

GFD
Top Inlet Hepa Filter Box

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 6 major groups as Air Handling Units, Rooftop Units, Heat/Energy Recovery Units, Air Purifiers, Air Distribution & Management Products and Kitchen Ventilation Equipments 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 2 factories, in total area of 32.000 sqm in which 17.500 sqm indoor space that enables DOGU HVAC manufactures 180 various type of products. Additionally, DOGU HVAC has a powerful sales network with 4 sales offices located in İstanbul, Ankara, Antalya and Adana 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 55 countries.

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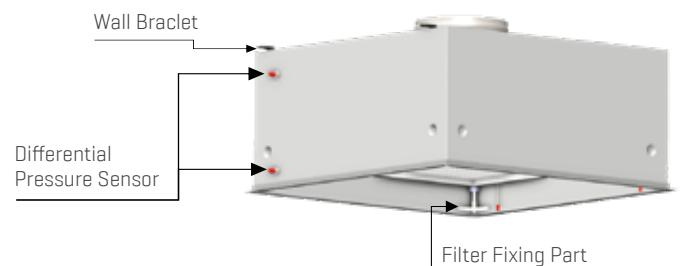


TOP INLET HEPA FILTER BOX



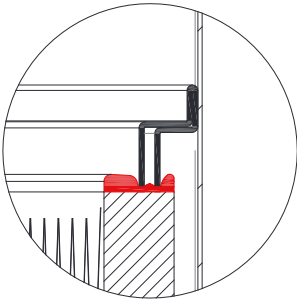
GENERAL FEATURES

- GFD – Top Entry Hepa Filter Box is designed for sterile spaces, operating theaters and clean rooms (pharmaceutical, chemical, food industries).
- Hepa filter boxes have been tested according to DIN 1946/4 and are offered for use with a 100% impermeability guarantee.
- Thanks to its wide product range, it fully meets the application requirements.
- As a standard, gasket leakproof test is applied to each product.
- It has differential pressure measuring tips to measure filter pollution.
- The inside of the box is resistant to disinfection processes.

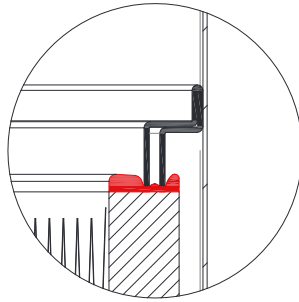


MATERIAL

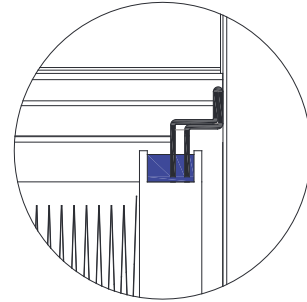
- ☞ Hepa filter box is produced from DKP sheet or optional AISI 304 quality stainless sheet.
- ☞ All accessories are corrosion resistant.
- ☞ Flat profile type in Hepa filter is compatible with both EPDM and gel type filter gaskets.



Aluminum Frame with EPDM Gasket



MDF Frame with EPDM Gasket



Aluminum Frame Gel Filled

- ☞ MDF and aluminum options are available for the frame of the HEPA filter. At the same time, filter pile heights can be selected as 50 mm or 125 mm depending on the dimensions of the Hepa filter.

MATERIAL

- ☞ RAL 9010 electrostatic powder paint as standard
- ☞ Optional
 - Different RAL color codes

INSTALLATION OPTIONS

- ☞ Bolted from Center
- ☞ Corner Mounting

PRODUCT SELECTION

After the target product and filter type are determined, the performance data is checked from the table.

STANDARD DIMENSIONS

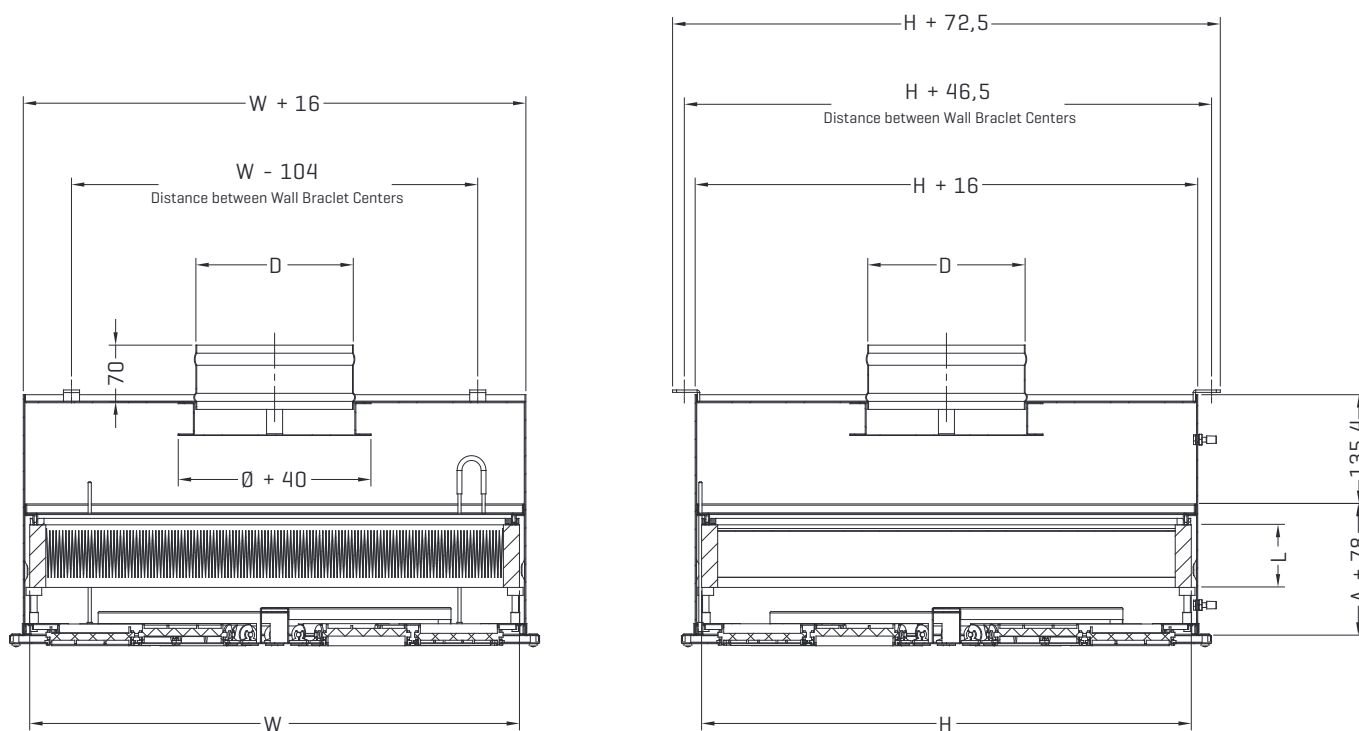


Table 1. Standard Dimensions Table

Standard Dimensions (W x H x Filter Height) (mm x mm x mm)	
305 x 305 x 78	305 x 305 x 149
305 x 610 x 78	305 x 610 x 149
457 x 457 x 78	457 x 457 x 149
457 x 610 x 78	457 x 610 x 149
535 x 535 x 78	535 x 535 x 149
575 x 575 x 78	575 x 575 x 149
610 x 610 x 78	610 x 610 x 149
762 x 762 x 78	762 x 762 x 149

When L [Filter height] is 78 mm, A [Box height] = 300 mm.
 When L [Filter height] is 149 mm, A [Box height] = 370 mm.

PERFORMANCE DATA

Table 2. Performance Data Table

Dimensions (mm x mm x mm)	Pleat Length (mm)	Flow Rate [m ³ /h]	Clean Filter Pressure Drop [Pa]		Dirty Filter Pressure Drop [Pa]		Recommended Flex Pipe Diameter [mm]
			H13	H14	H13	H14	
305 x 305 x 78	50	150	100	125	200	250	Ø125
305 x 610 x 78	50	300	100	125	200	250	Ø160
457 x 457 x 78	50	340	100	125	200	250	Ø160
457 x 610 x 78	50	450	100	125	200	250	Ø180
535 x 535 x 78	50	465	100	125	200	250	Ø180
575 x 575 x 78	50	535	100	125	200	250	Ø200
610 x 610 x 78	50	600	100	125	200	250	Ø200
762 x 762 x 78	50	940	100	125	200	250	Ø250
305 x 305 x 149	125	150	55	70	110	140	Ø125
305 x 610 x 149	125	300	55	70	110	140	Ø160
457 x 457 x 149	125	340	55	70	110	140	Ø160
457 x 610 x 149	125	450	55	70	110	140	Ø180
535 x 535 x 149	125	465	55	70	110	140	Ø180
575 x 575 x 149	125	535	55	70	110	140	Ø200
610 x 610 x 149	125	600	55	70	110	140	Ø200
762 x 762 x 149	125	940	55	70	110	140	Ø250

Note: The values in the table are valid when the air velocity is 0.45 m/s at the filter surface.

