0.50 m/s).

@ V_t=0.75 m/s = 5.7 m (where the drawn line intersecting the Throw vertical line @ V_t=0.25 and 0.50 m/s draw a horizontal straight line toward the opposite Throw vertical line @ V_t = 0.75 m/s and read this value).

Case I : Size and Air Flow Rate are given



Case II : Air Flow Rate and Noise Level are given.

Illustrative Example :

Given Data : Required Model : RAG HB SD
Air Flow Rate : 200 CFM
Noise Level : not to exceed 25 dB.

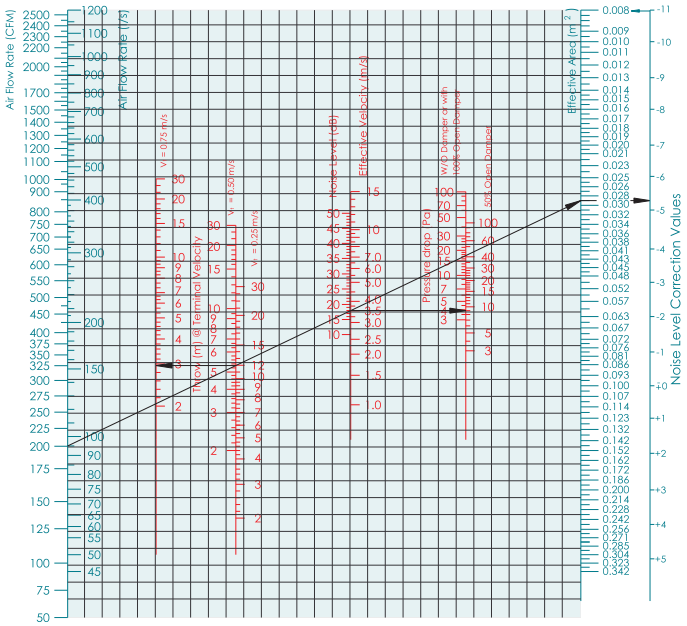
Assume $V_{eff.}$ = 3.5 m/s to find that Noise Level = (18 - 5) = 13 (not exceeding 25 dB), then other related data can be read as below :-

Effective Area = 0.029 m ^{2}
Grille Nominal Size = 200 x 200 mm
Pressure Drop = 3.9 Pa
Throw Values : not required for Return Air Grilles.

Above data are based on 0 ° Blades Deflection, in case that the same Grille is required but @ 45 ° Blades Deflection, data to be corrected as below :-

$V_{eff.}$ = 3.5 x 1.4 = 4.9 m/s
Noise Level = 13 + 3 = 16 dB
Pressure Drop = 3.9 x 1.6 =6.24 Pa

Case II : Air Flow Rate and Noise Level are given



Tabular Selection for Double Deflection Grilles / Registers
Model SAR & SAG (HFB or VFB) DD

TABLE GR-07

SIZE (L) x (H)		$A_{eff.}$	Flow Rate	24 (50)	35 (75)	47 (100)	59 (125)	71 (150)	83 (175)	94 (200)	106 (225)	118 (250)	130 (275)
mm	Inch	m^2	L/S (CFM)										
100 x 100	4" x 4"	0.005	Veff. FPM (m/s)	664 (3.3)	995 (5.0)	1327 (6.6)	1659 (8.3)						
			△ Pt (pa)	8.4	11.5	16.0	24.0						
150 x 100	6" x 4"	0.008	Th. (m)	1.7-2.8-6.5	2.1-3.5-8.0	2.6-4.4-11	3.2-5.7-13						
			Noise Level	16	20	24	29						
200 x 100	8" x 4"	0.011	Veff. FPM (m/s)	422 (2.1)	633 (3.2)	844 (4.2)	1056 (5.3)	1267 (6.3)	1478 (7.4)	1689 (8.4)	1900 (9.5)	2111 (10.6)	
			△ Pt (pa)	4.5	5.6	8.7	13.0	18.0	28.0	40.0	48.0	55.0	
			Th. (m)	1.4-2.5-5.5	1.9-3.0-7.0	2.2-3.7-8.4	2.8-5.0-11	3.3-6-12.4	4.2-7.5-17	5.3-9.3-20	5.9-10.5-24	7.0-12-28	
			Noise Level	<15	<15	17	24	27	32	36	37	40	
150 x 150	6" x 6"	0.013	Veff. FPM (m/s)	344 (1.7)	516 (2.6)	688 (3.4)	860 (4.3)	1032 (5.2)	1204 (6.0)	1376 (6.9)	1548 (7.7)	1720 (8.6)	1892 (9.5)
			△ Pt (pa)	2.5	4.0	5.4	8.2	11.5	17.0	22.0	28.0	35.0	43.0
250 x 100	10" x 4"	0.014	Th. (m)	1.1-2.2-4.8	1.5-2.7-6.0	2.0-3.3-7.5	2.6-4.4-9.7	3.0-5.3-12	3.8-6.7-15	4.6-8.2-18	5.2-9.4-20	5.9-10.5-24	7.0-12-27
			Noise Level	<15	<15	<15	19	23	28	31	33	35	37
300 x 100	12" x 4"	0.016	Veff. FPM (m/s)	265 (1.3)	398 (2.0)	531 (2.7)	664 (3.3)	796 (4.0)	929 (4.6)	1062 (5.3)	1194 (6.0)	1327 (6.6)	1460 (7.3)
200 x 150	8" x 6"	0.017	△ Pt (pa)	0.7	1.5	2.0	3.7	5.0	7.3	10.0	13.0	15.0	19.0
350 x 100	14" x 4"	0.019	Th. (m)	0.8-1.8-4.0	1.1-2.3-5.0	1.6-2.7-6.2	2.2-3.5-8.0	2.6-4.4-9.7	3.2-5.6-13	3.8-6.5-15	4.2-7.5-17	4.8-8.7-19	5.4-9.8-22
			Noise Level	<15	<15	<15	<15	<15	19	23	25	27	30
400 x 100	16" x 4"	0.022	Veff. FPM (m/s)	211 (1.1)	317 (1.6)	422 (2.1)	528 (2.6)	633 (3.2)	739 (3.7)	844 (4.2)	950 (4.8)	1056 (5.3)	1161 (5.8)
250 x 150	10" x 6"	0.022	△ Pt (pa)	0.3	0.5	1.0	2.5	3.7	4.5	7.0	9.0	11.0	13.5
200 x 200	8" x 8"	0.022	Th. (m)	0.5-1.4-3.7	1.0-2.0-4.4	1.4-2.5-5.7	2.0-3.2-7.3	2.4-4.0-9.0	2.8-5.0-11	3.5-6.0-14	4.0-7.0-16	4.4-8-17.5	5.0-9-19.5
			Noise Level	<15	<15	<15	<15	<15	<15	18	21	23	26
450 x 100	18" x 4"	0.025	Veff. FPM (m/s)			364 (1.8)	455 (2.3)	546 (2.7)	638 (3.2)	729 (3.6)	820 (4.1)	911 (4.6)	1002 (5.0)
			△ Pt (pa)			0.5	1.0	2.0	3.5	4.8	6.0	7.0	9.0
300 x 150	12" x 6"	0.026	Th. (m)			1.2-2.3-5.0	1.8-2.9-6.7	2.2-3.6-8.0	2.7-4.8-10.5	3.1-5.5-12.2	3.6-6.2-14.5	4.0-7.0-16	4.6-9.0-18
			Noise Level			<15	<15	<15	<15	<15	17	19	22
500 x 100	20" x 4"	0.028	Veff. FPM (m/s)			320 (1.6)	400 (2.0)	480 (2.4)	561 (2.8)	641 (3.2)	721 (3.6)	801 (4.0)	881 (4.4)
550 x 100	22" x 4"	0.029	△ Pt (pa)			0.4	0.6	1.0	2.5	3.6	4.5	5.5	7.0
250 x 200	10" x 8"	0.029	Th. (m)			1.1-2.1-4.6	1.6-2.7-6.2	2.1-3.4-7.7	2.6-4.4-9.7?<15	2.9-5.2-11.5	3.3-5.8-13.5	3.8-6.7-15	4.2-7.5-17
350 x 150	14" x 6"	0.030	Noise Level			<15	<15	<15	485 (2.4)	<15	<15	17	20
600 x 100	24" x 4"	0.032	Veff. FPM (m/s)			277 (1.4)	347 (1.7)	416 (2.1)	0.9	555 (2.8)	624 (3.1)	693 (3.5)	763 (3.8)
300 x 200	12" x 8"	0.034	△ Pt (pa)			0.2	0.4	0.6	2.3-3.8-8.7	1.7	3.0	4.0	4.7
650 x 100	26" x 4"	0.035	Th. (m)			0.8-1.8-4.2	1.4-2.5-5.5	1.8-3.0-7.0	<15	2.6-4.6-10	3.0-5.4-12	3.5-6.0-14	3.9-6.8-15
400 x 150	16" x 6"	0.035	Noise Level			<15	<15	<15		<15	<15	<15	16

Notes :

- Blades setting at 0 ° Deflection.
- Demper at full open position.
- Throw distance measured at Vt=0.75, 0.50 and 0.25 m/s respectively.
- Noise Level values are based on 10 dB room attenuation.

Tabular Selection for Double Deflection Grilles / Registers
Model SAR & SAG (HFB or VFB) DD

TABLE GR-08

SIZE (L) x (H)		$A_{eff.}$	Flow Rate	142 (300)	153 (325)	165 (350)	177 (375)	189 (400)	212 (450)	236 (500)
mm	Inch	m^2	L/S (CFM)							
			Veff. FPM (m/s)	2064 (10.3)						
150 x 150	6" x 6"	0.013	△ Pt (pa)	50.0						
250 x 100	10" x 4"	0.014	Th. (m)	7.6-13.2- /						
			Noise Level	40						
			Veff. FPM (m/s)	1592 (8.0)	1725 (8.6)	1858 (9.3)	1991 (10.0)	2123 (10.6)	2389 (11.9)	
300 x 100	12" x 4"	0.016	△ Pt (pa)	21.5	23.5	32.0	38.0	50.0	70.0	
200 x 150	8" x 6"	0.017	Th. (m)	6.3-11-25	7.2-12.2-29	7.5-13- /	8.4-14- /	9.3-16- /	11-19- /	
350 x 100	14" x 4"	0.019	Noise Level	32	34	36	38	40	44	
			Veff. FPM (m/s)	1267 (6.3)	1372 (6.9)	1478 (7.4)	1583 (7.9)	1689 (8.4)	1900 (9.5)	2111 (10.6)
400 x 100	16" x 4"	0.022	△ Pt (pa)	16.0	19.0	22.0	25.0	30.0	40.0	46.0
250 x 150	10" x 6"	0.022	Th. (m)	5.7-10-22	6.5-11.5-23	7.1-12-28	7.5-13- /	8.0-14- /	9.4-16- /	11-19- /
200 x 200	8" x 8"	0.022	Noise Level	28	31	33	34	36	38	40
			Veff. FPM (m/s)	1093 (5.5)	1184 (5.9)	1275 (6.4)	1366 (6.8)	1457 (7.3)	1639 (8.2)	1821 (9.1)
450 x 100	18" x 4"	0.025	△ Pt (pa)	10.5	13.0	15.0	17.0	20.0	24.0	33.0
300 x 150	12" x 6"	0.026	Th. (m)	5-9.2-19.8	5.7-10-22.5	6.3-11-24	7.0-12-28	7.7-13.2- /	8.7-15- /	9.7-17- /
			Noise Level	24	27	29	31	33	35	38
500 x 100	20" x 4"	0.028	Veff. FPM (m/s)	978 (4.9)	1059 (5.3)	1141 (5.7)	1222 (6.1)	1304 (6.5)	1467 (7.3)	1630 (8.1)
550 x 100	22" x 4"	0.029	△ Pt (pa)	8.0	9.5	11.0	13.0	16.0	20.0	24.0
250 x 200	10" x 8"	0.029	Th. (m)	4.7-8.5-18.8	5.3-9.5-20	5.8-10.2-23	6.5-11.2-25	7.2-12.5-29	8-14- /	9.3-16- /
350 x 150	14" x 6"	0.030	Noise Level	22	24	25	27	30	32	35
600 x 100	24" x 4"	0.032	Veff. FPM (m/s)	832 (4.2)	901 (4.5)	971 (4.9)	1040 (5.2)	1109 (5.5)	1248 (6.2)	1386 (6.9)
300 x 200	12" x 8"	0.034	△ Pt (pa)	5.9	6.9	7.3	9.0	10.5	13.4	16.0
650 x 100	26" x 4"	0.035	Th. (m)	4.4-7.9-15.5	4.8-8.7-19	5.3-9.5-21	5.9-10.5-23	6.5-11.5-27	7.5-13-30	8.3-14.2- /
400 x 150	16" x 6"	0.035	Noise Level	19	21	22	24	26	28	30

