DOĞU
İKLİMLENDİRME | HVAC SYSTEMS

DPA
Adjustable Louvre

FOUR SEASONS®

Venues Breathe with DOGU HVAC Systems!

DOGU HVAC founded in 1999, and ever since has been manufacturing Energy-and Cost-Efficient products as Air Handling Units, Air Distribution & Management & Movement Systems [HVAC Components] and constantly enhancing to provide an integrated solution for well-being. DOGU HVAC's core business products which are subsumed under four major groups as Air Handling Units, Heat/Energy Recovery Units, Air Distribution & Management Products and Kitchen Ventilation Equipment are all produced under the compliance with EU standarts. Particularly AHU and HRU-ER units are entitled under the "FOUR SEASONS" brand name for domestic and foreign markets. DOGU HVAC's, headquarter in Izmir/Turkey, operates in a large-sized plant spread over two factories, in total area of 45.000 sqm in which 25.000 sqm indoor space that enables DOGU HVAC manufactures 140 various type of products. Additionally, DOGU HVAC has a powerful sales network with three sales offices located in Istanbul, Ankara and Antalya in Turkey as well as authorized dealers in many other countries for sales and after sales operations. DOGU HVAC has been exporting to more than 50 countries.

Thanks to our "Customer Satisfaction","Zero-Defect Policy" motto and reinforced by complete certified products, more than 250 employees. DOGU HVAC R&D center developed exclusive products, such as Double Skin Make-Up Kitchen Hood, Recirculated Laminar Airflow Unit, Single Piece Square Ceiling Diffuser and Ecology Units, for the first time have brought to the sector. DOGU HVAC R&D has the ability to make customized production which can meet the requirement of the customers by means of special software such as "ANSYS FLUENT". DOGU HVAC guaranteed its quality of management by having advantages of ISO 9001, ISO 14001, ISO 18001 certifications. Air Handling Units have EUROVENT, TUV Hygiene [in accordance with DIN1946-4, VDI 6022-1, DIN EN 13053 standarts], CE, TSEK, GOST-R certifications; Fire Dampers have EN 1366-2 and EN 13501-3 CE certifications; Smoke Control Dampers have EN 1366-10 and 12101-8 CE certifications; Kitchen Ventilation Products have TSE, CE and GOST-R quality certifications.

- DPA - Adjustable Louvre allows its blades to be easily adjusted with the adjustment lever.
- It is generally preferred for natural ventilation of the environment in bathroom or WC applications.

MATERIAL

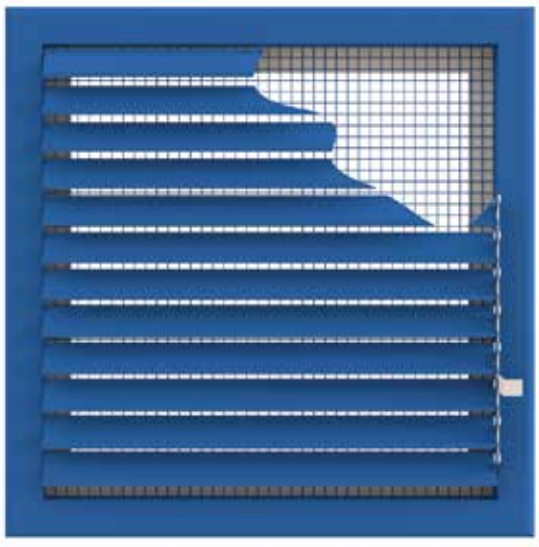
- Frame and blades made of aluminum 6063 extruded profile
- 32 mm frame

SURFACE COATING

- RAL 9010 or RAL 9016 electrostatic powder paint as standard
- Optional
  - Different RAL color codes
  - Matt aluminum anodized finish for a matte and metallic look
  - Unpainted manufacturing

MOUNTING OPTIONS

- Screwed System
- Without Mounting Hole



ACCESORIES

- Optional
  - 2x2 wires

*"DOGU HVAC" reserves the right to introduce changes of parameters and sizes in the process of improvement of the devices.