Table 3. Air Distributor Data Table

Hepa Filter Box Dimensions [mm x mm]	Air Distributor Equipment	Corresponding Equipment Size [mm x mm]	Maximum Flow [m ³ /h]	Pressure Drop [Pa]
305x305	OSB - Prismatic Swirl Diffuser	355x355	150	20
	OAK - Kare Anemostat	201x201		3
305x610	OSB - Prizmatik Swirl Difüzör	355x660	300	38
	OAP - Prizmatik Anemostat	201x506		4
457x457	OSB - Prizmatik Swirl Difüzör	507x507	340	14
	OAK - Kare Anemostat	353x353		2
457x610	OSB - Prizmatik Swirl Difüzör	507x660	450	25
	OAP - Prizmatik Anemostat	353x506		2
535x535	OSB - Prizmatik Swirl Difüzör	585x585	465	13
	OAK - Kare Anemostat	431x431		2
575x575	OSB - Prizmatik Swirl Difüzör	625x625	535	18
	OAK - Kare Anemostat	471x471		2
610x610	OSB - Prizmatik Swirl Difüzör	660x660	600	23
	OAK - Kare Anemostat	506x506		2
762x762	OSB - Prizmatik Swirl Difüzör	812x812	940	20
	OAK - Kare Anemostat	658x658		4

INSTALLATION OPTIONS

INSTALLATION DETAIL

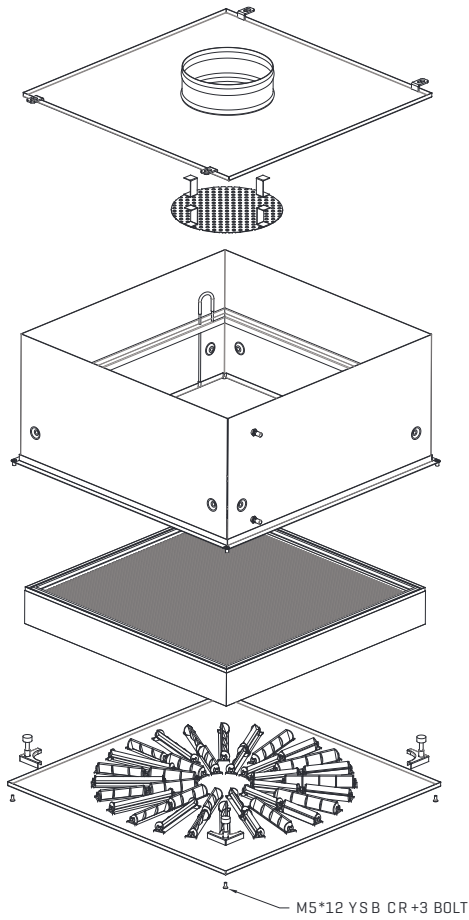


Figure 1. Bolted from Corners Installation

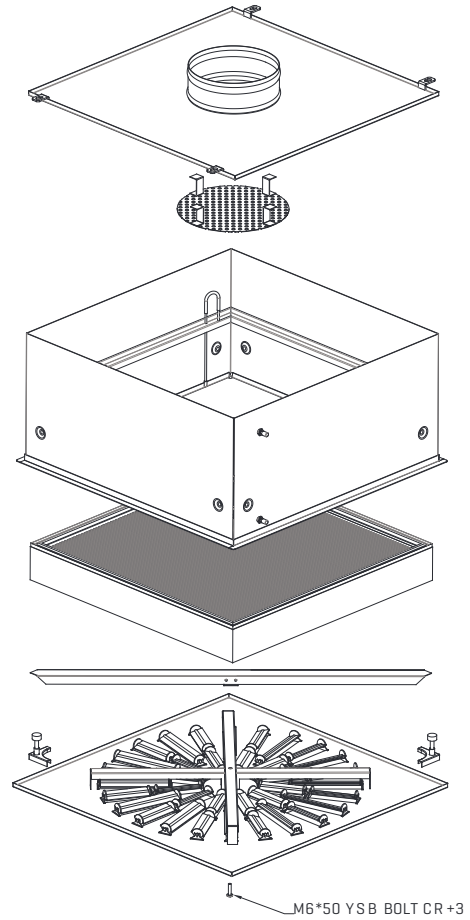
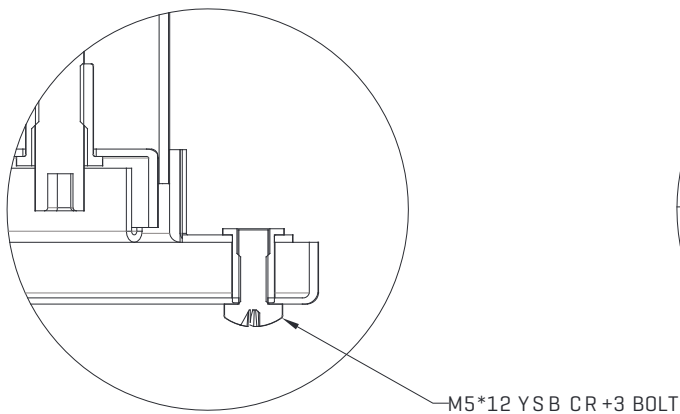
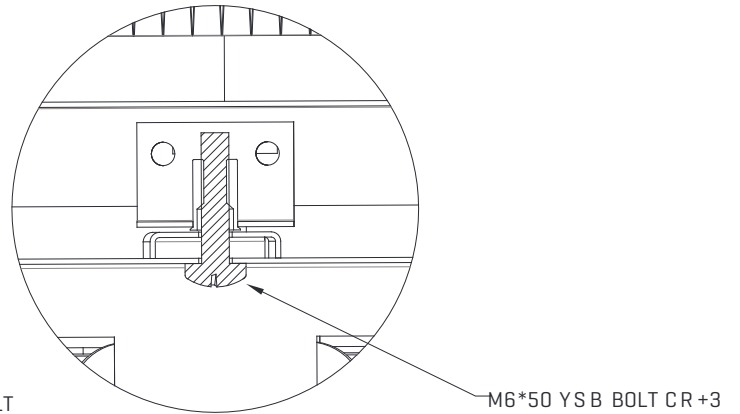