- Tabulated data are subject to the same notes as in page No.GR - 18.

Tabular Selection for Double Deflection Grilles / Registers
Model SAR & SAG (HFB or VFB) DD

TABLE GR-09

SIZE (L) x (H)		$A_{eff.}$	Flow Rate											
mm	Inch	m^2	L/S (CFM)	118 (250)	130 (275)	142 (300)	153 (325)	165 (350)	170 (375)	189 (400)	200 (425)	212 (450)	224 (475)
250 x 250	10" x 10"	0.037	Veff. FPM (m/s)	603 (3.0)	664 (3.3)	724 (3.6)	784 (3.9)	844 (4.2)	905 (4.5)	965 (4.8)	1025 (5.1)	1086 (5.4)	1146 (5.7)
700 x 100	28" x 4"	0.038	△ Pt (pa)	2.7	3.6	4.3	5.1	6.0	5.9	8.0	8.8	10.0	11.8
450 x 150	18" x 6"	0.039	Th. (m)	3.3-5.7-13	3.7-6.4-14.8	4.1-7.2-16.5	4.6-8.1-18	5.0-9-19.5	5.4-9.6-21	6.0-11-23	6.5-11.3-26	7.0-12-28	7.6-13- /
750 x 100	30" x 4"	0.040	Noise Level	<15	<15	15	18	19	20	22	23	25	27
800 x 100	32" x 4"	0.043	Veff. FPM (m/s)	540 (2.7)	594 (3.0)	648 (3.2)	702 (3.5)	756 (3.8)	810 (4.1)	864 (4.3)	918 (4.6)	972 (4.9)	1026 (5.1)
500 x 150	20" x 6"	0.043	△ Pt (pa)	2.0	3.0	3.5	4.3	5.0	5.7	6.5	7.4	8.0	9.0
300 x 250	12" x 10"	0.043	Th. (m)	3.1-5.5-12.5	3.5-6.0-14	3.9-6.8-15.5	4.4-7.8-17.5	4.8-8.5-18.5	5.2-9.3-20	5.6-10-22	6.3-11-25	6.6-12-26.5	7.2-12.2-29
			Noise Level	<15	<15	<15	16	18	19	21	22	24	25
850 x 100	32" x 4"	0.046	Veff. FPM (m/s)	505 (2.5)	555 (2.8)	606 (3.0)	656 (3.3)	707 (3.5)	757 (3.8)	808 (4.0)	858 (4.3)	909 (4.5)	959 (4.8)
550 x 150	22" x 6"	0.046	△ Pt (pa)	1.5	2.4	3.0	3.7	4.3	4.9	6.0	6.3	7.0	8.0
400 x 200	16" x 8"	0.046	Th. (m)	3.0-5.3-12	3.4-5.8-13.5	3.8-6.6-15	4.3-7.5-17	4.5-8.0-18	5-9.0-19.5	5.4-9.6-21	5.9-10.5-23	6.3-11-25	7.0-12-27
			Noise Level	<15	<15	<15	<15	16	18	19	21	22	23
900 x 100	36" x 4"	0.049	Veff. FPM (m/s)	460 (2.3)	506 (2.5)	552 (2.8)	598 (3.0)	644 (3.2)	690 (3.4)	736 (3.7)	782 (3.9)	828 (4.1)	874 (4.4)
350 x 250	14" x 10"	0.050	△ Pt (pa)	0.9	1.0	1.8	2.5	3.5	3.6	4.2	4.7	5.2	6.0
450 x 200	18" x 8"	0.051	Th. (m)	2.8-11-5.0	3.1-8.0-12.8	3.5-6.1-14.2	4.0-7.0-16	4.3-7.5-17	4.6-8.3-18	5-9.0-19.5	5.5-9.6-21	6.0-10-23	6.3-11-25
300 x 300	12" x 12"	0.052	Noise Level	<15	<15	<15	<15	<15	<15	16	17	18	20

TABLE GR-10

SIZE (L) x (H)		$A_{eff.}$	Flow Rate											
mm	Inch	m^2	L/S (CFM)	142 (300)	153 (325)	165 (350)	170 (375)	189 (400)	200 (425)	212 (450)	224 (475)	236 (500)	260 (550)
650 x 150	26" x 6"	0.055	Veff. FPM (m/s)	489 (2.4)	530 (2.6)	570 (2.9)	611 (3.1)	652 (3.3)	693 (3.5)	733 (3.7)	774 (3.9)	815 (4.1)	896 (4.5)
500 x 200	20" x 8"	0.057	△ Pt (pa)	1.2	1.9	2.5	3.0	3.5	4.0	4.5	4.8	5.1	6.5
400 x 250	16" x 10"	0.058	Th. (m)	3.4-5.8-13.5	3.8-6.6-15	4.0-7.0-16	4.5-8.0-17.7	4.8-8.5-19	5.2-9.5-20	5.5-9.8-22	5.8-10.1-25	6.5-11.3-26	7.5-13-30
700 x 150	28" x 6"	0.059	Noise Level	<15	<15	<15	<15	<15	16	18	19	20	22
350 x 300	14" x 12"	0.060	Veff. FPM (m/s)	446 (2.2)	483 (2.4)	520 (2.6)	557 (2.8)	595 (3.0)	632 (3.2)	669 (3.3)	706 (3.5)	743 (3.7)	817 (4.1)
1150 x 100	46" x 4"	0.062	△ Pt (pa)	0.8	1.0	1.5	2.0	2.5	3.0	3.4	3.9	4.0	5.0
750 x 150	30" x 6"	0.063	Th. (m)	3.2-5.6-13	3.6-6.2-14.2	3.9-6.7-15.5	4.2-7.5-17	4.6-8.0-18	4.9-8.9-19	5.2-9.3-20	5.6-10-22	6.3-10.5-24	7.0-12-28
450 x 250	18" x 10"	0.065	Noise Level	<15	<15	<15	<15	<15	<15	<15	16	17	19
600 x 200	24" x 8"	0.067	Veff. FPM (m/s)	410 (2.0)	444 (2.2)	478 (2.4)	512 (2.6)	546 (2.7)	581 (2.9)	615 (3.1)	649 (3.2)	683 (3.4)	751 (3.8)
800 x 150	32" x 6"	0.068	△ Pt (pa)	0.6	0.9	1.0	1.6	2.0	2.7	3.0	3.4	3.8	4.6
400 x 300	16" x 12"	0.069	Th. (m)	3.1-5.5-12.8	3.5-6.0-14	3.8-6.6-15	4.1-7.2-16.5	4.5-8.0-18	4.8-8.6-19	5.1-9-19.7	5.5-9.6-21	6.3-11-23	6.9-11.8-27
350 x 350	14" x 14"	0.069	Noise Level	<15	<15	<15	<15	<15	<15	<15	15	16	18

- Tabulated data are subject to the same notes as in page No.GR - 18.

Tabular Selection for Double Deflection Grilles / Registers
Model SAR & SAG (HFB or VFB) DD

TABLE GR-11

SIZE (L) x (H)		$A_{eff.}$	Flow Rate	236 (500)	260 (550)	283 (600)	307 (650)	330 (700)	354 (750)	378 (800)
mm	Inch	m^2	L/S (CFM)							
250 x 250	10" x 10"	0.037	Veff. FPM (m/s)	1206 (6.0)	1327 (6.6)	1448 (7.2)	1568 (7.8)	1689 (8.4)	1810 (9.0)	
700 x 100	28" x 4"	0.038	△ Pt (pa)	13.0	16.0	18.5	24.0	26.0	30.0	
450 x 150	18" x 6"	0.039	Th. (m)	8.0-13.8- /	9.0-15- /	10-17- /	11.5-20- /	13-23- /	13.8-27- /	
750 x 100	30" x 4"	0.040	Noise Level	28	31	33	35	37	39	
800 x 100	32" x 4"	0.043	Veff. FPM (m/s)	1080 (5.4)	1188 (5.9)	1296 (6.5)	1404 (7.0)	1512 (7.6)	1620 (8.1)	
500 x 150	20" x 6"	0.043	△ Pt (pa)	10.0	12.0	15.0	18.0	21.0	24.0	
300 x 250	12" x 10"	0.043	Th. (m)	7.6-13- /	8.3-14.5- /	9.3-16- /	11-18.5- /	12.0-20- /	13-25- /	
			Noise Level	26	29	31	33	35	37	
850 x 100	32" x 4"	0.046	Veff. FPM (m/s)	1010 (5.0)	1111 (5.6)	1212 (6.1)	1313 (6.6)	1414 (7.1)	1515 (7.6)	1616 (8.1)
550 x 150	22" x 6"	0.046	△ Pt (pa)	8.5	11.0	13.0	15.0	17.0	20.0	24.0
400 x 200	16" x 8"	0.046	Th. (m)	7.3-12.5-29	8.3-14- /	9.3-16- /	10.5-18- /	11.3-19.5- /	12.5-23- /	14-27- /
			Noise Level	24	27	29	32	33	35	37
900 x 100	36" x 4"	0.049	Veff. FPM (m/s)	920 (4.6)	1012 (5.1)	1104 (5.5)	1196 (6.0)	1288 (6.4)	1380 (6.9)	1472 (7.4)
350 x 250	14" x 10"	0.050	△ Pt (pa)	6.5	7.3	9.5	11.5	14.5	16.0	19.0
450 x 200	18" x 8"	0.051	Th. (m)	6.7-12-27	7.6-13- /	8.5-15- /	9.5-16.5- /	10.8-18.5- /	12-20- /	13-25- /
300 x 300	12" x 12"	0.052	Noise Level	21	23	26	28	31	32	34