PRODUCT SELECTION

STANDARD DIMENSIONS

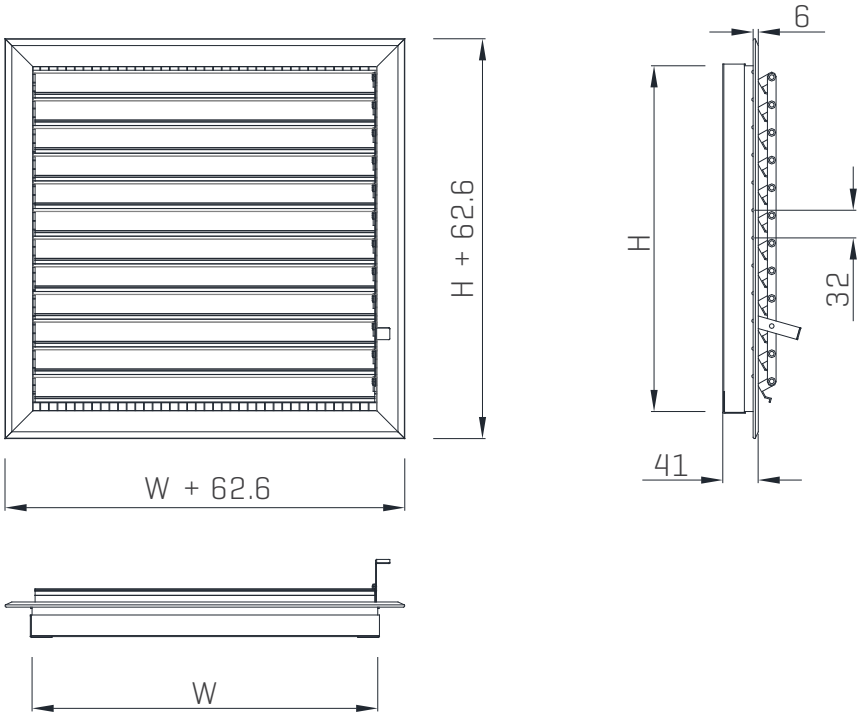


Table 1. Standard Dimensions

Standard Dimensions		H (Height) [mm]								
		100	200	300	400	500	600	700	800	900
W (Width) [mm]	100	✓	✓	✓	✓	✓				
	200	✓	✓	✓	✓	✓	✓	✓	✓	✓
	300	✓	✓	✓	✓	✓	✓	✓	✓	✓
	400	✓	✓	✓	✓	✓	✓	✓	✓	✓
	500	✓	✓	✓	✓	✓	✓	✓	✓	✓
	600	✓	✓	✓	✓	✓	✓	✓	✓	✓
	700	✓	✓	✓	✓	✓	✓	✓	✓	✓
	800	✓	✓	✓	✓	✓	✓	✓	✓	✓
	900	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1000	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1100	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1200	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1300	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1400	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1500	✓	✓	✓	✓	✓	✓	✓	✓	✓

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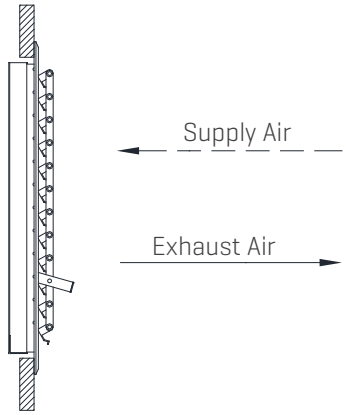
PERFORMANCE DATA

Performance data are given below according to the fresh air supply into the space and the exhaust air from the space to the outside. Product dimensions are determined from the effective area provided according to the desired performance criteria.



EFFECTIVE AREA TABLE

Table 2. Effective Area

Effective Area[m²]		100	200	300	400	500	600	700	800	900
W [Width] [mm]	100	0.009	0.014	0.019	0.024	0.029				
	200	0.014	0.024	0.034	0.043	0.053	0.063	0.073	0.083	0.092
	300	0.019	0.034	0.048	0.063	0.078	0.092	0.107	0.122	0.137
	400	0.024	0.043	0.063	0.083	0.102	0.122	0.142	0.161	0.181
	500	0.029	0.053	0.078	0.102	0.127	0.151	0.176	0.200	0.225
	600	0.034	0.063	0.092	0.122	0.151	0.181	0.210	0.240	0.269
	700	0.038	0.073	0.107	0.142	0.176	0.210	0.245	0.279	0.313
	800	0.043	0.083	0.122	0.161	0.200	0.240	0.279	0.318	0.358
	900	0.048	0.092	0.137	0.181	0.225	0.269	0.313	0.358	0.402
	1000	0.053	0.102	0.151	0.200	0.250	0.299	0.348	0.397	0.446
	1100	0.058	0.112	0.166	0.220	0.274	0.328	0.382	0.436	0.490
	1200	0.063	0.122	0.181	0.240	0.299	0.358	0.416	0.475	0.534
	1300	0.068	0.132	0.196	0.259	0.323	0.387	0.451	0.515	0.578
	1400	0.073	0.142	0.210	0.279	0.348	0.416	0.485	0.554	0.623
	1500	0.078	0.151	0.225	0.299	0.372	0.446	0.519	0.593	0.667