Figure 2. Bolted from Center Installation

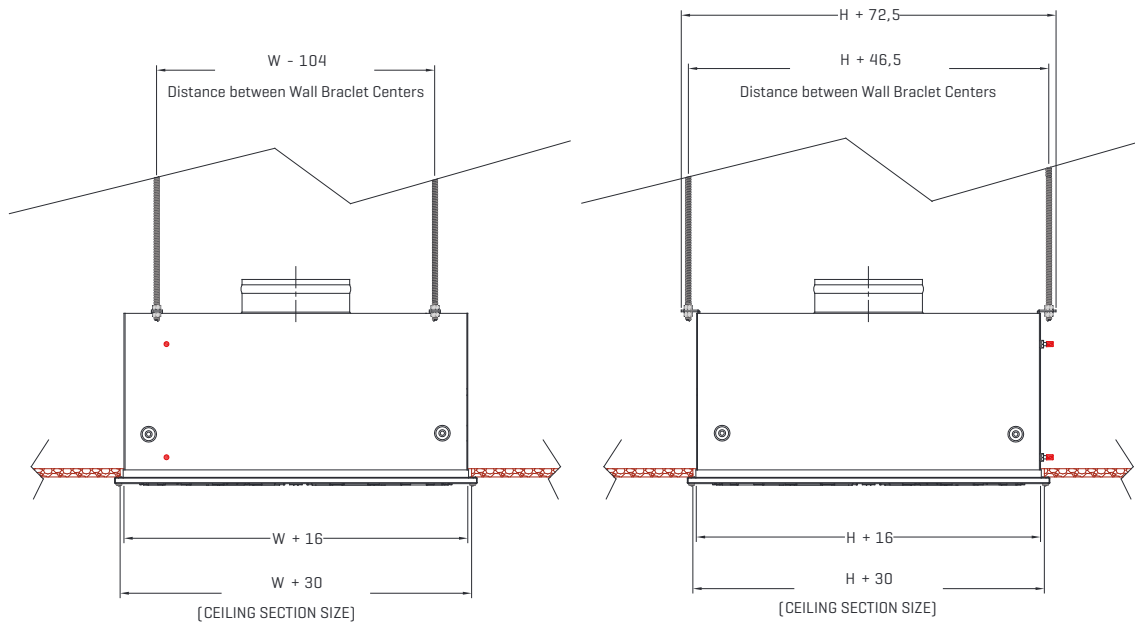
Bolted from Corner Installation Detail



Bolted from Center Installation Detail



WALL BRACLET INSTALLATION DETAIL



PRODUCT SELECTION

Example: The supply air flow rate of the Hepa filter was determined as 450 m³/h. H13 filter type with a height of 50 mm will be selected. A swirl diffuser will be used as air distribution equipment. Make the product selection.

Solution: From the performance data table [Table 2] for a flow rate of 450 m³/h:

The appropriate size is selected:

457 x 610 x 78

The corresponding clean filter pressure drop is 100 Pa.

For the air distributor data to be used in the product, refer to the air distributor table [Table 3]. For the swirl diffuser, there is a pressure loss of 20 Pa at an air flow rate of 450 m³/h.

Total Pressure Loss = Filter Pressure Loss [Clean/Dirty] + Air Distributor Pressure Loss

From the formula

Total Pressure Drop = 100 Pa + 20 Pa = 120 Pa

WALL BRACLET INSTALLATION DETAIL

FILTER ORDER CODE

Filter Type	Filter Frame	Filter Length [mm]	Dimensions [mm x mm]							
			305 x 305	305 x 610	457 x 457	457 x 610	535 x 535	575 x 575	610 x 610	762 x 762
H13	MDF	78	F01	F09	F02	F94	F03	F04	F05	F20
	EPDM Gasket	149	F07	F48	F06	F94	F08	F14	F17	F20
	Aluminum	78	F21	H11	F22	H13	F23	F43	F24	F89
	EPDM Gasket	149	H01	F46	H02	H17	F93	H03	F91	H19
	Aluminum	78	F27	H21	F28	H22	F29	F30	F31	H23
	Gel Gasket	149	H24	H25	H26	H27	H28	H29	H30	H31
H14	MDF	78	F60	F66	F61	H08	F62	F63	F64	F75
	EPDM Gasket	149	F68	H09	F69	H10	H04	F82	F65	F75
	Aluminum	78	F97	H12	F96	H14	F95	F18	F15	H15
	EPDM Gasket	149	H05	H16	H06	H18	F88	H07	F25	H20
	Aluminum	78	H32	H33	H34	H35	H36	H37	H38	H39
	Gel Gasket	149	H40	H41	H42	H43	H44	H45	H46	H47

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

GFD.<A>..<C>.<D>.<E>.<F>

A	Raw Material Type	
	DKP	Painted DKP Sheet
	PAS	AISI 304 Quality Stainless Steel
B	Filter	
	F00	Without Filter
	XXX	You can check the Filter Order Code Table
C	Installation Option	
	GC	Bolted from Center
	KM	Bolted from Corners
D	Width [W] [mm]	
	0000	You can check the Standard Sizes Table
E	Height [W] [mm]	
	0000	You can check the Standard Sizes Table
F	Flex Diameter [Ø] [mm]	
	100 - 125 - 150 - 160 - 180 - 200 - 229 - 250 - 255 - 280 - 300 - 315 - 350 - 356	

Sample Coding; GFD.DKP.F03.KM.0535.0535.0078.180

NOTES





We make the difference with
180 different types of products.



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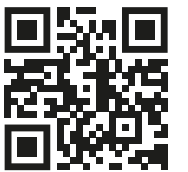
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FOUR BGK
Heat Recovery Units
With By-Pass Damper



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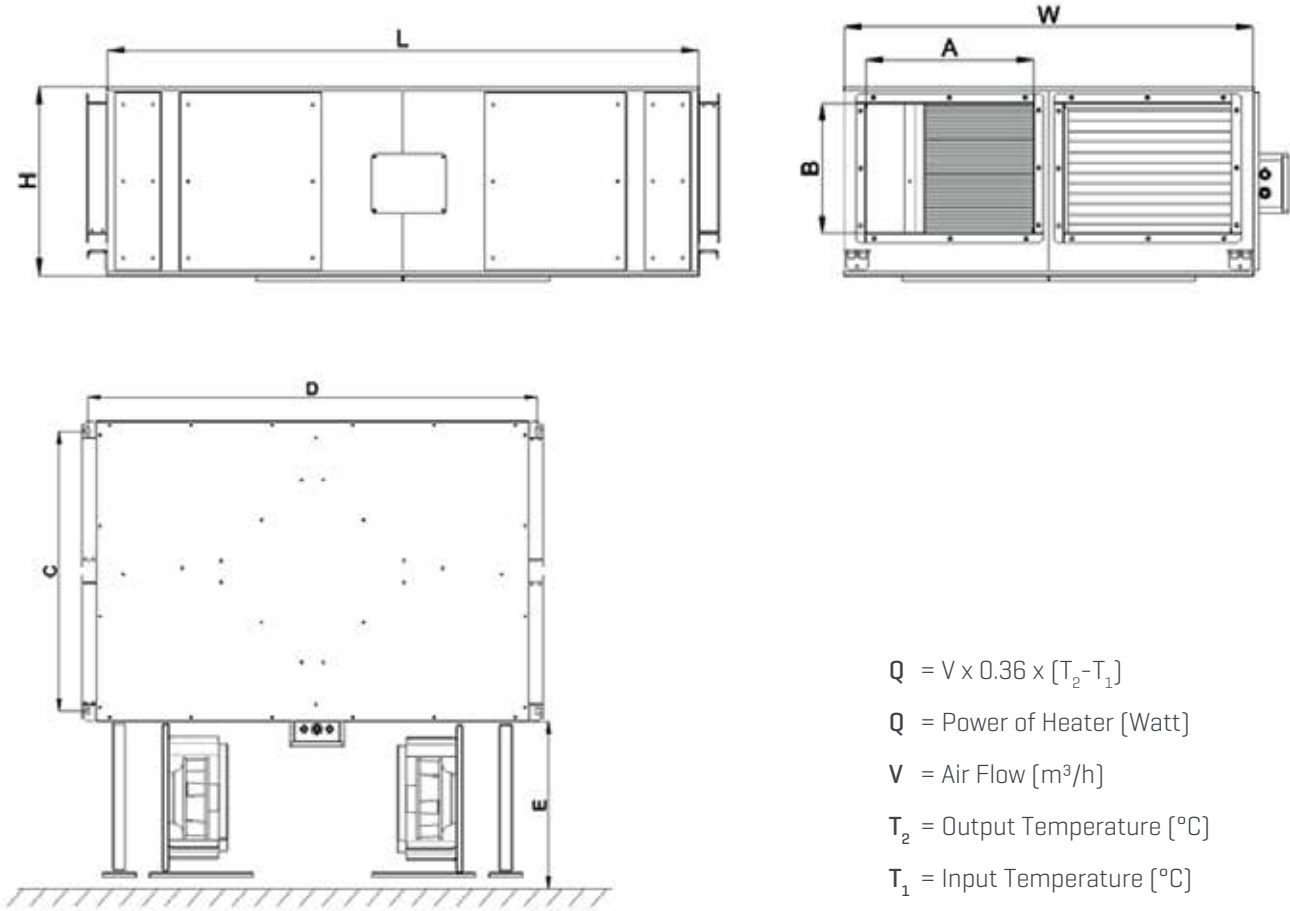