TABLE GR-12

SIZE (L) x (H)		$A_{eff.}$	Flow Rate	283 (600)	307 (650)	330 (700)	354 (750)	378 (800)	401 (850)	425 (900)
mm	Inch	m^2	L/S (CFM)							
650 x 150	26" x 6"	0.055	Veff. FPM (m/s)	978 (4.9)	1059 (5.3)	1141 (5.7)	1222 (6.1)	1304 (6.5)	1385 (6.9)	1467 (7.3)
500 x 200	20" x 8"	0.057	△ Pt (pa)	7.8	9.3	11.0	13.0	14.0	17.0	18.0
400 x 250	16" x 10"	0.058	Th. (m)	8.0-14- /	9.0-15.5- /	10-17.3- /	11.0-19- /	12.5-23- /	13.5-26- /	14.5-29- /
700 x 150	28" x 6"	0.059	Noise Level	25	27	29	30	32	33	35
350 x 300	14" x 12"	0.060	Veff. FPM (m/s)	892 (4.5)	966 (4.8)	1040 (5.2)	1115 (5.6)	1189 (5.9)	1263 (6.3)	1338 (6.7)
1150 x 100	46" x 4"	0.062	△ Pt (pa)	6.5	7.3	9.0	10.0	12.0	14.0	15.0
750 x 150	30" x 6"	0.063	Th. (m)	7.7-13.5- /	8.6-14.8- /	9.3-16- /	10.2-18- /	11.8-20- /	13-23- /	14-26- /
450 x 250	18" x 10"	0.065	Noise Level	22	24	26	28	30	32	33
600 x 200	24" x 8"	0.067	Veff. FPM (m/s)	820 (4.1)	888 (4.4)	956 (4.8)	1025 (5.1)	1093 (5.5)	1161 (5.8)	1229 (6.1)
800 x 150	32" x 6"	0.068	△ Pt (pa)	5.0	7.0	8.0	9.5	9.8	11.0	12.0
400 x 300	16" x 12"	0.069	Th. (m)	7.6-13.0- /	8.4-14.5- /	9.2-15.9- /	10-17.5- /	11.0-19- /	12-20- /	13-23- /
350 x 350	14" x 14"	0.069	Noise Level	21	23	25	27	28	30	31

- Tabulated data are subject to the same notes as in page No.GR - 18.

Tabular Selection for Double Deflection Grilles / Registers
Model SAR & SAG (HFB or VFB) DD

TABLE GR-13

SIZE (L) x (H)		$A_{eff.}$	Flow Rate											
mm	Inch	m^2	L/S (CFM)	200 (425)	212 (450)	224 (475)	236 (500)	260 (550)	283 (600)	307 (650)	330 (700)	354 (750)	378 (800)
1300 x 100	52" x 4"	0.070	Veff. FPM (m/s)	552 (2.8)	585 (2.9	617 (3.1)	650 (3.2)	715 (3.6)	780 (3.9)	844 (4.2)	909 (4.5)	974 (4.9)	1039 (5.2)
850 x 150	34" x 6"	0.072	△ Pt (pa)	1.5	2.0	2.5	3.0	3.5	4.5	5.5	6.1	7.4	7.6
650 x 200	26" x 8"	0.072	Th. (m)	4.5-8.0-18	4.8-8.5-19	5-9.2-19.8	5.5-9.7-21	6.3-11-25	7.3-12.5-29	8.0-14.0- /	8.3-14.9- /	9.5-16.5- /	10.5-18- /
500 x 250	20" x 10"	0.073	Noise Level	<15	<15	<15	<15	16	19	21	23	24	26
1350 x 100	54" x 4"	0.073											
1400 x 100	56" x 4"	0.076	Veff. FPM (m/s)	513 (2.6)	543 (2.7)	573 (2.9)	603 (3.0)	664 (3.3)	724 (3.6)	784 (3.9)	844 (4.2)	905 (4.5)	965 (4.8)
550 x 250	22" x 10"	0.077	△ Pt (pa)	1.0	1.2	1.5	2.3	3.0	3.9	4.5	5.2	6.2	7.0
450 x 300	18" x 12"	0.077	Th. (m)	4.3-7.6-17	4.4-7.7-17.3	4.6-8.1-18.2	5.3-9.5-20	6.0-10.7-24	7.9-12-28	9.1-13.5- /	8.3-14.5- /	9.3-15.8- /	10-17.5- /
700 x 200	28" x 8"	0.078	Noise Level	<15	<15	<15	<15	<15	16	19	20	22	24
400 x 350	16" x 14"	0.080	Veff. FPM (m/s)	479 (2.4)	507 (2.5)	535 (2.7)	563 (2.8)	619 (3.1)	676 (3.4)	732 (3.7)	788 (3.9)	844 (4.2)	901 (4.5)
950 x 150	38" x 6"	0.081	△ Pt (pa)	0.8	1.0	1.3	2.1	2.5	3.0	4.0	4.6	5.2	6.0
750 x 200	30" x 8"	0.084	Th. (m)	4.2-7.5-16.8	4.5-8-17.5	4.7-8.2-18.5	5-9.0-19.5	5.7-10.2-23	6.6-11.5-26	7.5-13-30	8.0-14- /	9.0-15- /	9.7-17- /
600 x 250	24" x 10"	0.085	Noise Level	<15	<15	<15	<15	<15	<15	17	19	21	23
1000 x 150	40" x 6"	0.086	Veff. FPM (m/s)	454 (2.3)	480 (2.4)	507 (2.5)	534 (2.7)	587 (2.9)	641 (3.2)	694 (3.5)	747 (3.7)	801 (4.0)	854 (4.3)
500 x 300	20" x 12"	0.087	△ Pt (pa)	0.7	0.9	1.0	1.5	2.1	2.9	3.5	4.2	5.0	5.8
1050 x 150	42" x 6"	0.088	Th. (m)	4.1-7.3-16.5	4.4-7.8-17.2	4.6-8.4-18.3	4.9-8.9-19.2	5.6-10-23	6.5-11.3-25	7.3-12.9-30	7.9-13.9- /	8.6-14.9- /	9.5-16.5- /
			Noise Level	<15	<15	<15	<15	<15	<15	16	18	20	22
800 x 200	32" x 8"	0.090	Veff. FPM (m/s)	431 (2.2)	457 (2.3)	482 (2.4)	508 (2.5)	558 (2.8)	609 (3.0)	660 (3.3)	711 (3.6)	761 (3.8)	812 (4.1)
450 x 350	18" x 14"	0.090	△ Pt (pa)	0.7	0.8	0.9	1.0	1.5	2.5	3.2	3.8	4.5	5.0
650 x 250	26" x 10"	0.092	Th. (m)	4.0-7.0-16	4.2-7.5-17	4.6-8.0-18	4.8-8.6-19	5.4-9.8-21	6.2-11-25	7.2-12.5-29	7.7-13.5- /	8.5-14.5-/	9.3-16- /
550 x 300	22" x 12"	0.092	Noise Level	<15	<15	<15	<15	<15	<15	16	18	20	21
400 x 400	16" x 16"	0.093											
850 x 200	34" x 8"	0.095	Veff. FPM (m/s)	403 (2.0)	427 (2.1)	450 (2.3)	474 (2.4)	521 (2.6)	569 (2.8)	616 (3.1)	664 (3.3)	711 (3.6)	758 (3.8)
1150 x 150	46" x 6"	0.097	△ Pt (pa)	0.5	0.6	0.7	0.8	1.0	1.5	2.5	3.0	3.6	4.0
700 x 250	28" x 10"	0.100	Th. (m)	3.8-6.6-15	4.1-7.1-16.1	4.3-7.6-17.1	4.6-8.1-18	5.2-9.4-20	6.0-10.5-24	7.0-12-28	7.4-13-30	8.0-14- /	9.0-15- /
900 x 200	36" x 8"	0.101											
600 x 300	24" x 12"	0.101	Noise Level	<15	<15	<15	<15	<15	<15	<15	15	17	19
500 x 350	20" x 14"	0.101											
1200 x 150	48" x 6"	0.102	Veff. FPM (m/s)	378 (1.9)	400 (2.0)	422 (2.1)	444 (2.2)	489 (2.4)	533 (2.7)	578 (2.9)	622 (3.1)	667 (3.3)	711 (3.6)
450 x 400	18" x 16"	0.104	△ Pt (pa)	0.3	0.5	0.6	0.7	0.9	1.4	1.5	2.6	3.3	3.8
550 x 350	22" x 14"	0.106	Th. (m)	3.7-6.5-15	4.0-7.0-16	4.2-7.5-17	4.5-8.0-17.8	5-9.1-19.7	5.7-10.2-21	6.7-11.0-25	7.3-12.8-30	8.0-13.8- /	8.7-14.8- /
950 x 200	38" x 8"	0.107	Noise Level	<15	<15	<15	<15	<15	<15	<15	<15	16	18
750 x 250	30" x 10"	0.107											

- Tabulated data are subject to the same notes as in page No.GR - 18.

Tabular Selection for Double Deflection Grilles / Registers
Model SAR & SAG (HFB or VFB) DD