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FRESH AIR DATA

Table 3. Fresh Air Data

Flow Rate (m³/h)		Effective Speed (m/s)										
		0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	6.0
50	Effective Area [m²]	0.0278	0.0139	0.0093								
	Pressure Drop [Pa]	<1	<1	2								
	Sound Power Level [dB(A)]	<15	<15	<15								
100	Effective Area [m²]	0.0556	0.278	0.019	0.014	0.011	0.009					
	Pressure Drop [Pa]	<1	<1	2	4	8	14					
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	15					
200	Effective Area [m²]	0.111	0.056	0.037	0.028	0.022	0.019	0.016	0.014	0.012	0.011	0.009
	Pressure Drop [Pa]	<1	<1	2	4	8	14	23	34	49	68	118
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	18	24	29	33	37	44
300	Effective Area [m²]	0.167	0.083	0.056	0.042	0.033	0.028	0.024	0.021	0.019	0.017	0.014
	Pressure Drop [Pa]	<1	<1	2	4	8	14	22	34	48	67	117
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	19	25	30	35	39	46
400	Effective Area [m²]	0.222	0.111	0.074	0.056	0.044	0.037	0.032	0.028	0.025	0.022	0.019
	Pressure Drop [Pa]	<1	<1	2	4	8	14	22	33	48	66	115
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	21	26	31	36	40	47
500	Effective Area [m²]	0.278	0.139	0.093	0.069	0.056	0.046	0.040	0.035	0.031	0.028	0.023
	Pressure Drop [Pa]	<1	<1	2	4	8	14	22	33	47	65	114
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	21	27	32	37	41	48
600	Effective Area [m²]	0.333	0.167	0.111	0.083	0.067	0.056	0.048	0.042	0.037	0.0333	0.028
	Pressure Drop [Pa]	<1	<1	2	4	8	14	22	33	47	65	114
	Sound Power Level [dB(A)]	<15	<15	<15	<15	15	22	28	33	37	41	48
700	Effective Area [m²]	0.389	0.194	0.130	0.097	0.078	0.065	0.056	0.049	0.043	0.0389	0.032
	Pressure Drop [Pa]	<1	<1	2	4	8	13	22	33	47	65	113
	Sound Power Level [dB(A)]	<15	<15	<15	<15	16	23	29	34	38	42	49
800	Effective Area [m²]	0.444	0.222	0.148	0.111	0.089	0.074	0.063	0.056	0.049	0.0444	0.037
	Pressure Drop [Pa]	<1	<1	2	4	8	13	22	32	47	64	113
	Sound Power Level [dB(A)]	<15	<15	<15	<15	16	23	29	34	39	43	49
900	Effective Area [m²]	0.500	0.250	0.167	0.125	0.100	0.083	0.071	0.063	0.056	0.500	0.042
	Pressure Drop [Pa]	<1	<1	2	4	8	13	21	32	46	64	112
	Sound Power Level [dB(A)]	<15	<15	<15	<15	17	24	30	35	39	43	50
1000	Effective Area [m²]	0.556	0.278	0.185	0.139	0.111	0.093	0.079	0.069	0.062	0.556	0.046
	Pressure Drop [Pa]	<1	<1	2	4	8	13	21	32	46	64	112
	Sound Power Level [dB(A)]	<15	<15	<15	<15	17	24	30	35	39	43	50
1250	Effective Area [m²]		0.347	0.231	0.174	0.139	0.116	0.099	0.087	0.077	0.0694	0.058
	Pressure Drop [Pa]		<1	2	4	8	13	21	32	46	63	111
	Sound Power Level [dB(A)]		<15	<15	<15	18	25	31	36	40	44	51
1500	Effective Area [m²]		0.417	0.278	0.208	0.167	0.139	0.119	0.104	0.0926	0.0833	0.069
	Pressure Drop [Pa]		<1	2	4	8	13	21	32	45	63	110
	Sound Power Level [dB(A)]		<15	<15	<15	19	26	32	37	41	45	52
1750	Effective Area [m²]		0.486	0.324	0.243	0.194	0.162	0.139	0.122	0.1080	0.0972	0.081
	Pressure Drop [Pa]		<1	2	4	7	13	21	32	45	62	109
	Sound Power Level [dB(A)]		<15	<15	<15	20	26	32	37	42	46	53
2000	Effective Area [m²]		0.556	0,370	0.278	0.222	0.185	0.159	0.139	0.1235	0.1111	0.093
	Pressure Drop [Pa]		<1	2	4	7	13	21	31	45	62	109
	Sound Power Level [dB(A)]		<15	<15	<15	20	27	33	38	42	46	53
2500	Effective Area [m²]			0.463	0.347	0.278	0.231	0.198	0.174	0.1543	0.1389	0.116
	Pressure Drop [Pa]			2	4	7	13	21	31	45	62	108
	Sound Power Level [dB(A)]			<15	<15	21	28	34	39	43	47	54
3000	Effective Area [m²]			0.556	0.417	0.333	0.2778	0.2381	0.2083	0.1852	0.1667	0.139
	Pressure Drop [Pa]			2	4	7	13	21	31	44	61	107
	Sound Power Level [dB(A)]			<15	<15	22	29	34	39	44	48	55
4000	Effective Area [m²]				0.556	0.444	0.370	0.3175	0.2778	0.2469	0.2222	0.185
	Pressure Drop [Pa]				4	7	13	20	31	44	61	106
	Sound Power Level [dB(A)]				<15	23	30	36	41	45	49	56
5000	Effective Area [m²]					0.556	0.4630	0.3968	0.3472	0.3086	0.2778	0.231
	Pressure Drop [Pa]					7	13	20	30	44	60	105
	Sound Power Level [dB(A)]					24	31	36	41	46	50	57
7500	Effective Area [m²]							0.5952	0.5208	0.4630	0.4167	0.347
	Pressure Drop [Pa]							20	30	43	59	104
	Sound Power Level [dB(A)]							38	43	47	51	58
10000	Effective Area [m²]									0.6173	0.5556	0.463
	Pressure Drop [Pa]									42	59	103
	Sound Power Level [dB(A)]									49	53	59
12500	Effective Area [m²]											0.579
	Pressure Drop [Pa]											102
	Sound Power Level [dB(A)]											60