GENERAL INFORMATION

- ☞ Low Energy Consumption
- ☞ Aluminum Heat Exchanger with High Efficiency
- ☞ Low Sound Level
- ☞ High External Static Pressure
- ☞ G4 Class Filter
- ☞ By-Pass Damper
- ☞ Voltage Control
- ☞ Optional Water or Electric Heater
- ☞ Optional Sound Attenuator
- ☞ Optional Smart Control System

DIMENSIONS

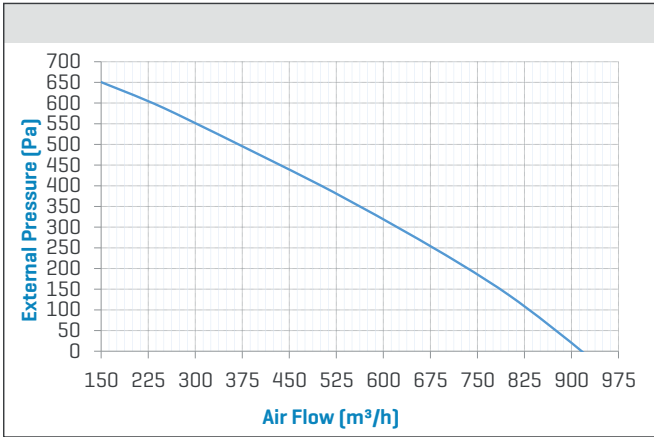


$$Q = V \times 0.36 \times [T_2 - T_1]$$

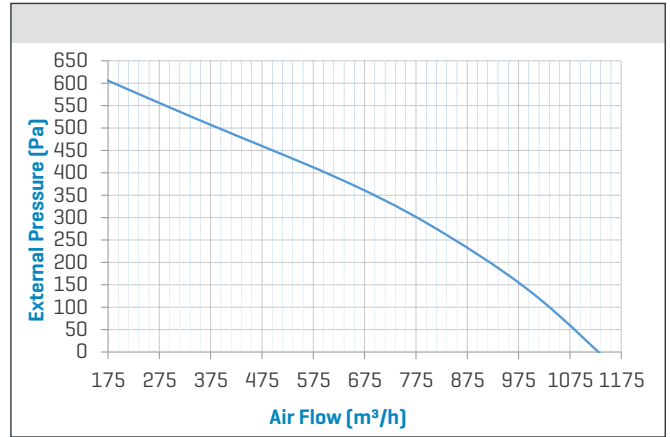
Q = Power of Heater [Watt]
 V = Air Flow [m³/h]
 T₂ = Output Temperature [°C]
 T₁ = Input Temperature [°C]

	Units	CAPACITY				L	W	H	A	B	C	D	E	Weight	ELECTRIC HEATER
		Air Flow	Pressure	Air Flow	Pressure										
		m³/h	Pa	m³/h	Pa	mm	mm	mm	mm	mm	mm	mm	mm	kg	Capacity
MODELS	BGK-09	910	0	800	150	1120	720	455	260	210	650	1086	400	55	3 Kw-2Kd
	BGK-11	1125	0	1000	150	1160	800	485	300	240	730	1126	440	60	4 Kw-2Kd
	BGK-15	1570	0	1350	150	1430	980	550	390	300	910	1496	550	105	6 Kw-3Kd
	BGK-25	2350	0	2000	150	1590	1100	610	450	350	1030	1656	610	130	9 Kw-3Kd
	BGK-30	3100	0	2500	150	1900	1126	720	510	460	1156	1966	660	165	12 Kw-3Kd
	BGK-40	4155	0	3500	150	1930	1300	775	550	520	1230	1996	700	210	15 Kw-3Kd
	BGK-55	5550	0	5000	150	1930	1300	775	550	520	1230	1996	700	210	15 Kw-3Kd

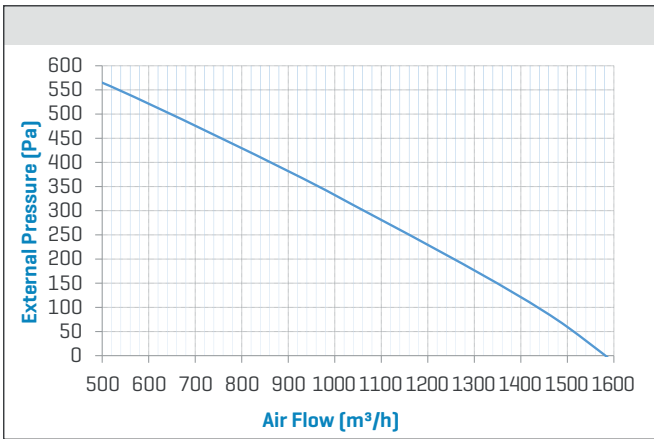
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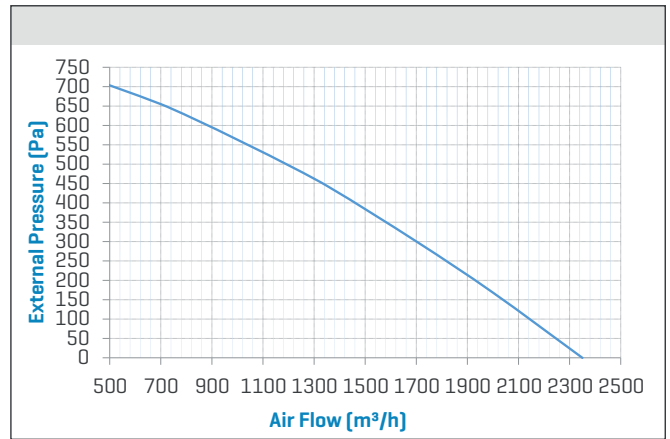
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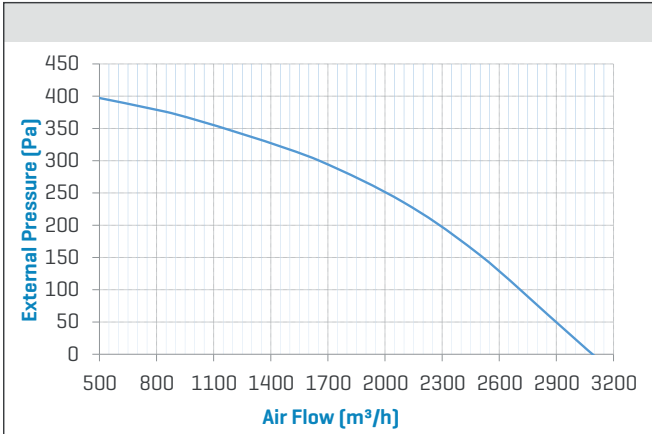
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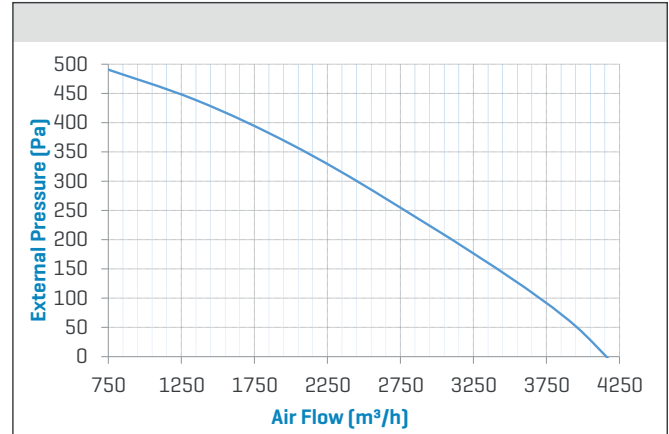
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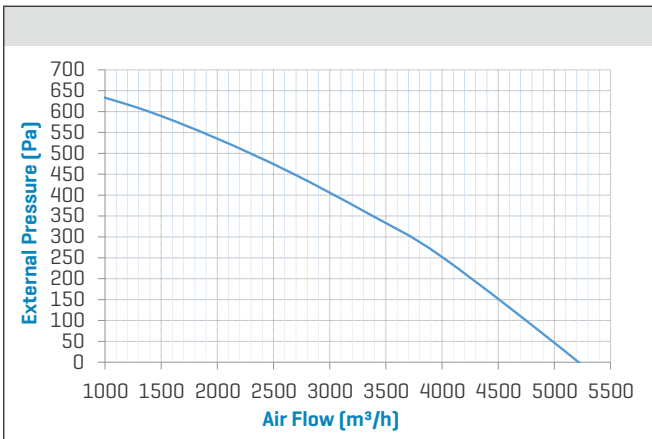
BGK-30



BGK-40



BGK-55





We make the difference with
140 different types of products.