TABLE GR-14

SIZE (L) x (H)		$A_{eff.}$	Flow Rate	401 (850)	425 (900)	448 (950)	472 (1000)	495 (1050)	519 (1100)	543 (1150)	566 (1200)	590 (1250)	613 (1300)
mm	Inch	m^2	L/S (CFM)										
1300 x 100	52" x 4"	0.070	Veff. FPM (m/s)	1104 (5.5)	1169 (5.8)	1234 (6.2)	1299 (6.5)	1364 (6.8)	1429 (7.1)	1494 (7.5)	1559 (7.8)	1624 (8.1)	1689 (8.4)
850 x 150	34" x 6"	0.072	△ Pt (pa)	9.7	10.5	12.0	12.5	14.0	15.0	16.0	18.0	19.0	21.0
650 x 200	26" x 8"	0.072	Th. (m)	11.7-20 - /	12.5-23- /	13-25- /	14.0-26- /	14-29.5- /	15.5- / - /	16.3- / - /	16.5- / - /	18- / - /	19- / - /
500 x 250	20" x 10"	0.073	Noise Level	28	29	30	31	32	33	34	35	36	37
1350 x 100	54" x 4"	0.073											
1400 x 100	56" x 4"	0.076	Veff. FPM (m/s)	1025 (5.1)	1086 (5.4)	1146 (5.7)	1206 (6.0)	1267 (6.3)	1327 (6.6)	1387 (6.9)	1448 (7.2)	1508 (7.5)	1568 (7.8)
550 x 250	22" x 10"	0.077	△ Pt (pa)	8.5	9.0	10.0	10.5	11.0	13.0	14.3	15.0	17.0	18.5
450 x 300	18" x 12"	0.077	Th. (m)	11.0-19- /	12-21.5- /	12.9-23- /	13.2-25- /	14-29.2- /	15- / - /	16- / - /	17- / - /	18.5- / - /	18.7- / - /
700 x 200	28" x 8"	0.078	Noise Level	26	27	28	29	30	31	32	33	35	36
400 x 350	16" x 14"	0.080	Veff. FPM (m/s)	957 (4.8)	1013 (5.1)	1070 (5.3)	1126 (5.6)	1182 (5.9)	1239 (6.2)	1295 (6.5)	1351 (6.8)	1407 (7.0)	1464 (7.3)
950 x 150	38" x 6"	0.081	△ Pt (pa)	7.1	8.0	8.8	9.0	10.0	11.5	12.5	13.5	14.3	15.5
750 x 200	30" x 8"	0.084	Th. (m)	10.8-18.5- /	11.5-19.5- /	12-22.0- /	13-23.0- /	13.5-26- /	14.5-30- /	15- / - /	16- / - /	17- / - /	18- / - /
600 x 250	24" x 10"	0.085	Noise Level	24	25	26	27	29	30	31	32	33	34
1000 x 150	40" x 6"	0.086	Veff. FPM (m/s)	908 (4.5)	961 (4.8)	1014 (5.1)	1068 (5.3)	1121 (5.6)	1175 (5.9)	1228 (6.1)	1281 (6.4)	1335 (6.7)	1388 (6.9)
500 x 300	20" x 12"	0.087	△ Pt (pa)	6.8	7.4	8.1	8.5	9.0	10.0	11.0	12.0	13.0	14.0
1050 x 150	42" x 6"	0.088	Th. (m)	10.5-18- /	10.2-19- /	11.8-20- /	12.5-22- /	13-24- /	14-28- /	14.9-30- /	15.8- / - /	16.5- / - /	17.5- / - /
			Noise Level	23	24	26	27	28	30	31	32	33	34
800 x 200	32" x 8"	0.090	Veff. FPM (m/s)	863 (4.3)	914 (4.6)	964 (4.8)	1015 (5.1)	1066 (5.3)	1117 (5.6)	1168 (5.8)	1218 (6.1)	1269 (6.3)	1320 (6.6)
450 x 350	18" x 14"	0.090	△ Pt (pa)	6.0	6.5	7.0	7.5	8.5	9.0	10.5	11.5	12.0	13.0
650 x 250	26" x 10"	0.092	Th. (m)	10-17.5- /	11-19.0- /	12.0-20- /	12.3-21- /	13-23- /	14-27- /	14.8-30- /	10.5- / - /	16- / - /	17- / - /
550 x 300	22" x 12"	0.092	Noise Level	23	24	25	26	27	29	30	31	32	33
400 x 400	16" x 16"	0.093											
850 x 200	34" x 8"	0.095	Veff. FPM (m/s)	806 (4.0)	853 (4.3)	900 (4.5)	948 (4.7)	995 (5.0)	1043 (5.2)	1090 (5.5)	1137 (5.7)	1185 (5.9)	1232 (6.2)
1150 x 150	46" x 6"	0.097	△ Pt (pa)	5.0	5.5	6.0	6.3	7.2	7.4	8.4	9.0	9.8	10.5
700 x 250	28" x 10"	0.100	Th. (m)	9.7-15.8- /	10.2-18- /	10.3-19- /	11.2-19.5- /	12.2-21- /	13-25- /	13.8-27- /	14.8-30- /	15.2- / - /	16.1- / - /
900 x 200	36" x 8"	0.101											
600 x 300	24" x 12"	0.101	Noise Level	21	22	23	24	25	26	27	28	29	30
500 x 350	20" x 14"	0.101											
1200 x 150	48" x 6"	0.102	Veff. FPM (m/s)	756 (3.8)	800 (4.0)	844 (4.2)	889 (4.4)	933 (4.7)	978 (4.9)	1022 (5.1)	1067 (5.3)	1111 (5.6)	1156 (5.8)
450 x 400	18" x 16"	0.104	△ Pt (pa)	4.6	5.0	5.3	6.0	6.7	7.0	7.5	8.2	9.0	9.8
550 x 350	22" x 14"	0.106	Th. (m)	9.4-16.2- /	10-17.5- /	10.2-18.5- /	11-19.2- /	12-20- /	12.8-23- /	14-27- /	14.2-29- /	27- / - /	30- / - /
950 x 200	38" x 8"	0.107	Noise Level	20	21	22	23	24	25	26	27	28	29
750 x 250	30" x 10"	0.107											

- Tabulated data are subject to the same notes as in page No.GR - 18.

Tabular Selection for Double Deflection Grilles / Registers
Model SAR & SAG (HFB or VFB) DD

TABLE GR-15

SIZE (L) x (H)		$A_{eff.}$	Flow Rate	637 (1350)	661 (1400)	684 (1450)	708 (1500)	731 (1550)	755 (1600)	779 (1650)	802 (1700)	826 (1750)	849 (1800)
mm	Inch	m^2	L/S (CFM)										
1300 x 100	52" x 4"	0.070	Veff. FPM (m/s)	1754 (8.8)	1819 (9.1)	1884 (9.4)							
850 x 150	34" x 6"	0.072	△ Pt (pa)	22.0	25.0	27.0							
650 x 200	26" x 8"	0.072	Th. (m)	20- / - /	23- / - /	25- / - /							
500 x 250	20" x 10"	0.073	Noise Level	38	39	40							
1350 x 100	54" x 4"	0.073											
1400 x 100	56" x 4"	0.076	Veff. FPM (m/s)	1629 (8.1)	1689 (8.4)	1749 (8.7)	1810 (9.0)						
550 x 250	22" x 10"	0.077	△ Pt (pa)	20.0	22.0	24.0	26.0						
450 x 300	18" x 12"	0.077	Th. (m)	19.5- / - /	21- / - /	23- / - /	25- / - /						
700 x 200	28" x 8"	0.078	Noise Level	37	38	39	40						
400 x 350	16" x 14"	0.080	Veff. FPM (m/s)	1520 (7.6)	1576 (7.9)	1633 (8.2)	1689 (8.4)	1745 (8.7)					
950 x 150	38" x 6"	0.081	△ Pt (pa)	17.0	18.5	20.0	21.0	21.3					
750 x 200	30" x 8"	0.084	Th. (m)	18.8- / - /	20- / - /	21- / - /	23- / - /	25- / - /					
600 x 250	24" x 10"	0.085	Noise Level	35	36	37	38	39					
1000 x 150	40" x 6"	0.086	Veff. FPM (m/s)	1441 (7.2)	1495 (7.5)	1548 (7.7)	1602 (8.0)	1655 (8.3)	1708 (8.5)	1762 (8.8)	1815 (9.1)		
500 x 350	20" x 14"	0.087	△ Pt (pa)	15.2	16.0	17.5	19.0	20.0	21.0	21.2	25.0		
1050 x 150	42" x 6"	0.088	Th. (m)	18.2- / - /	19.4- / - /	20.2- / - /	22.5- / - /	24- / - /	25- / - /	27- / - /	28- / - /		
			Noise Level	35	35	36	37	38	39	39	40		
800 x 200	32" x 8"	0.090	Veff FPM (m/s)	1371 (6.9)	1421 (7.1)	1472 (7.4)	1523 (7.6)	1574 (7.9)	2624 (8.1)	1675 (8.4)	1726 (8.6)	1777 (8.9)	
450 x 350	18" x 14"	0.090	△ Pt (pa)	14.0	15.5	16.0	17.5	19.0	20.0	20.5	21.0	25.0	
650 x 250	26" x 10"	0.092	Th. (m)	18- / - /	19- / - /	20- / - /	22- / - /	23- / - /	24- / - /	25- / - /	27- / - /	29- / - /	
550 x 300	22" x 12"	0.092	Noise Level	34	35	35	36	37	38	38	39	40	
400 x 400	16" x 16"	0.093											
850 x 200	34" x 8"	0.095	Veff. FPM (m/s)	1280 (6.4)	1327 (6.6)	1374 (6.9)	1422 (7.1)	1469 (7.3)	1517 (7.6)	1564 (7.8)	1611 (8.1)	1659 (8.3)	1706 (8.5)
1150 x 150	46" x 6"	0.097	△ Pt (pa)	11.0	11.5	13.5	14.5	16.0	16.4	17.0	18.0	19.0	20.0
700 x 250	28" x 10"	0.100	Th. (m)	17- / - /	18.5- / - /	19- / - /	19.5- / - /	21- / - /	22- / - /	23- / - /	25- / - /	27- / - /	28- / - /
900 x 200	36" x 8"	0.101											
600 x 300	24" x 12"	0.101	Noise Level	31	32	33	34	35	36	37	37	38	39
500 x 350	20" x 14"	0.101											
1200 x 150	48" x 6"	0.102	Veff. FPM (m/s)	1200 (6.0)	1245 (6.2)	1289 (6.4)	1333 (6.7)	1378 (6.9)	1422 (7.1)	1467 (7.3)	1511 (7.6)	1556 (7.8)	1600 (8.0)
450 x 400	18" x 16"	0.104	△ Pt (pa)	10.5	11.5	13.0	14.0	14.2	15.0	16.0	16.4	18.5	19.0
550 x 350	22" x 14"	0.106	Th. (m)	—	—	—	—	—	—	—	—	—	—
950 x 200	38" x 8"	0.107	Noise Level	30	31	32	33	34	34	35	35	36	37
750 x 250	30" x 10"	0.107											

- Tabulated data are subject to the same notes as in page No.GR - 18.

Tabular Selection for Double Deflection Grilles / Registers
Model SAR & SAG (HFB or VFB) DD