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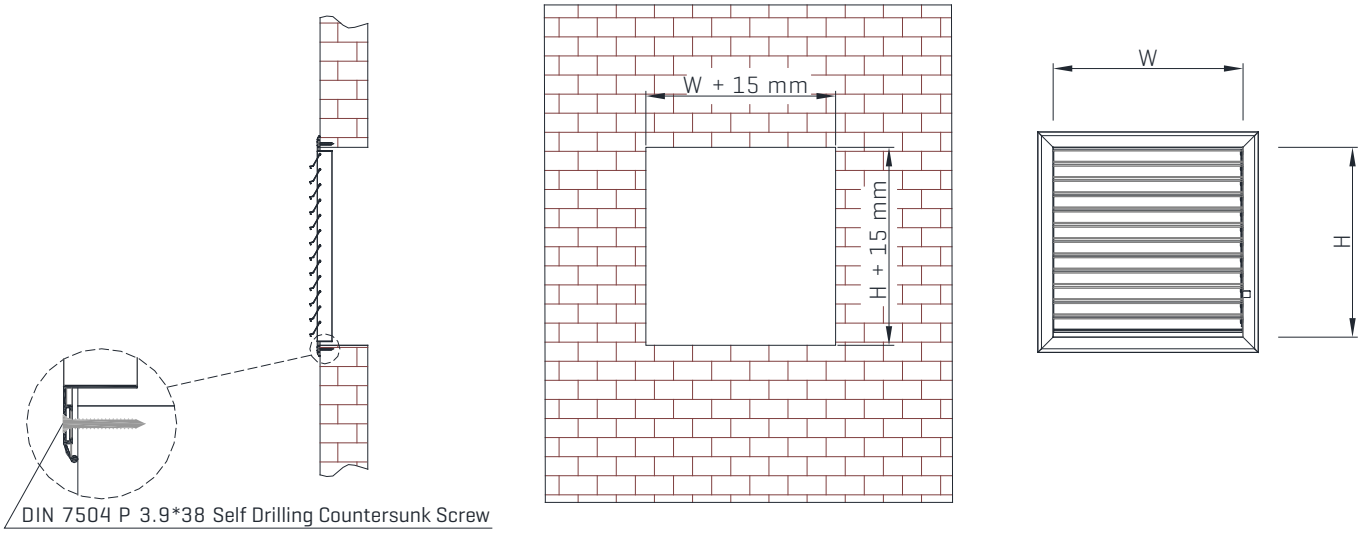
EXHAUST AIR DATA