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FOUR
SEASONS®

 **DOĞU**
İKLİMLENDİRME | HVAC SYSTEMS



FOUR-HOME

Residential Type Heat Recovery Unit

FOUR-HOME CEILING

Ceiling Type Residential Heat Recovery Unit



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- 1- Supply Fan [EC Plug]
- 2- Extract Fan [EC Plug]
- 3- Counter Flow Heat Recovery Exchanger
- 4- Control Box
- 5- Supply Filter
- 6- Extract Filter
- 7- By-pass Damper Motor
- 8- Galvanized, Painted Isolated Condensation Drip Tray
- 9- Plastic Spigot TOP or SIDE Switchable Direction



- 1- Spigot
- 2- Extract Fan [EC Plug]
- 3- Filters
- 4- Counter Flow Heat Recovery Exchanger
- 5- By-pass Damper Motor
- 6- Control Box
- 7- EC Plug Supply Fan

FOUR HOME / FOUR HOME CEILING

- ⌚ High efficient fans with low sound level
- ⌚ High efficient heat recovery
- ⌚ Optional electrical heater DX/heating/cooling coil
- ⌚ Sensitive supply air temperature control
- ⌚ 19 mm acoustics insulation of the walls
- ⌚ Easy mounting
- ⌚ Galvanized, painted-isolated drip pan
- ⌚ By-pass damper
- ⌚ Plug&Play
- ⌚ Optional wireless temperature sensor, wireless CO₂ sensor, wireless differential pressure sensor, wireless control panel-display available

Heat Exchanger

- ⌚ High-efficiency polypropylene counter flow heat exchanger
- ⌚ Special application for the anti-freeze protection

Filters

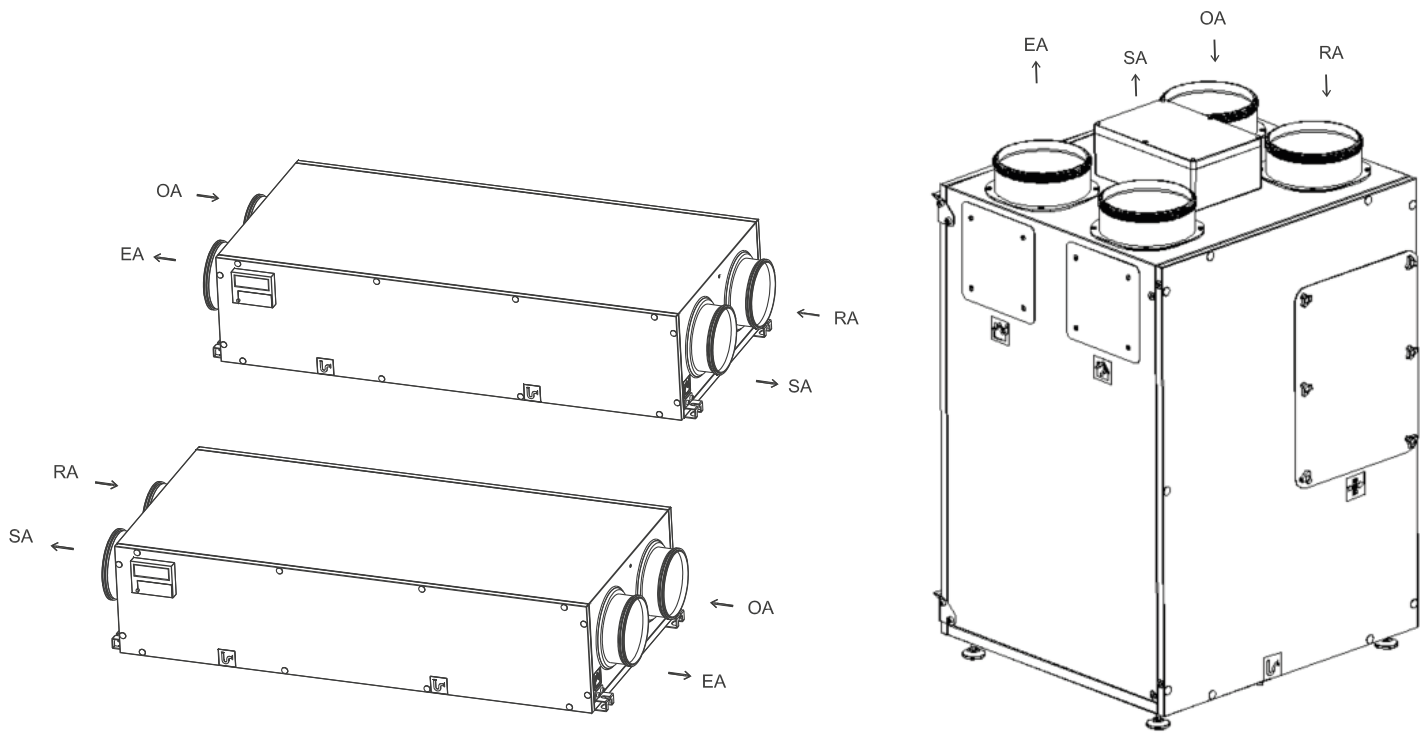
- ⌚ Large filtering area for energy efficiency and long service period (up to 6 months)
- ⌚ G4 panel filters or optional high efficiency F7 filter on supply air side.

Fans

- ⌚ New generation EC fans
- ⌚ Low power consumption
- ⌚ Low sound level
- ⌚ 10 years product life time [40.000 hours]