TABLE GR-16

SIZE (L) x (H)		$A_{eff.}$	Flow Rate										
mm	Inch	m^2	L/S (CFM)	330 (700)	354 (750)	378 (800)	401 (850)	425 (900)	448 (950)	472 (1000)	495 (1050)	519 (1100)	543 (1150)
650 x 300	26" x 12"	0.109	Veff. FPM (m/s)	583 (2.9)	625 (3.1)	667 (3.3)	708 (3.5)	750 (3.7)	791 (4.0)	833 (4.2)	875 (4.4)	916 (4.6)	958 (4.8)
1300 x 150	52" x 6"	0.110	△ Pt (pa)	2.1	2.7	3.3	3.9	4.3	4.6	5.0	5.3	5.6	6.6
1000 x 200	40" x 8"	0.113	Th. (m)	7.2-12.2-28	7.7-13.5- /	8.3-14.5- /	9.2-15.5- /	9.7-16.9- /	10.5-18- /	10.8-18.5- /	11.5-19.5- /	12.5-21.9- /	13-24- /
1350 x 150	54" x 6"	0.114	Noise Level	<15	15	16	19	20	21	22	23	24	25
800 x 250	32" x 10"	0.115	Veff. FPM (m/s)	561 (2.8)	601 (3.0)	641 (3.2)	681 (3.4)	721 (3.6)	761 (3.8)	801 (4.0)	841 (4.2)	881 (4.4)	921 (4.6)
500 x 400	20" x 16"	0.116	△ Pt (pa)	1.6	2.3	2.9	3.4	3.8	4.2	4.4	4.8	5.2	6.0
450 x 450	18" x 18"	0.116	Th. (m)	7-12-28.2	7.5-13- /	8.0-14- /	9-15- /	9.4-16- /	9.9-17.3- /	10.4-17- /	11.0-19- /	12.0-12- /	12.8-23- /
1050 x 200	42" x 8"	0.116	Noise Level	<15	<15	15	17	19	20	21	22	23	24
600 x 350	24" x 14"	0.117											
700 x 300	28" x 12"	0.119	Veff. FPM (m/s)	529 (2.6)	566 (2.8)	604 (3.0)	642 (3.2)	680 (3.4)	717 (3.6)	755 (3.8)	793 (4.0)	831 (4.2)	869 (4.3)
1400 x 150	56" x 6"	0.119											
850 x 250	34" x 10"	0.121	△ Pt (pa)	1.3	1.6	2.3	3.0	3.3	3.7	3.8	4.4	4.8	5.2
1100 x 200	44" x 8"	0.122											
1450 x 150	58" x 6"	0.123	Th. (m)	6.7-11.5-28	7.2-12.5-30	7.8-13.5- /	8.5-14.5- /	9.2-15.5- /	9.4-16- /	9.7-16.9- /	10.5-18.5- –/	12.0-20- /	12.4-22- /
550 x 400	22" x 16"	0.123											
750 x 300	30" x 12"	0.127	Noise Level	<15	<15	<15	16	17	18	19	20	21	22
650 x 350	26" x 14"	0.127											
1500 x 150	60" x 6"	0.128	Veff. FPM (m/s)	494 (2.5)	530 (2.6)	565 (2.8)	600 (3.0)	636 (3.2)	671 (3.4)	706 (3.5)	742 (3.7)	777 (3.9)	812 (4.1)
1150 x 200	46" x 8"	0.128	△ Pt (pa)	0.8	1.3	1.5	2.3	2.7	3.0	3.2	3.6	4.1	4.3
900 x 250	36" x 10"	0.129	Th. (m)	6.3-11-25	7.1-12.2-28	7.7-13.2- /	8.3-14.2- /	9.0-15- /	9.3-16- /	9.5-16.5- /	10.2-18- /	11.0-19- /	11.8-20- /
500 x 450	20" x 18"	0.130											
1200 x 200	48" x 8"	0.134	Noise Level	<15	<15	<15	<15	15	17	18	19	20	21
600 x 400	24" x 16"	0.135											
950 x 250	38" x 10"	0.136	Veff. FPM (m/s)	473 (2.4)	507 (2.5)	540 (2.7)	574 (2.9)	608 (3.0)	642 (3.2)	676 (3.4)	709 (3.5)	743 (3.7)	777 (3.9)
800 x 300	32" x 12"	0.136	△ Pt (pa)	0.7	1.0	1.3	1.9	2.3	2.7	3.0	3.3	3.6	4.1
700 x 350	28" x 14"	0.137	Th. (m)	6.1-10.8-23	7.0-12-27	7.5-13- /	8.0-14- /	8.6-14.5- /	9.1-15.5- /	9.4-16- /	10-17- /	10.8-18.9- /	11.5-19.8- /
550 x 450	22" x 18"	0.137	Noise Level	<15	<15	<15	<15	<15	16	17	18	19	20
1250 x 200	50" x 8"	0.139											
1000 x 250	40" x 10"	0.144	Veff. FPM (m/s)	447 (2.2)	479 (2.4)	511 (2.6)	543 (2.7)	575 (2.9)	607 (3.0)	638 (3.0)	670 (3.4)	702 (3.5)	734 (3.7)
850 x 300	34" x 12"	0.144	△ Pt (pa)	0.6	0.7	0.9	1.3	1.8	2.0	2.3	2.8	3.3	3.6
1300 x 200	52" x 8"	0.145	Th. (m)	5.9-10.5-22	6.6-11.8-26	7.3-12.8-30	7.9-13.5- /	8.3-14.4- /	8.9-15- /	9.3-15.8- /	9.9-17- /	10.7-18.5- /	11.0-19- /
650 x 400	26" x 16"	0.146											
500 x 500	20" x 20"	0.146	Noise Level	<15	<15	<15	<15	<15	<15	15	17	18	19
750 x 350	30" x 14"	0.147											

- Tabulated data are subject to the same notes as in page No.GR - 18.

Tabular Selection for Double Deflection Grilles / Registers
Model SAR & SAG (HFB or VFB) DD

TABLE GR-17

SIZE (L) x (H)		$A_{eff.}$	Flow Rate	566 (1200)	590 (1250)	613 (1300)	637 (1350)	661 (1400)	684 (1450)	708 (1500)	731 (1550)	755 (1600)	779 (1650)
mm	Inch	m^2	L/S (CFM)										
650 x 300	26" x 12"	0.109	Veff. FPM (m/s)	1000 (5.5)	1041 (5.2)	1083 (5.4)	1125 (5.6)	1166 (5.8)	1208 (6.0)	1250 (6.2)	1291 (6.5)	1333 (6.7)	1375 (6.9)
1300 x 150	52" x 6"	0.110	△ Pt (pa)	7.1	7.8	8.5	9.0	9.8	11.0	11.5	11.6	13.0	13.5
1000 x 200	40" x 8"	0.113	Th. (m)	13.9-27- /	14.5-29- /	15- / - /	16- / - /	17- / - /	18- / - /	18.5- / - /	19.5-- / - /	20- / - /	21- / - /
1350 x 150	54" x 6"	0.114	Noise Level	26	27	28	29	30	31	32	33	33	34
800 x 250	32" x 10"	0.115	Veff. FPM (m/s)	961 (4.8)	1001 (5.0)	1041 (5.2)	1081 (5.4)	1121 (5.6)	1161 (5.8)	1201 (6.0)	1241 (6.2)	1281 (6.4)	1321 (6.6)
500 x 400	20" x 16"	0.116	△ Pt	6.6	7.0	7.8	8.0	8.6	9.4	10.0	10.5	11.5	12.0
450 x 450	18" x 18"	0.116	Th. (m)	13.4-25- /	14-28- /	14.8-30- /	15.5- / - /	16.5- / - /	17.5- / - /	18- / - /	19- / - /	19.5- / - /	20- / - /
1050 x 200	42" x 8"	0.116	Noise Level	25	26	27	28	29	30	31	31	32	33
600 x 350	24" x 14"	0.117											
700 x 300	28" x 12"	0.119	Veff. FPM (m/s)	906 (4.5)	944 (4.7)	982 (4.9)	1020 (5.1)	1057 (5.3)	1095 (5.5)	1133 (5.7)	1171 (5.9)	1208 (6.0)	1246 (6.2)
1400 x 150	56" x 6"	0.119											
850 x 250	34" x 10"	0.121	△ Pt (pa)	5.3	6.2	6.6	7.1	7.8	8.5	9.0	9.4	9.8	10.5
1100 x 200	44" x 8"	0.122											
1450 x 150	58" x 6"	0.123	Th. (m)	13.0-24- /	13.8-27- /	14.2-29- /	15.0-30- /	16- / - /	17- / - /	17.5- / - /	18- / - /	19- / - /	19.5- / - /
550 x 400	22" x 16"	0.123											
750 x 300	30" x 12"	0.127	Noise Level	23	24	25	26	27	28	29	30	30	31
650 x 350	26" x 14"	0.127											
1500 x 150	60" x 6"	0.128	Veff. FPM (m/s)	848 (4.2)	883 (4.4)	918 (4.6)	954 (4.8)	989 (4.9)	1024 (5.1)	1060 (5.3)	1095 (5.5)	1130 (5.7)	1166 (5.8)
1150 x 200	46" x 8"	0.128	△ Pt (pa)	4.6	5.0	5.3	6.0	6.6	6.8	7.8	8.0	8.5	9,0
900 x 250	36" x 10"	0.129	Th. (m)	12.5-24- /	13-24.4- /	13.8-27- /	14.4-29- /	15- / - /	16- / - /	16.9- / - /	17.5- / - /	18- / - /	18.5- / - /
500 x 450	20" x 18"	0.130											
1200 x 200	48" x 8"	0.134	Noise Level	22	23	24	25	26	27	28	29	29	30
600 x 400	24" x 16"	0.135											
950 x 250	38" x 10"	0.136	Veff. FPM (m/s)	811 (4.1)	844 (4.2)	878 (4.4)	912 (4.6)	946 (4.7)	980 (4.9)	1013 (5.1)	1047 (5.2)	1081 (5.4)	1115 (5.6)
800 x 300	32" x 12"	0.136	△ Pt (pa)	4.3	4.8	5.0	5.2	6.2	6.6	6.8	7.1	7.8	7.0
700 x 350	28" x 14"	0.137	Th. (m)	12.0-21- /	12.8-23- /	13.5-26- /	14.0-28- /	14.9-30- /	15- / - /	16.4- / - /	16.9- / - /	17.5- / - /	18- / - /
550 x 450	22" x 18"	0.137	Noise Level	21	22	23	24	25	26	27	28	28	29
1250 x 200	50" x 8"	0.139											
1000 x 250	40" x 10"	0.144	Veff. FPM (m/s)	766 (3.8)	798 (4.0)	830 (4.1)	862 (4.3)	894 (4.5)	926 (4.6)	958 (4.8)	990 (4.9)	1022 (5.1)	1053 (5.3)
850 x 300	34" x 12"	0.144	△ Pt (pa)	3.8	4.3	4.6	5.0	5.3	5.8	6.2	6.6	7.0	7.3
1300 x 200	52" x 8"	0.145	Th. (m)	11.9-20- /	12.5-22- /	12.8-23- /	13.0-24- /	14.7-27- /	15- / - /	15.8- / - /	16.5- / - /	17- / - /	17.9- / - /
650 x 400	26" x 16"	0.146											
500 x 500	20" x 20"	0.146	Noise Level	20	21	22	23	24	25	26	26	27	28
750 x 350	30" x 14"	0.147											

- Tabulated data are subject to the same notes as in page No.GR - 18.

Tabular Selection for Double Deflection Grilles / Registers
Model SAR & SAG (HFB or VFB) DD