Table 4. Exhaust Air Data

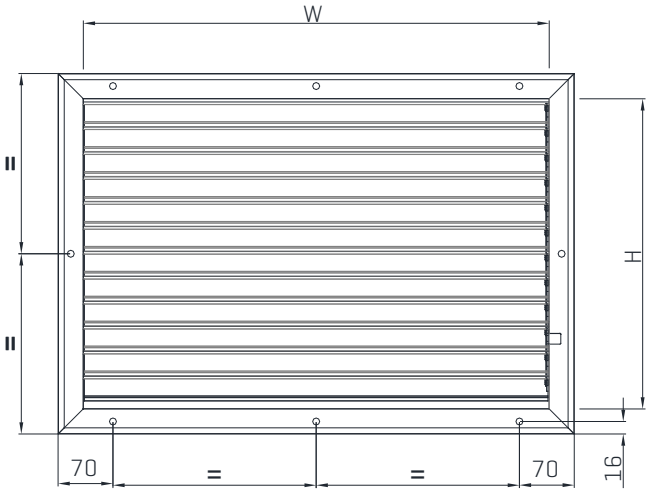
Flow Rate (m³/h)		Effective Speed (m/s)										
		0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	6.0
50	Effective Area [m²]	0.0278	0.0139	0.0093								
	Pressure Drop [Pa]	<1	3	6								
	Sound Power Level [dB(A)]	<15	<15	<15								
100	Effective Area [m²]	0.0556	0.278	0.019	0.014	0.011	0.009					
	Pressure Drop [Pa]	<1	3	6	11	17	25					
	Sound Power Level [dB(A)]	<15	<15	<15	<15	16	21					
200	Effective Area [m²]	0.111	0.056	0.037	0.028	0.022	0.019	0.016	0.014	0.012	0.011	0.009
	Pressure Drop [Pa]	<1	3	6	11	17	25	33	44	55	68	97
	Sound Power Level [dB(A)]	<15	<15	<15	<15	19	24	28	31	34	37	42
300	Effective Area [m²]	0.167	0.083	0.056	0.042	0.033	0.028	0.024	0.021	0.019	0.017	0.014
	Pressure Drop [Pa]	<1	3	6	11	17	25	33	44	55	68	97
	Sound Power Level [dB(A)]	<15	<15	<15	15	21	26	30	33	36	39	44
400	Effective Area [m²]	0.222	0.111	0.074	0.056	0.044	0.037	0.032	0.028	0.025	0.022	0.019
	Pressure Drop [Pa]	<1	3	6	11	17	25	33	44	55	68	97
	Sound Power Level [dB(A)]	<15	<15	<15	16	22	27	31	34	37	40	45
500	Effective Area [m²]	0.278	0.139	0.093	0.069	0.056	0.046	0.040	0.035	0.031	0.028	0.023
	Pressure Drop [Pa]	<1	3	6	11	17	25	33	44	55	68	97
	Sound Power Level [dB(A)]	<15	<15	<15	17	23	28	32	35	38	41	46
600	Effective Area [m²]	0.333	0.167	0.111	0.083	0.067	0.056	0.048	0.042	0.037	0.0333	0.028
	Pressure Drop [Pa]	<1	3	6	11	17	25	33	44	55	68	97
	Sound Power Level [dB(A)]	<15	<15	<15	18	24	29	33	36	39	42	47
700	Effective Area [m²]	0.389	0.194	0.130	0.097	0.078	0.065	0.056	0.049	0.043	0.0389	0.032
	Pressure Drop [Pa]	<1	3	6	11	17	25	33	44	55	68	97
	Sound Power Level [dB(A)]	<15	<15	<15	19	25	29	33	37	40	43	47
800	Effective Area [m²]	0.444	0.222	0.148	0.111	0.089	0.074	0.063	0.056	0.049	0.0444	0.037
	Pressure Drop [Pa]	<1	3	6	11	17	25	33	44	55	68	97
	Sound Power Level [dB(A)]	<15	<15	<15	19	25	30	34	37	40	43	48
900	Effective Area [m²]	0.500	0.250	0.167	0.125	0.100	0.083	0.071	0.063	0.056	0.500	0.042
	Pressure Drop [Pa]	<1	3	6	11	17	25	33	44	55	68	97
	Sound Power Level [dB(A)]	<15	<15	<15	20	26	30	34	38	41	44	48
1000	Effective Area [m²]	0.556	0.278	0.185	0.139	0.111	0.093	0.079	0.069	0.062	0.556	0.046
	Pressure Drop [Pa]	<1	3	6	11	17	25	33	44	55	68	97
	Sound Power Level [dB(A)]	<15	<15	<15	20	26	31	35	385	41	44	49
1250	Effective Area [m²]		0.347	0.231	0.174	0.139	0.116	0.099	0.087	0.077	0.0694	0.58
	Pressure Drop [Pa]		3	6	11	17	25	33	44	55	68	97
	Sound Power Level [dB(A)]		<15	<15	21	27	32	36	39	42	45	50
1500	Effective Area [m²]		0.417	0.278	0.208	0.167	0.139	0.119	0.104	0.0926	0.833	0.069
	Pressure Drop [Pa]		3	6	11	17	25	33	44	55	68	97
	Sound Power Level [dB(A)]		<15	<15	22	28	33	37	40	43	46	51
1750	Effective Area [m²]		0.486	0.324	0.243	0.194	0.162	0.139	0.122	0.1080	0.972	0.081
	Pressure Drop [Pa]		3	6	11	17	25	33	44	55	68	97
	Sound Power Level [dB(A)]		<15	15	23	29	33	37	41	44	47	51
2000	Effective Area [m²]		0.556	0.370	0.278	0.222	0.185	0.159	0.139	0.1235	0.1111	0.093
	Pressure Drop [Pa]		3	6	11	17	25	33	44	55	68	97
	Sound Power Level [dB(A)]		<15	16	23	29	34	38	41	44	47	52
2500	Effective Area [m²]			0.463	0.347	0.278	0.231	0.198	0.174	0.1543	0.1389	0.116
	Pressure Drop [Pa]			6	11	17	25	33	44	55	68	97
	Sound Power Level [dB(A)]			17	24	30	35	39	42	45	48	53
3000	Effective Area [m²]			0.556	0.417	0.333	0.2778	0.2381	0.2083	0.1852	0.1667	0.139
	Pressure Drop [Pa]			6	11	17	25	33	44	55	68	97
	Sound Power Level [dB(A)]			18	25	31	36	40	43	46	49	54
4000	Effective Area [m²]				0.556	0.444	0.370	0.3175	0.2778	0.2469	0.2222	0.185
	Pressure Drop [Pa]				11	17	25	33	44	55	68	97
	Sound Power Level [dB(A)]				26	32	37	41	44	47	50	55
5000	Effective Area [m²]					0.556	0.4630	0.3968	0.3472	0.3086	0.2778	0.231
	Pressure Drop [Pa]					17	25	33	44	55	68	97
	Sound Power Level [dB(A)]					33	38	42	45	48	51	56
7500	Effective Area [m²]							0.5952	0.5208	0.4630	0.4167	0.347
	Pressure Drop [Pa]							33	44	55	68	97
	Sound Power Level [dB(A)]							44	47	50	53	58
10000	Effective Area [m²]									0.6173	0.5556	0.463
	Pressure Drop [Pa]									55	68	97
	Sound Power Level [dB(A)]									51	54	59
12500	Effective Area [m²]											0.579
	Pressure Drop [Pa]											97
	Sound Power Level [dB(A)]											60