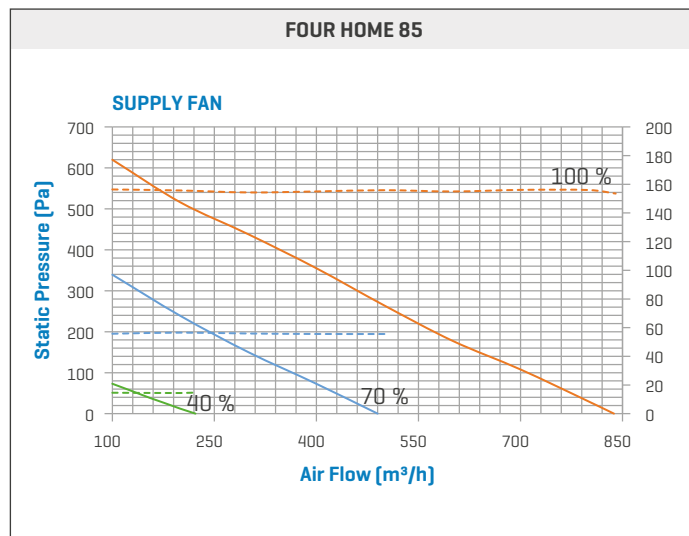
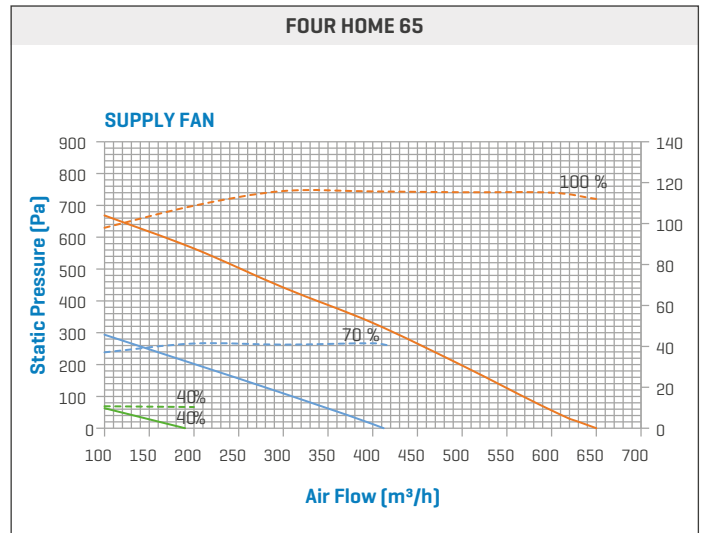
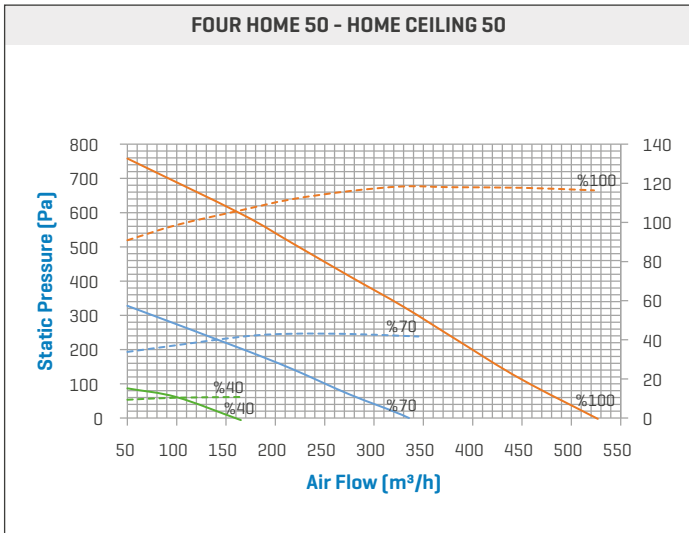
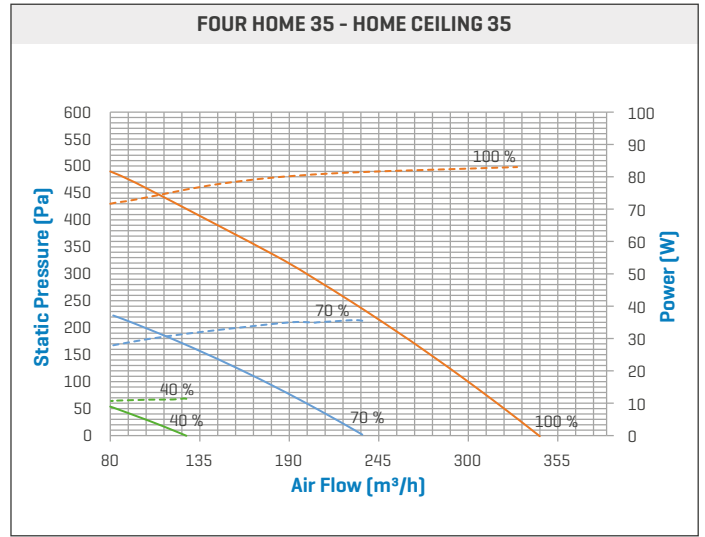
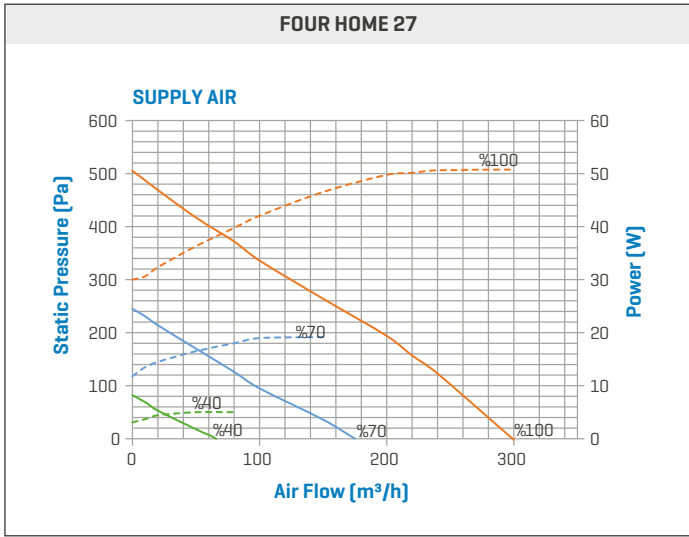
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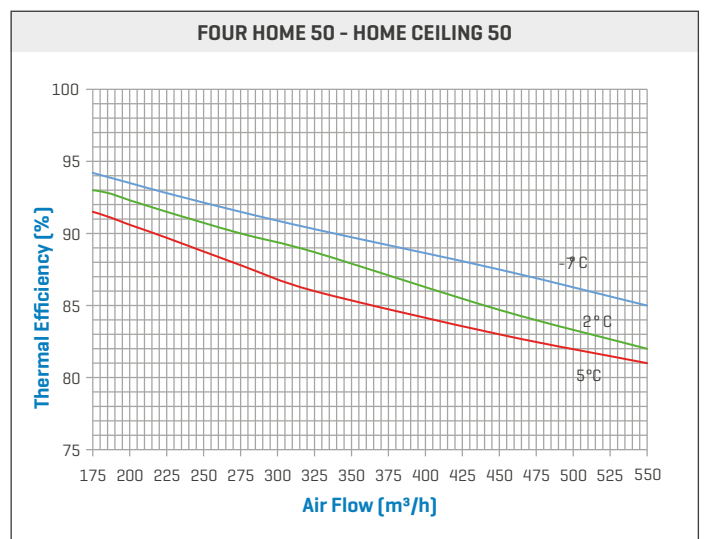
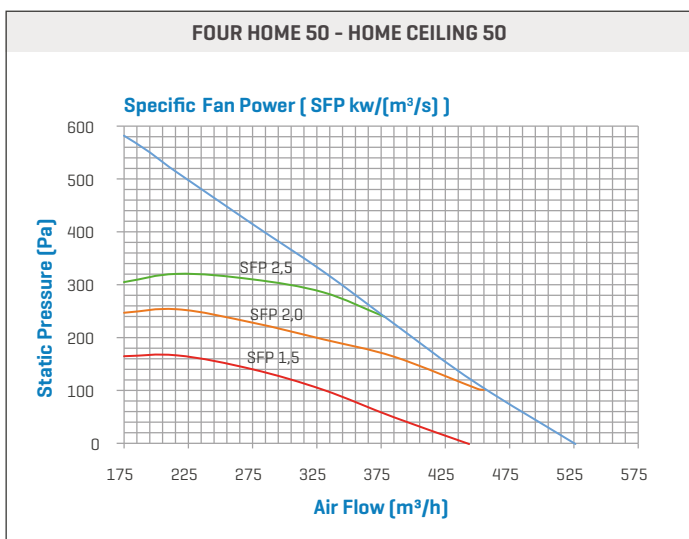
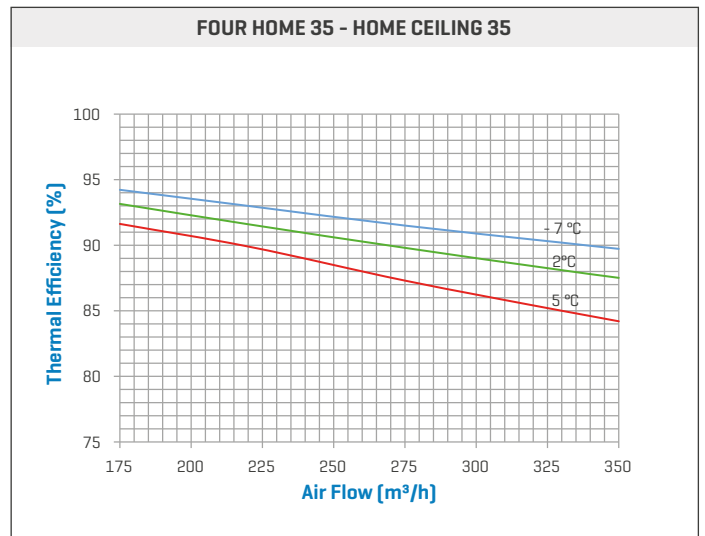
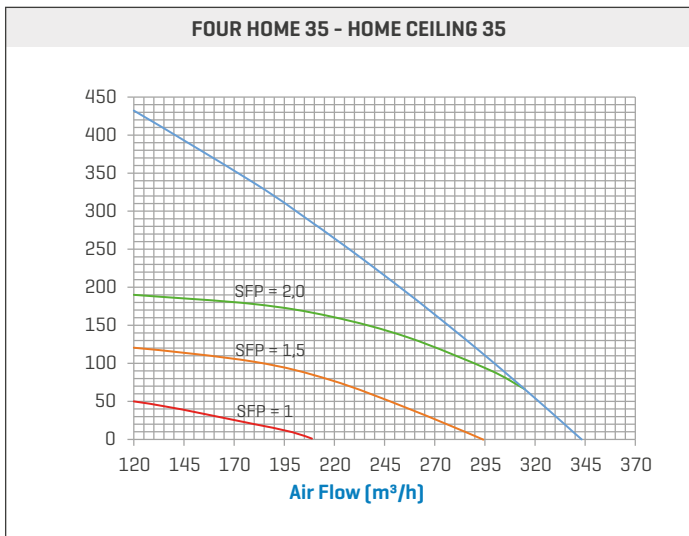
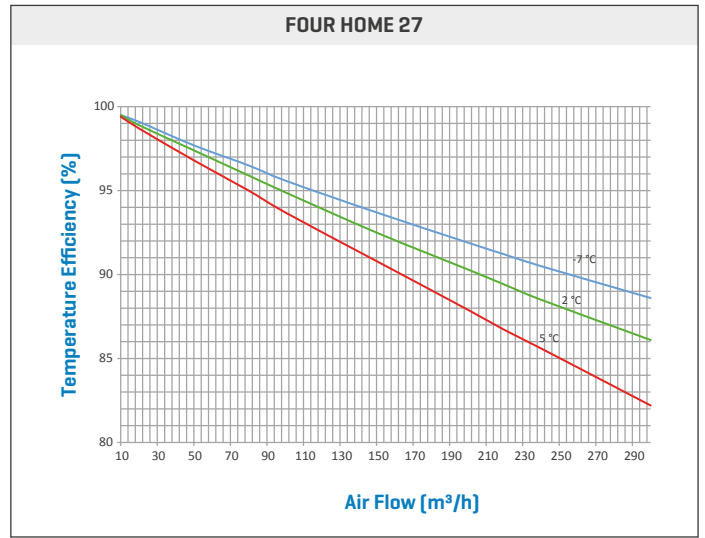
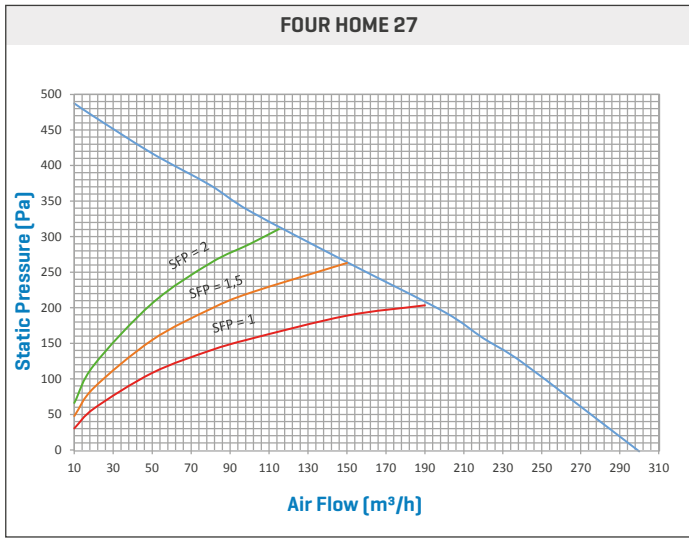
- ⌚ Optional electrical heater or DX/heating/cooling coil
- ⌚ Optional CO₂ or pressure sensor
- ⌚ Optional wireless temperature sensor, wireless CO₂ sensor, wireless differential pressure sensor, wireless control panel-display available