TABLE GR-18

SIZE (L) x (H)		$A_{eff.}$	Flow Rate	802 (1700)	826 (1750)	849 (1800)	873 (1850)	897 (1900)	920 (1950)	944 (2000)	967 (2050)	991 (2100)	1015 (2150)
mm	Inch	m^2	L/S (CFM)										
650 x 300	26" x 12"	0.109	Veff. FPM (m/s)	1416 (7.1)	1458 (7.3)	1500 (7.5)	1541 (7.7)	1583 (7.9)	1625 (8.1)	1666 (8.3)	1708 (8.5)	1750 (8.7)	1791 (9.0)
1300 x 150	52" x 6"	0.110	△ Pt (pa)	14.2	15.0	16.2	17.0	17.5	18.4	19.5	20.5	22.0	23.0
1000 x 200	40" x 8"	0.113	Th. (m)	22- / - /	24- / - /	25- / - /	27- / - /	28- / - /	30- / - /	—	—	—	—
1350 x 150	54" x 6"	0.114	Noise Level	35	35	36	37	37	38	39	39	40	40
800 x 250	32" x 10"	0.115	Veff. FPM (m/s)	1361 (6.8)	1401 (7.0)	1441 (7.2)	1481 (7.4)	1522 (7.6)	1562 (7.8)	1602 (8.0)	1642 (8.2)	1682 (8.4)	1722 (8.6)
500 x 400	20" x 16"	0.116	△ Pt (pa)	13.0	13.8	14.2	15.0	16.0	16.2	17.2	18.4	18.8	21.0
450 x 450	18" x 18"	0.116	Th. (m)	21- / - /	23- / - /	24- / - /	26- / - /	27- / - /	29- / - /	30- / - /	—	—	—
1050 x 200	42" x 8"	0.116	Noise Level	33	34	35	35	36	36	37	38	38	39
600 x 350	24" x 14"	0.117											
700 x 300	28" x 12"	0.119	Veff. FPM (m/s)	1284 (6.4)	1322 (6.6)	1359 (6.8)	1397 (7.0)	1435 (7.2)	1473 (7.4)	1510 (7.6)	1548 (7.7)	1586 (7.9)	1624 (8.1)
1400 x 150	56" x 6"	0.119											
850 x 250	34" x 10"	0.121	△ Pt (pa)	11.0	12.0	11.6	13.1	13.9	14.2	15.5	16.2	17.0	18.0
1100 x 200	44" x 8"	0.122											
1450 x 150	58" x 6"	0.123	Th. (m)	20- / - /	21.5- / - /	23- / - /	24- / - /	26- / - /	27- / - /	28- / - /	30- / - /	—	—
550 x 400	22" x 16"	0.123											
750 x 300	30" x 12"	0.127	Noise Level	32	32	33	34	35	35	36	36	37	37
650 x 350	26" x 14"	0.127											
1500 x 150	60" x 6"	0.128	Veff. FPM (m/s)	1201 (6.0)	1236 (6.2)	1272 (6.4)	1307 (6.5)	1342 (607)	1378 (6.9)	1413 (7.1)	1448 (7.2)	1483 (7.4)	1519 (7.6)
1150 x 200	46" x 8"	0.128	△ Pt (pa)	9.4	9.8	10.5	11.0	11.5	12.0	13.0	13.8	14.2	15.0
900 x 250	36" x 10"	0.129	Th. (m)	19- / - /	20- / - /	20.5- / - /	22- / - /	24- / - /	25- / - /	26- / - /	28 - / - /	30 - / - /	—
500 x 450	20" x 18"	0.130											
1200 x 200	48" x 8"	0.134	Noise Level	31	31	32	33	33	34	34	35	36	36
600 x 400	24" x 16"	0.135											
950 x 250	38" x 10"	0.136	Veff. FPM (m/s)	1149 (5.7)	1182 (5.9)	1216 (6.1)	1250 (6.2)	1284 (6.4)	1317 (6.6)	1351 (6.8)	1385 (6.9)	1419 (7.1)	1453 (7.3)
800 x 300	32" x 12"	0.136	△ Pt (pa)	8.6	9.0	9.4	10.0	10.5	11.4	12.0	13.0	13.1	14.0
700 x 350	28" x 14"	0.137	Th. (m)	18.8- / - /	19.3- / - /	20- / - /	21- / - /	23- / - /	24- / - /	25.5- / - /	27- / - /	29- / - /	30- / - /
550 x 450	22" x 18"	0.137	Noise Level	29	30	31	32	32	33	33	34	35	35
1250 x 200	50" x 8"	0.139											
1000 x 250	40" x 10"	0.144	Veff. FPM (m/s)	1085 (5.4)	1117 (5.6)	1149 (5.7)	1181 (5.9)	1213 (6.1)	1245 (6.2)	1277 (6.4)	1309 (6.5)	1341 (6.7)	1373 (6.9)
850 x 300	34" x 12"	0.144	△ Pt (pa)	7.8	8.0	8.5	9.0	9.4	10.0	10.5	11.0	11.4	12.5
1300 x 200	52" x 8"	0.145	Th. (m)	18.3- / - /	19- / - /	19.5- / - /	20- / - /	22- / - /	23- / - /	24- / - /	26- / - /	27- / - /	28- / - /
650 x 400	26" x 16"	0.146											
500 x 500	20" x 20"	0.146	Noise Level	28	29	29	30	30	31	32	33	34	34
750 x 350	30" x 14"	0.147											

- Tabulated data are subject to the same notes as in page No.GR - 18.

Tabular Selection for Double Deflection Grilles / Registers
Model SAR & SAG (HFB or VFB) DD

TABLE GR-19

SIZE (L) x (H)		$A_{eff.}$	Flow Rate	472 (1000)	496 (1050)	519 (1100)	543 (1150)	566 (1200)	590 (1250)	613 (1300)	661 (1400)	708 (1500)	755 (1600)
mm	Inch	m^2	L/S (CFM)										
1050 x 250	42"x10"	0.148	Veff. FPM (m/s)	615 (3.1)	646 (3.2)	677 (3.4)	707 (3.5)	738 (3.7)	769 (3.8)	800 (4.0)	861 (4.3)	923 (4.6)	984 (4.9)
1350 x 200	54"x 8"	0.151	△ Pt (pa)	2.1	2.6	3.0	3.3	3.6	3.9	4.3	5.0	5.6	6.4
600 x 450	24"x18"	0.151	Th. (m)	9-15.1- /	9.5-16.5- /	10.5-18- /	11-19- /	11.8-19.8- /	12.1-21- /	13-24- /	14.2-28- /	15.5-/- /	16.8- /- /
900 x 300	36"x12"	0.154	Noise Level	<15	<15	17	18	19	20	21	23	24	26
550 x 500	22"x20"	0.154											
1100 x 250	44"x10"	0.156	Veff. FPM (m/s)	584 (2.9)	613 (3.1)	643 (3.2)	672 (3.4)	701 (3.5)	730 (3.7)	760 (3.8)	818 (4.1)	876 (4.4)	935 (4.7)
1400 x 200	56"x 8"	0.157	△ Pt (pa)	1.6	2.0	2.3	2.9	3.2	3.3	3.8	4.4	5.0	5.8
800 x 350	32"x14"	0.158	Th. (m)	9-15.0- /	9.3-16- /	10-17.5- /	10.5-18.2- /	11.2-19.2- /	11.7-20- /	12.5-22- /	13.8-26- /	15- /- /	16.2- /- /
700 x 400	28"x16"	0.159											
950 x 300	38"x12"	0.162	Noise Level	<15	<15	15	17	18	19	20	21	23	25
1450 x 200	58"x 8"	0.162											
1150 x 250	46"x10"	0.163	Veff. FPM (m/s)	556 (2.8)	584 (2.9)	612 (3.1)	640 (3.2)	667 (3.3)	695 (3.5)	723 (3.6)	779 (3.9)	834 (4.2)	890 (4.4)
650 x 450	26"x18"	0.164											
850 x 350	34"x14"	0.167	△ Pt (pa)	1.4	1.5	2.0	2.3	2.7	3.0	3.2	3.8	4.5	5.0
1500 x 200	60"x 8"	0.169											
750 x 400	30"x16"	0.170	Th. (m)	8.4-14.5- /	9-15.3- /	9.6-16.8- /	10.2-17.5- /	10.6-18.5- /	11.4-19.5- /	12-21- /	13.3-25- /	14.8-30- /	15.7-/- /
600 x 500	24"x20"	0.170											
1200 x 250	48"x10"	0.171	Noise Level	<15	<15	<15	<15	15	17	18	20	22	23
1000 x 300	40"x12"	0.171											
1050 x 300	42"x12"	0.176	Veff. FPM (m/s)	525 (2.6)	551 (2.8)	577 (2.9)	604 (3.0)	630 (3.1)	656 (3.3)	682 (3.4)	735 (3.7)	787 (3.9)	840 (4.2)
1250 x 250	50"x10"	0.178	△ Pt (pa)	0.8	1.0	1.4	1.6	1.9	2.3	2.7	3.2	3.8	4.2
900 x 350	36"x12"	0.178	Th. (m)	8.2-14- /	8.7-14.8- /	9.3-16- /	9.7-17- /	10.3-18- /	11-19- /	11.8-20- /	12.8-23- /	14-28- /	15- /- /
700 x 450	28"x18"	0.178	Noise Level	<15	<15	<15	<15	<15	<15	15	18	20	21
800 x 400	32"x16"	0.183	Veff. FPM (m/s)	495 (2.5)	520 (2.6)	545 (2.7)	570 (2.8)	595 (3.0)	619 (3.1)	644 (3.2)	694 (3.5)	743 (3.7)	793 (4.0)
650 x 500	26"x20"	0.184	△ Pt (pa)	0.7	0.8	1.0	1.4	1.6	1.9	2.3	3.0	3.4	3.8
1100 x 300	44"x12"	0.185											
1300 x 250	52"x10"	0.186	Th. (m)	8-14- /	8.5-14.5- /	9.2-16- /	9.5-16.5- /	10-17.5- /	10.6-18.5- /	11.3-19.3- /	12.8-23- /	13.8-26- /	14.8-30- /
950 x 350	38"x14"	0.188											
750 x 450	30"x18"	0.190	Noise Level	<15	<15	<15	<15	<15	<15	<15	17	19	20
1350 x 250	54"x10"	0.192											
1150 x 300	46"x12"	0.194	Veff. FPM (m/s)	472 (2.4)	495 (2.5)	519 (2.6)	542 (2.7)	566 (2.8)	589 (2.9)	613 (3.1)	660 (3.3)	707 (3.5)	754 (3.8)
850 x 400	34"x16"	0.194	△ Pt (pa)	0.6	0.7	0.8	1.0	1.4	1.6	1.9	2.7	3.2	3.4
1000 x 350	40"x14"	0.199	Th. (m)	7.8-13.5- /	8.3-14.2- /	9-15- /	9.3-16- /	9.7-17- /	10.3-18- /	11-19- /	12.3-22- /	13.5-26- /	14.5-28- /
700 x 500	28"x20"	0.199	Noise Level	<15	<15	<15	<15	<15	<15	<15	15	18	17
1400 x 250	56"x10"	0.200											

- Tabulated data are subject to the same notes as in page No.GR - 18.