INSTALLATION

SCREW SYSTEM



The assembly of the product is done as shown in the above figure with screws.



The number of screw holes used for a profile in various order sizes are given in the table below.

W (Width) [mm]	Number of Holes in Horizontal
W ≤ 300	1
300 < W ≤ 900	2
1000 < W ≤ 1500	3

H (Height) [mm]	Number of Holes in Vertical
600 < H ≤ 900	1

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SIZE PARAMETERS

In case of **W ≤ 1500 – H ≥ 900** , the louvers are produced as modules by dividing the H dimension.

You can use 30 mm x 60 mm profile in module assemblies.

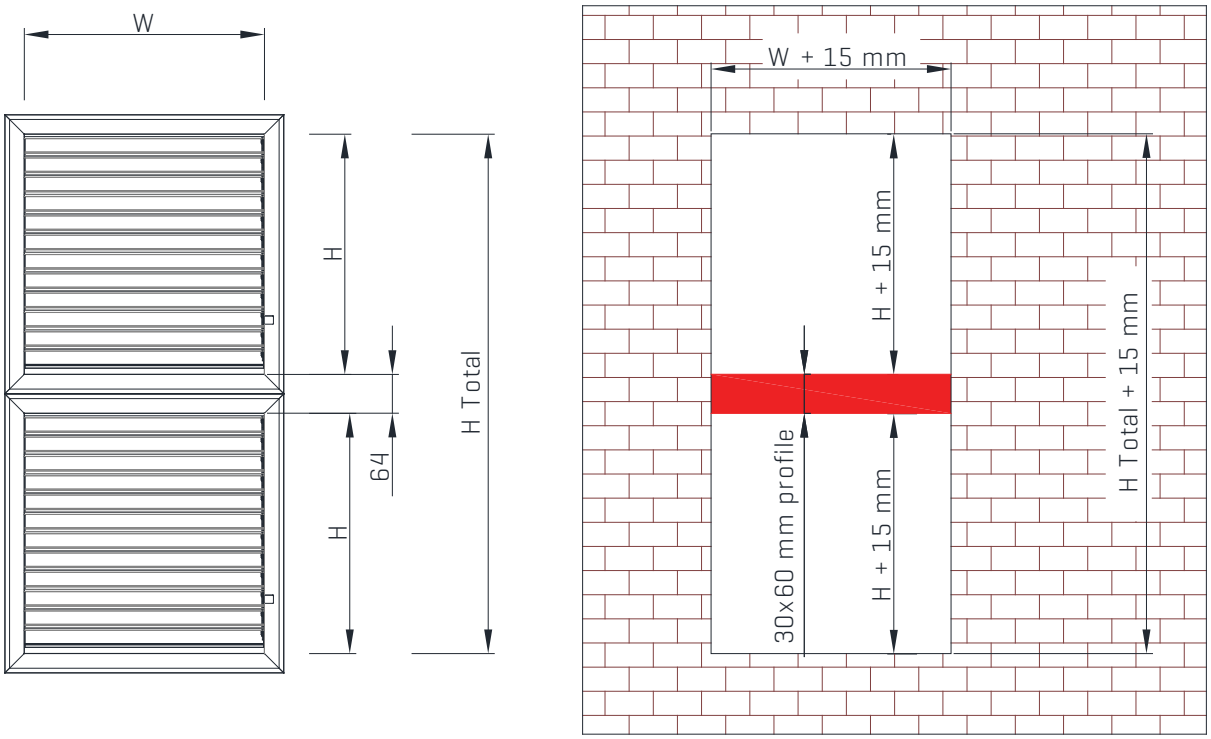


Figure 1

In the case of **W ≥ 1200 – H ≤ 900**, the louvres are produced as modules by dividing from W dimensions. During the assembly, a profile must be placed at the module junction as shown in Figure.2.

You can use 30 mm x 60 mm profile in module assemblies.