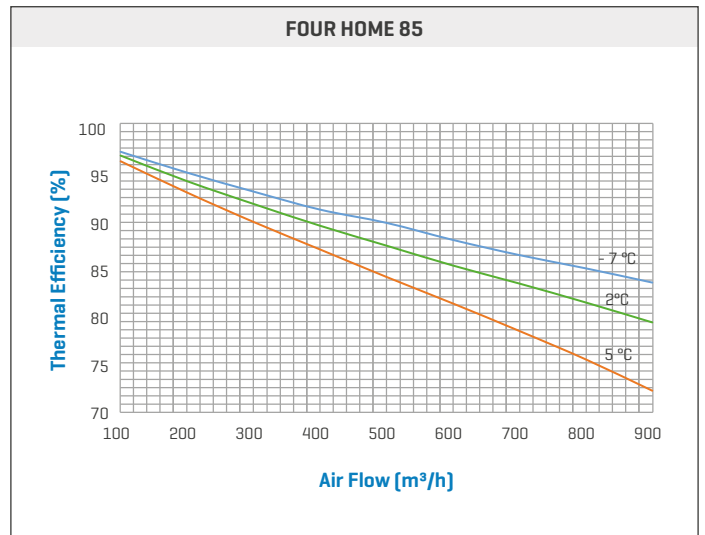
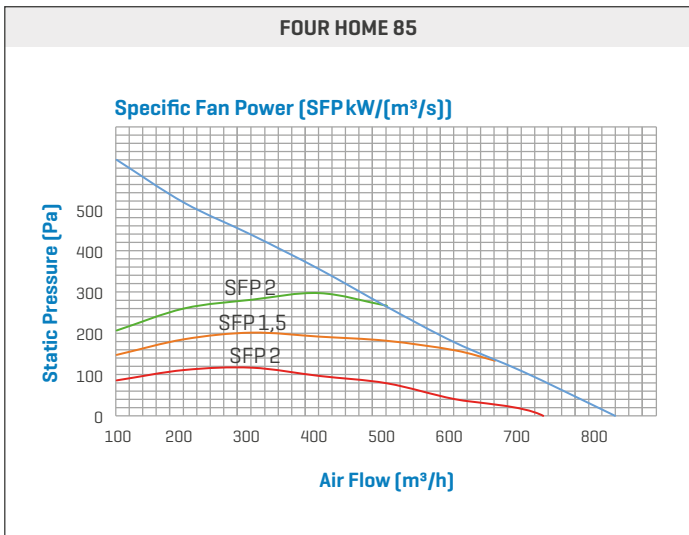
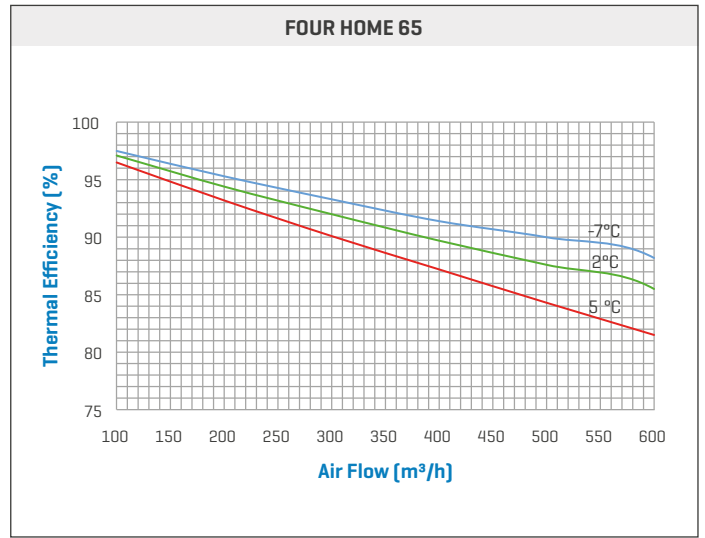
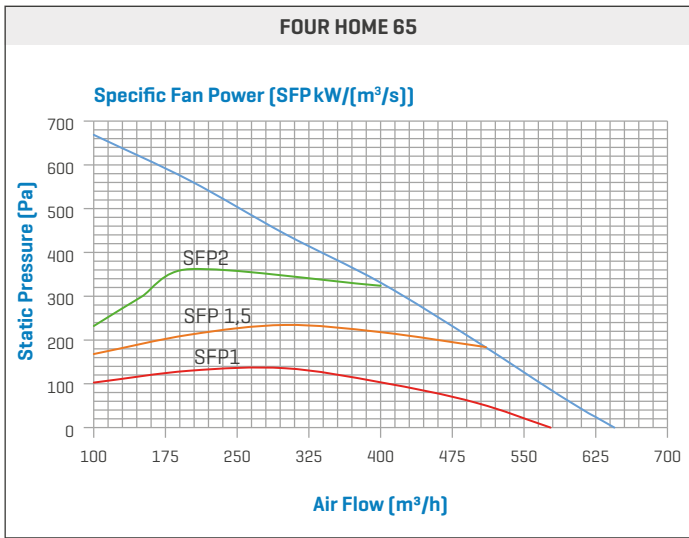