Tabular Selection for Double Deflection Grilles / Registers
Model SAR & SAG (HFB or VFB) DD

TABLE GR-20

SIZE (L) x (H)		$A_{eff.}$	Flow Rate	802 (1700)	849 (1800)	897 (1900)	944 (2000)	991 (2100)
mm	Inch	m^2	L/S (CFM)					
1050 x 250	42"x10"	0.148	Veff. FPM (m/s)	1046 (5.2)	1107 (5.5)	1169 (5.8)	1230 (6.2)	1292 (6.5)
1350 x 200	54"x 8"	0.151	△ Pt (pa)	7.0	8.0	9.0	9.8	11.5
600 x 450	24"x18"	0.151	Th. (m)	18-/ - /	19.2- / - /	21- / - /	23- / - /	27- / - /
900 x 300	36"x12"	0.154	Noise Level	27	28	30	31	32
550 x 500	22"x20"	0.154						
1100 x 250	44"x10"	0.156	Veff. FPM (m/s)	993 (5.5)	1052 (5.3)	1110 (5.6)	1168 (5.8)	1227 (6.1)
1400 x 200	56"x 8"	0.157	△ Pt (pa)	6.4	7.0	8.0	8.8	9.8
800 x 350	32"x14"	0.158	Th. (m)	17.5-/ - /	18.6- / - /	19.8- / - /	22- / - /	25- / - /
700 x 400	28"x16"	0.159						
950 x 300	38"x12"	0.162	Noise Level	26	27	29	30	31
1450 x 200	58"x 8"	0.162						
1150 x 250	46"x10"	0.163	Veff. FPM (m/s)	946 (4.7)	1001 (5.0)	1057 (5.3)	1112 (5.6)	1168 (5.8)
650 x 450	26"x18"	0.164						
850 x 350	34"x14"	0.167	△ Pt (pa)	5.6	6.2	6.9	7.8	8.3
1500 x 200	60"x 8"	0.169						
750 x 400	30"x16"	0.170	Th. (m)	17- / - /	18- / - /	19- / - /	21- / - /	23- / - /
600 x 500	24"x20"	0.170						
1200 x 250	48"x10"	0.171	Noise Level	24	25	27	28	29
1000 x 300	40"x12"	0.171						
1050 x 300	42"x12"	0.176	Veff. FPM (m/s)	892 (4.5)	945 (4.7)	997 (5.0)	1050 (5.2)	1102 (5.5)
1250 x 250	50"x10"	0.178	△ Pt (pa)	4.4	5.2	6.0	6.6	7.0
900 x 350	36"x12"	0.178	Th. (m)	16- / - /	16.5- / - /	18.5- / - /	19.8- / - /	22- / - /
700 x 450	28"x18"	0.178	Noise Level	22	24	25	26	27
800 x 400	32"x16"	0.183	Veff. FPM (m/s)	842 (4.2)	892 (4.5)	941 (4.7)	991 (5.0)	1040 (5.2)
650 x 500	26"x20"	0.184	△ Pt (pa)	4.3	4.8	5.6	6.0	6.6
1100 x 300	44"x12"	0.185						
1300 x 250	52"x10"	0.186	Th. (m)	15.8-/ - /	17- / - /	18- / - /	19- / - /	21- / - /
950 x 350	38"x14"	0.188						
750 x 450	30"x18"	0.190	Noise Level	21	22	24	25	26
1350 x 250	54"x10"	0.192						
1150 x 300	46"x12"	0.194	Veff. FPM (m/s)	802 (4.0)	849 (4.2)	896 (4.5)	943 (4.7)	990 (5.0)
850 x 400	34"x16"	0.194	△ Pt (pa)	3.9	4.4	4.8	5.6	6.0
1000 x 350	40"x14"	0.199	Th. (m)	15.3- / - /	16.5- / - /	17.8- / - /	19- / - /	20- / - /
700 x 500	28"x20"	0.199	Noise Level	20	22	23	24	25
1400 x 250	56"x10"	0.200						

- Tabulated data are subject to the same notes as in page No.GR - 18.

Tabular Selection for Double Deflection Grilles / Registers
Model SAR & SAG (HFB or VFB) DD

TABLE GR-21

SIZE (L) x (H)		$A_{eff.}$	Flow Rate	566 (1200)	613 (1300)	661 (1400)	708 (1500)	755 (1600)	802 (1700)	849 (1800)	897 (1900)	944 (2000)	991 (2100)
mm	Inch	m^2	L/S (CFM)										
1200 x 300	48" x 12"	0.203	Veff. FPM (m/s)	536 (2.7)	581 (2.9)	625 (3.1)	670 (3.3)	715 (3.6)	759 (3.8)	804 (4.0)	849 (4.2)	893 (4.5)	938 (4.7)
1050 x 350	42" x 14"	0.204	△ Pt (pa)	1.0	1.5	2.0	2.7	3.0	3.4	3.9	4.3	4.8	5.3
800 x 450	32" x 18"	0.204											
900 x 400	36" x 16"	0.206	Th. (m)	9.5-16.5- /	10.6-18.4- /	11.8-20- /	13-24- /	14-27- /	14.8- /- /	16- /- /	17- /- /	18.5- /- /	19.5- /- /
1450 x 250	58" x 10"	0.207											
1250 x 300	50" x 12"	0.211	Noise Level	<15	<15	15	17	18	19	21	22	23	25
750 x 500	30" x 20"	0.213											
1500 x 250	60" x 10"	0.215	Veff. FPM (m/s)	508 (2.5)	550 (2.8)	592 (3.0)	635 (3.2)	677 (3.4)	719 (3.6)	762 (3.8)	804 (4.0)	846 (4.2)	889 (4.4)
1100 x 350	44" x 14"	0.215	△ Pt (pa)	0.8	1.0	1.6	2.3	2.7	3.2	3.5	3.9	4.3	4.8
950 x 400	38" x 16"	0.217	Th. (m)	9.3-15- /	10.4-18- /	11.6-19.8- /	12.8-23- /	13.6-26.5- /	14.5-30- /	15.3- /- /	16.5- /- /	17.8- /- /	18- /- /
850 x 450	34" x 18"	0.217											
1300 x 300	52" x 12"	0.221	Noise Level	<15	<15	<15	15	16	18	20	21	22	23
1150 x 350	46" x 14"	0.224											
800 x 500	32" x 20"	0.229	Veff. FPM (m/s)	479 (2.4)	519 (2.6)	559 (2.8)	599 (3.0)	639 (3.2)	679 (3.4)	719 (3.6)	759 (3.8)	799 (4.0)	839 (4.2)
1350 x 300	54" x 12"	0.229	△ Pt (pa)	0.6	0.7	1.0	1.5	2.0	2.3	2.7	3.2	3.6	3.8
1000 x 400	40" x 16"	0.230	Th. (m)	9-14.5- /	9.7-17- /	11-19- /	12.3-22.5- /	13-23- /	14-27.5- /	14.8-30- /	16- /- /	17-/- /	18- /- /
900 x 450	36" x 18"	0.231											
1200 x 350	48" x 14"	0.235	Noise Level	<15	<15	<15	<15	15	16	17	18	20	21
1050 x 400	42" x 16"	0.236											
1400 x 300	56" x 12"	0.238	Veff. FPM (m/s)	458 (2.3)	496 (2.5)	534 (2.7)	572 (2.9)	610 (3.1)	649 (3.2)	687 (3.4)	725 (3.6)	763 (3.8)	801 (4.0)
950 x 450	38" x 18"	0.243	△ Pt (pa)	0.4	0.6	0.7	1.0	1.4	1.5	2.3	2.7	3.1	3.4
850 x 500	34" x 20"	0.243	Th. (m)	8.6-14.4- /	9.5-16.5- /	10.5-18- /	11.8-20- /	12.8-23- /	13.5-26- /	14.3-28- /	15- /- /	16.4- /- /	17.5- /- /
1250 x 350	50" x 14"	0.245											
1450 x 300	58" x 12"	0.246	Noise Level	<15	<15	<15	<15	<15	15	16	17	19	20
1100 x 400	44" x 16"	0.249											
1500 x 300	60" x 12"	0.256	Veff. FPM (m/s)	428 (2.1)	464 (2.3)	499 (2.5)	535 (2.7)	571 (2.9)	606 (3.0)	642 (3.2)	678 (3.4)	713 (3.6)	749 (3.7)
1300 x 350	52" x 14"	0.256	△ Pt (pa)	0.3	0.4	0.6	0.8	1.0	1.4	1.5	2.2	2.7	3.1
1000 x 450	40" x 18"	0.257											
900 x 500	36" x 20"	0.259	Th. (m)	8.3-14.1- /	9.3-16- /	10.3-18- /	11.5-19.5- /	12.2-22- /	13-25- /	14-27- /	14.8-30- /	16- /- /	17- /- /
1150 x 400	46" x 16"	0.260											
1050 x 450	42" x 18"	0.264	Noise Level	<15	<15	<15	<15	<15	<15	15	16	18	19
1350 x 350	54" x 14"	0.265											
950 x 500	38" x 20"	0.272	Veff. FPM (m/s)	405 (2.0)	439 (2.2)	473 (2.4)	507 (2.5)	540 (2.7)	574 (2.9)	608 (3.0)	642 (3.2)	676 (3.4)	709 (3.5)
1200 x 400	48" x 16"	0.272	△ Pt (pa)	0.2	0.3	0.4	0.6	0.7	1.0	1.4	1.5	2.0	2.3
1400 x 350	56" x 14"	0.276	Th. (m)	8-14- /	8.8-15- /	9.6-17- /	11-19- /	11.9-20- /	12.5-23- /	13.5-25- /	14.2-29- /	15.3- /- /	16.5- /- /
1100 x 450	44" x 18"	0.278	Noise Level	<15	<15	<15	<15	<15	<15	<15	15	16	17

- Tabulated data are subject to the same notes as in page No.GR - 18.

Tabular Selection for Double Deflection Grilles / Registers
Model SAR & SAG (HFB or VFB) DD

TABLE GR-22

SIZE (L) x (H)		$A_{eff.}$	Flow Rate	1038 (2200)	1085 (2300)	1133 (2400)	1180 (2500)	1227 (2600)
mm	Inch	m^2	L/S (CFM)					
1200 x 300	48" x 12"	0.203	Veff. FPM (m/s)	983 (4.9)	1027 (5.1)	1072 (5.4)	1117 (5.6)	1161 (5.8)
1050 x 350	42" x 14"	0.204	△ Pt (pa)	6.2	6.9	8.0	9.0	10.5
800 x 450	32" x 18"	0.204						
900 x 400	36" x 16"	0.206	Th. (m)	22.5- / - /	25.5- / - /	30- / - /	—	—
1450 x 250	58" x 10"	0.207						
1250 x 300	50" x 12"	0.211	Noise Level	27	28	29	31	33
750 x 500	30" x 20"	0.213						
1500 x 250	60" x 10"	0.215	Veff. FPM (m/s)	931 (4.7)	973 (4.9)	1016 (5.1)	1058 (5.3)	1100 (5.5)
1100 x 350	44" x 14"	0.215	△ Pt (pa)	5.6	6.2	6.9	8.0	9.0
950 x 400	38" x 16"	0.217	Th. (m)	21- / - /	24- / - /	28- / - /	—	—
850 x 450	34" x 18"	0.217						
1300 x 300	52" x 12"	0.221	Noise Level	25	27	28	30	31
1150 x 350	46" x 14"	0.224						
800 x 500	32" x 20"	0.229	Veff. FPM (m/s)	879 (4.4)	919 (4.6)	959 (4.8)	999 (5.0)	1039 (5.2)
1350 x 300	54" x 12"	0.229	△ Pt (pa)	4.5	5.4	6.0	7.0	7.8
1000 x 400	40" x 16"	0.230	Th. (m)	19.8- / - /	23- / - /	26- / - /	—	—
900 x 450	36" x 18"	0.231						
1200 x 350	48" x 14"	0.235	Noise Level	23	24	26	28	29
1050 x 400	42" x 16"	0.236						
1400 x 300	56" x 12"	0.238	Veff. FPM (m/s)	839 (4.2)	877 (4.4)	916 (4.6)	954 (4.8)	992 (5.0)
950 x 450	38" x 18"	0.243	△ Pt (pa)	3.9	4.5	5.0	6.0	6.5
850 x 500	34" x 20"	0.243	Th. (m)	19- / - /	21- / - /	25- / - /	28- / - /	—
1250 x 350	50" x 14"	0.245						
1450 x 300	58" x 12"	0.246	Noise Level	22	23	25	27	28
1100 x 400	44" x 16"	0.249						
1500 x 300	60" x 12"	0.256	Veff. FPM (m/s)	785 (3.9)	820 (4.1)	856 (4.3)	891 (4.5)	927 (4.6)
1300 x 350	52" x 14"	0.256	△ Pt (pa)	3.4	3.9	4.6	5.3	6.0
1000 x 450	40" x 18"	0.257						
900 x 500	36" x 20"	0.259	Th. (m)	18.5- / - /	20- / - /	23- / - /	27- / - /	—
1150 x 400	46" x 16"	0.260						
1050 x 450	42" x 18"	0.264	Noise Level	21	22	24	26	27
1350 x 350	54" x 14"	0.265						
950 x 500	38" x 20"	0.272	Veff. FPM (m/s)	743 (3.7)	777 (3.9)	811 (4.1)	844 (4.2)	878 (4.4)
1200 x 400	48" x 16"	0.272	△ Pt (pa)	3.0	3.4	3.9	4.5	5.0
1400 x 350	56" x 14"	0.276	Th. (m)	17.8- / - /	19.4- / - /	22.5- / - /	25.5- / - /	30- / - /
1100 x 450	44" x 18"	0.278	Noise Level	19	20	22	24	25

- Tabulated data are subject to the same notes as in page No.GR - 18.