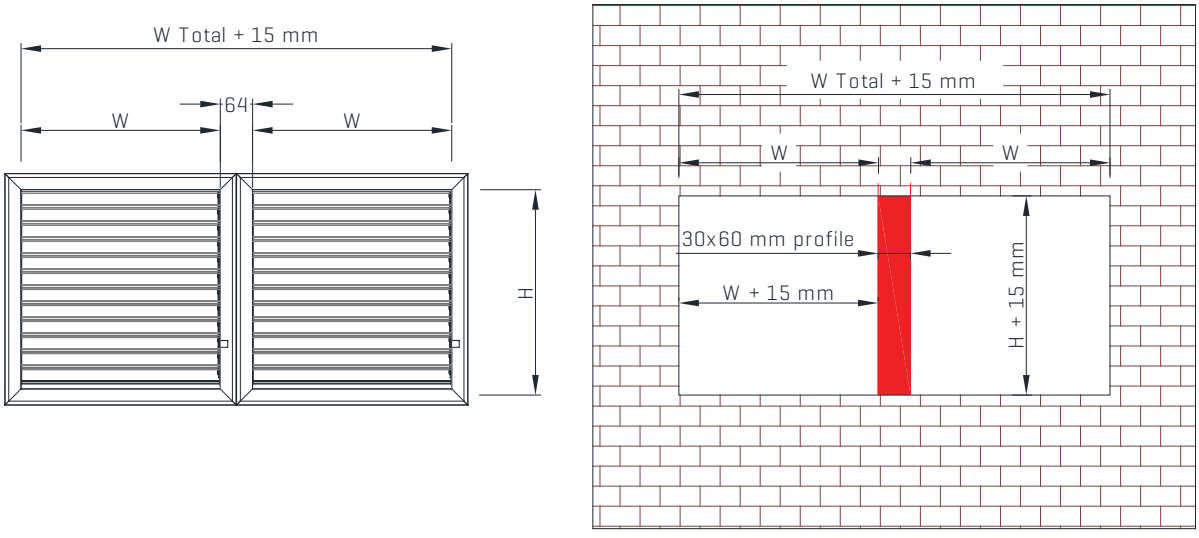


Figure 2

In case of **W ≥ 2300 – H ≥ 2100** , the louvres are produced as modules by dividing both W and H dimensions. During the assembly, a profile must be placed at the module junction as shown in Figure.3.

You can use 30 mm x 60 mm profile in module assemblies.

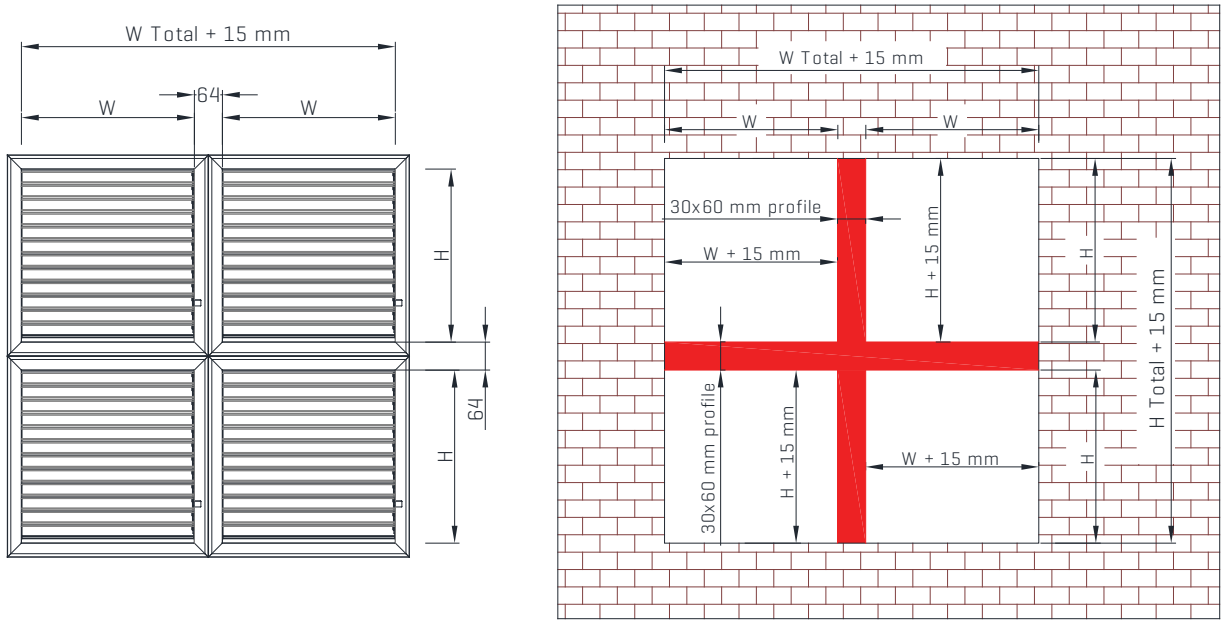


Figure 3

Module and Hole Size Calculation

W Total = W x n + (n-1) x 64 mm

W Total (mm): Module louvre throat size

W (mm): Horizontal size for 1 module (specified in the offer)

n: Number of modules (indicated in the offer)

Example: What is the module size and mounting hole size of the 3600 mm x 3000 mm adjustable louvre?

W Total= 3600 mm

3600 mm = W x n + (n-1) x 64 mm

n=2 (will be indicated in the offer)

W = It is found as 1768 mm.

H Total= 3000 mm

3000 mm = H x n + (n-1) x 64 mm

n=2 (will be indicated in the offer)

H = It is found as 1468 mm.

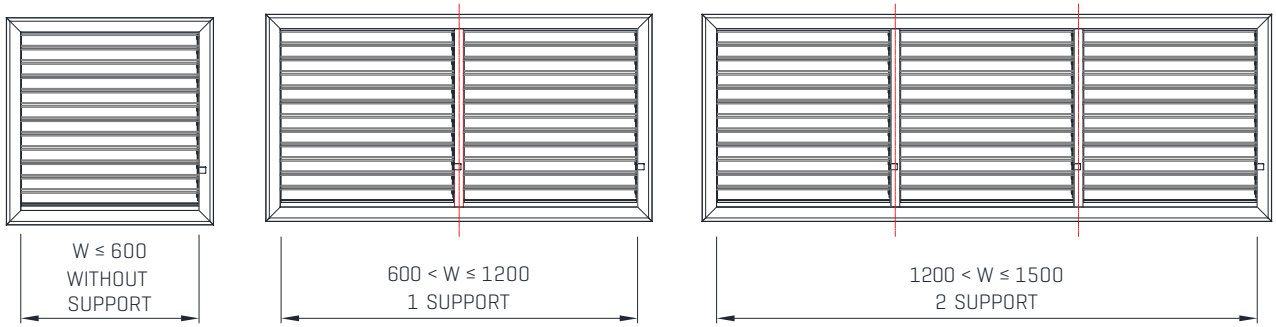
1 Module Size = 1768 mm x 1468 mm (W x H)

Hole size = 3615 mm x 3015 mm ((W total + 15 mm) x (H total + 15 mm))

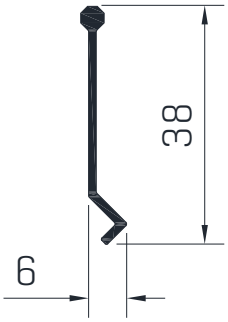
*"DOGU HVAC" reserves the right to introduce changes of parameters and sizes in the process of improvement of the devices.

SUPPORT COUNT PARAMETER

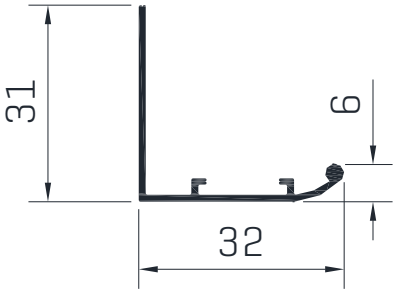
As the desired dimensions for a single module of the product increase, the product is produced with additional support and adjustment lever to increase strength.



FRAME AND BLADE TYPE



Louvre Blade



32 mm Frame

PRODUCT SELECTION

Example: In case the flow rate of the air to be exhausted is 800 m³/h, the pressure drop created by the adjustable louvre is required to be less than 30 Pa and the sound power level to be less than 36 dB(A).

Make the selection of the adjustable louvre.

Solution: From the exhaust air data table (Table 4), effective areas at values less than 30 Pa of pressure drop and 36 dB (A) of sound power level at 800 m³/h air flow are examined.

For example, in an effective area of 0.074 m², the effective velocity is 3 m/s, the pressure loss is 25 Pa and the sound power level is 30 dB(A).

The suitable louvre size can be selected from the effective area table (Table 2) as 500 mm x 300 mm corresponding to 0.074 m².

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PRODUCT ORDER CODES

You can place your orders according to the following coding format.

DPA.< A > . < B > . < C > . < D > . < E > . < F > . < G >

A	**Raw Material Type**	
	ALM	Aluminum
	EAL	Anodized Aluminum
B	**Frame Type**	
	06	32 mm
C	**Mounting Type**	
	VD	Screwed System
	MD	Without Mounting Hole
D	**Accessory**	
	22	2x2 Wire
	00	Without Accesories
E	**Horizontal Side (W) [mm]**	
	0000	You Can Look at the Standard Sizes
F	**Vertical Size (H) [mm]**	
	0000	You Can Look at the Standard Sizes
G	**Paint**	
	00	Unpainted
	S1	Standard Painted - RAL 9010
	S2	Standard Painted - RAL 9016
	XX	Special Painted

Sample Coding; DPA.ALM.06.VD.22.0750.0550.S1

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NOTES

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