Tabular Selection for Double Deflection Grilles / Registers
Model SAR & SAG (HFB or VFB) DD

TABLE GR-23

SIZE (L) x (H) mm	SIZE (L) x (H) Inch	$A_{eff.}$ m^2	Flow Rate L/S (CFM)	661 (1400)	708 (1500)	755 (1600)	802 (1700)	849 (1800)	897 (1900)	944 (2000)	991 (2100)	1038 (2200)	1085 (2300)
900 x 550	36" x 22"	0.283	Veff. FPM (m/s)	454 (2.3)	486 (2.4)	519 (2.6)	551 (2.8)	584 (2.9)	616 (3.1)	648 (3.2)	681 (3.4)	713 (3.6)	746 (3.7)
1250 x 400	50" x 16"	0.283	△ Pt (pa)	0.4	0.5	0.6	0.8	1.0	1.4	1.5	2.0	2.7	3.0
1450 x 350	58" x 14"	0.286	Th. (m)	9.5-16.5- /	10.4-18- /	11.2-19.3- /	12.2-21- /	13-24- /	14-27- /	14.9-30- /	16- / - /	17.2- / - /	19- / - /
1000 x 500	40" x 20"	0.288	Noise Level	<15	<15	<15	<15	<15	<15	15	17	19	20
1150 x 450	46" x 18"	0.290											
1300 x 400	52" x 16"	0.296	Veff. FPM (m/s)	438 (2.2)	469 (2.3)	500 (2.5)	532 (2.7)	563 (2.8)	594 (3.0)	626 (3.1)	657 (3.3)	688 (3.4)	719 (3.6)
1050 x 500	42" x 20"	0.296	△ Pt (pa)	0.3	0.4	0.5	0.7	0.8	1.0	1.4	1.5	2.3	2.7
1500 x 350	60" x 14"	0.297	Th. (m)	9.3-16- /	10.5-18- /	11-19- /	12-20.5- /	12.8-23.5- /	13.8-26- /	14.8-30- /	15.8- / - /	17- / - /	18.5- / - /
950 x 550	38" x 22"	0.298	Noise Level	<15	<15	<15	<15	<15	<15	<15	16	18	19
1200 x 450	48" x 18"	0.305	Veff. FPM (m/s)	414 (2.1)	443 (2.2)	473 (2.4)	502 (2.5)	532 (2.7)	561 (2.8)	591 (3.0)	620 (3.1)	650 (3.2)	679 (3.4)
1350 x 400	54" x 16"	0.307	△ Pt (pa)	0.2	0.3	0.4	0.6	0.7	0.8	1.0	1.4	1.5	2.3
1100 x 500	44" x 20"	0.312											
1000 x 550	40" x 22"	0.315	Th. (m)	9.2-14.8- /	10.2-17.5- /	10.8-18.8- /	11.8-20- /	12.7-23- /	13.5-25.5- /	14.2-28- /	15.2- / - /	16.8- / - /	18- / - /
1250 x 450	50" x 18"	0.317											
1400 x 400	56" x 16"	0.319	Noise Level	<15	<15	<15	<15	<15	<15	<15	<15	16	18
1050 x 550	42" x 22"	0.324											
1150 x 500	46" x 20"	0.326	Veff. FPM (m/s)	389 (1.9)	417 (2.1)	444 (2.2)	472 (2.4)	500 (2.5)	528 (2.6)	555 (2.8)	583 (2.9)	611 (3.1)	639 (3.2)
1450 x 400	58" x 16"	0.330	△ Pt (pa)	0.1	0.2	0.3	0.4	0.5	0.6	0.8	1.0	1.4	2.0
1300 x 450	52" x 18"	0.331	Th. (m)	9-15- /	9.7-17- /	10.5-18- /	11.3-19.3- /	12.2-21.5- /	13-24- /	14-27- /	14.8-30- /	16- / - /	17.5- / - /
1200 x 500	48" x 20"	0.341											
1500 x 400	60" x 16"	0.343	Noise Level	<15	<15	<15	<15	<15	<15	<15	<15	15	17
1350 x 450	54" x 18"	0.343											
1250 x 500	50" x 20"	0.355	Veff. FPM (m/s)	357 (1.8)	382 (1.9)	408 (2.0)	433 (2.2)	459 (2.3)	484 (2.4)	510 (2.5)	535 (2.7)	561 (2.8)	586 (2.9)
1150 x 550	46" x 22"	0.356	△ Pt (pa)	0.05	0.1	0.2	0.3	0.35	0.4	0.5	0.6	0.7	1.4
1400 x 450	56" x 18"	0.357	Th. (m)	8.5-14.5- /	9.3-16- /	10-17.5- /	10.5-18.5- /	11.5-20- /	12.5-22- /	13.3-25- /	14-27- /	15.3- / - /	17- / - /
1450 x 450	58" x 18"	0.370											
1300 x 500	52" x 20"	0.371	Noise Level	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15
1200 x 550	48" x 22"	0.374											

- Tabulated data are subject to the same notes as in page No.GR - 18.

Tabular Selection for Double Deflection Grilles / Registers
Model SAR & SAG (HFB or VFB) DD

TABLE GR-24

SIZE (L) x (H)		$A_{eff.}$	Flow Rate	1133 (2400)	1180 (2500)	1227 (2600)	1274 (2700)	1320 (2800)
mm	Inch	m^2	L/S (CFM)					
900 x 550	36" x 22"	0.283	Veff. FPM (m/s)	778 (3.9)	811 (4.1)	843 (4.2)	875 (4.4)	908 (4.5)
1250 x 400	50" x 16"	0.283	△ Pt (pa)	3.6	4.2	4.5	5.3	6.2
1450 x 350	58" x 14"	0.286	Th. (m)	21- / - /	25- / - /	28- / - /	—	—
1000 x 500	40" x 20"	0.288	Noise Level	22	23	25	27	28
1150 x 450	46" x 18"	0.290						
1300 x 400	52" x 16"	0.296	Veff. FPM (m/s)	751 (3.8)	782 (3.9)	813 (4.1)	844 (4.2)	876 (4.4)
1050 x 500	42" x 20"	0.296	△ Pt (pa)	3.2	3.9	4.3	5.0	5.6
1500 x 350	60" x 14"	0.297	Th. (m)	19- / - /	23- / - /	26.5- / - /	27- / - /	—
950 x 550	38" x 22"	0.298	Noise Level	21	22	24	26	27
1200 x 450	48" x 18"	0.305	Veff. FPM (m/s)	709 (3.5)	738 (3.7)	768 (3.8)	797 (4.0)	827 (4.1)
1350 x 400	54" x 16"	0.307	△ Pt (pa)	3.0	3.4	3.8	4.5	5.2
1100 x 500	44" x 20"	0.312						
1000 x 550	40" x 22"	0.315	Th. (m)	20- / - /	22- / - /	26- / - /	30- / - /	—
1250 x 450	50" x 18"	0.317						
1400 x 400	56" x 16"	0.319	Noise Level	20	21	23	25	26
1050 x 550	42" x 22"	0.324						
1150 x 500	46" x 20"	0.326	Veff. FPM (m/s)	667 (3.3)	694 (3.5)	722 (3.6)	750 (3.7)	778 (3.9)
1450 x 400	58" x 16"	0.330	△ Pt (pa)	2.3	3.0	3.4	3.9	4.5
1300 x 450	52" x 18"	0.331	Th. (m)	19.2- / - /	22.5- / - /	25- / - /	29- / - /	—
1200 x 500	48" x 20"	0.341						
1500 x 400	60" x 16"	0.343	Noise Level	18	20	22	23	25
1350 x 450	54" x 18"	0.343						
1250 x 500	50" x 20"	0.355	Veff. FPM (m/s)	612 (3.1)	637 (3.2)	663 (3.3)	688 (3.4)	714 (3.6)
1150 x 550	46" x 22"	0.356	△ Pt (pa)	1.5	2.3	2.7	3.2	3.6
1400 x 450	56" x 18"	0.357	Th. (m)	18- / - /	19.8- / - /	23- / - /	26- / - /	30- / - /
1450 x 450	58" x 18"	0.370						
1300 x 500	52" x 20"	0.371	Noise Level	16	18	19	21	22
1200 x 550	48" x 22"	0.374						

- Tabulated data are subject to the same notes as in page No.GR - 18.

Ordering Data

- **Available Surface Finishes For Grilles and Registers :**
  - Natural / Matt Silver Anodized .
  - Powder Coating (Standard Colors are white RAL 9010 / 9016, other optional colors if required to be provided in RAL - No. only and charged extra).
  - Aluminium in Mill Finish.
  - Other Special Finishes (on request if available).

- **Available Surface Finishes For Opposed Blade Dampers :**
  - Aluminium in Mill Finish (standard).
  - Matt Black Powder Coating (optional).

- **Ordering Specifications :**

Specify :

1 . Grille / Register Description (Supply, Return, Extract, Exhaust, Fresh Air , ... etc.).
2 . Blades Mounting (Not required for Fresh Air and Eggcrate Grilles / Registers).
3 . Single / Double Deflection (Not required for Fresh Air and Eggcrate Grilles / Registers).
4 . Opposed Blade Damper to be mentioned only :-
  - If required in black color.
  - Or, in case it's attached with Fresh Air or Eggcrate Grilles.
5 . Nominal / Neck size.
6 . Quantity.
7 . Grille / Register Surface Finish.
8 . RAL - No.(only mention if powder coating surface finish is required).
9 . Type of Fixing (Concealed or Face Screw Fixing).
10 . Optional Accessories or Remarks (Aluminium Washable Filter, Gasket, ... or others).

Example 1 :

1	2	3	4	5	6	7	8	9	10
SAR	HFB	DD	BD	20" x 8" 500 x 200 (mm)	150	Powder Coating	9016	Concealed	With Rubber Gasket

Example 2 :

1	2	3	4	5	6	7	8	9	10
FAG + D c/w FILTER	–	–	D	12" x 6" 300 x 150 (mm)	23	Silver Anodized	–	Concealed	(Double Frame) Fixed Blades < 45°

Example 3 :

1	2	3	4	5	6	7	8	9	10
ECG + F	–	–	–	12" x 8" 300 x 200 (mm)	10	Powder Coating	1015 (Optional)	Screw	With Filter

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