OA: OUTSIDE AIR
 SA: SUPPLY AIR
 RA: RETURN AIR
 EA: EXHAUST AIR

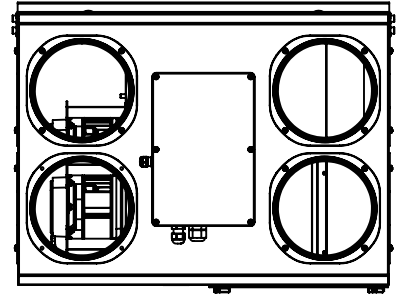
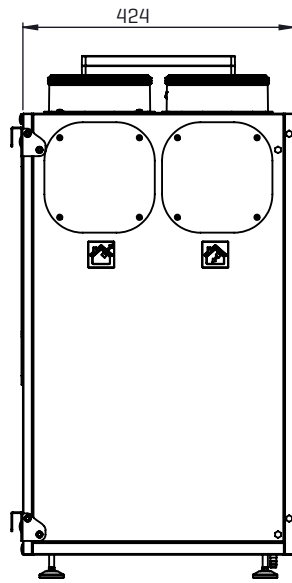
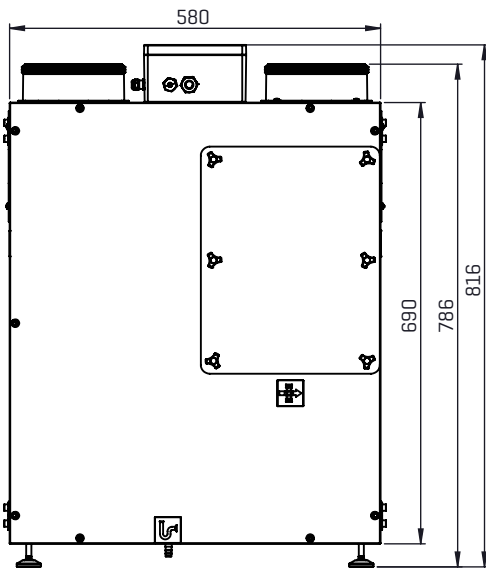
		HOME 27		HOME 35		HOME 50		HOME 65		HOME 85		HOME CEILING 35		HOME CEILING 50	
SEC [1]	warm	-17,09	E	-16,37	E	-16,9	E	-16,8	E	-17,71	E	-16,37	E	-16,9	E
	mild	-42,08	A	-41	A	-41,7	A	-41,14	A+	-42,61	A	-41	A	-41,7	A
	cold	-81,11	A+	-79,39	A+	-80,39	A+	-79,04	A+	-81,47	A+	-79,39	A+	-80,39	A+
Heat Recovery System		Recuperative		Recuperative		Recuperative		Recuperative		Recuperative		Rekuperator		Rekuperator	
SPI	W/(m³/h)	0,295		0,277		0,2975		0,267		0,2425		0,277		0,2975	
Thermal Efficiency	%	87,6		84,4		85,9		85,9		86,8		84,4		85,9	
Referenced Flow Rate [150 Pa]	m³/h	242		275		400		540		640		275		400	
Electrical Power Input	W	100		166		238		228,6		310,4		166		238	
Sound Power Level At Flow Rate	Lwa	43		39		41		41		54		39		41	
Filters		G4		G4		G4		G4		G4		G4		G4	
Control System		Integrated		Integrated		Integrated		Integrated		Integrated		Integrated		Integrated	



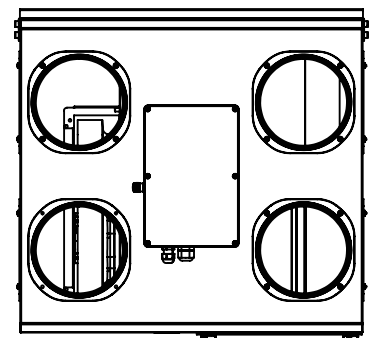
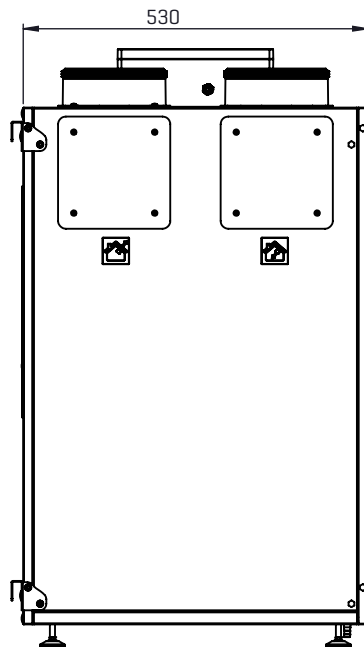
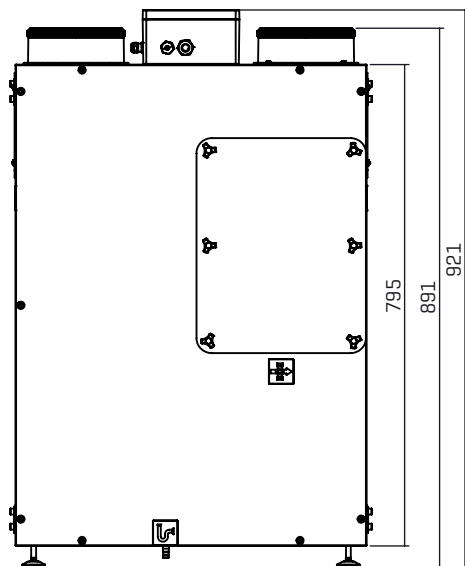




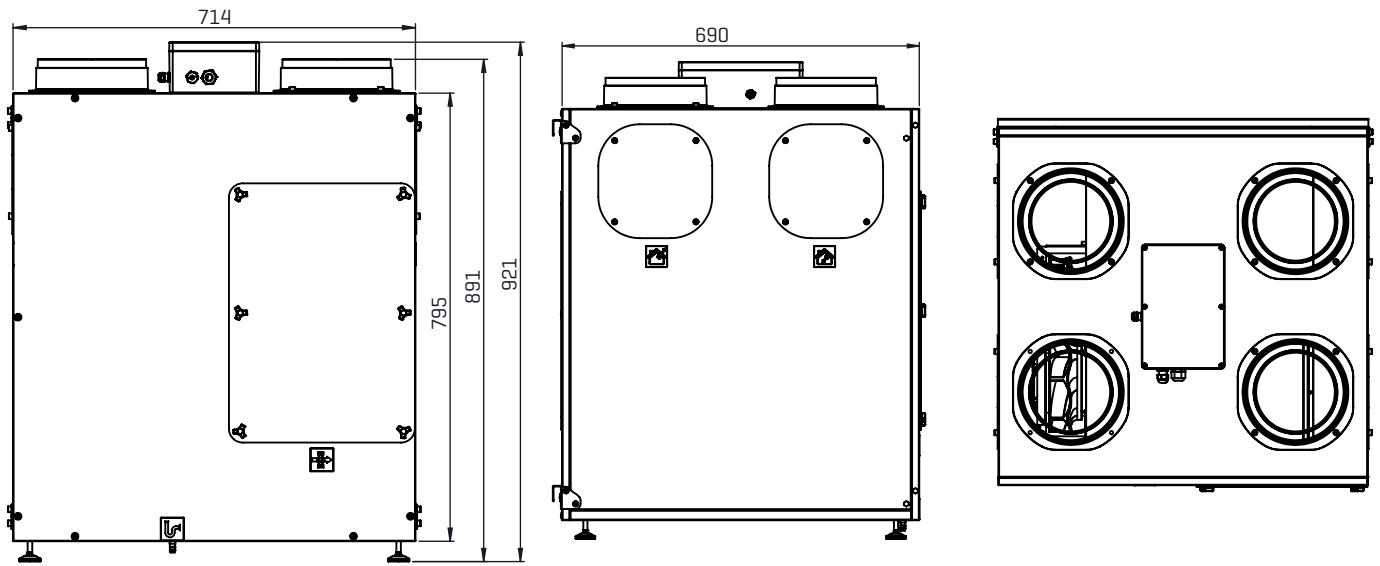
HOME 27



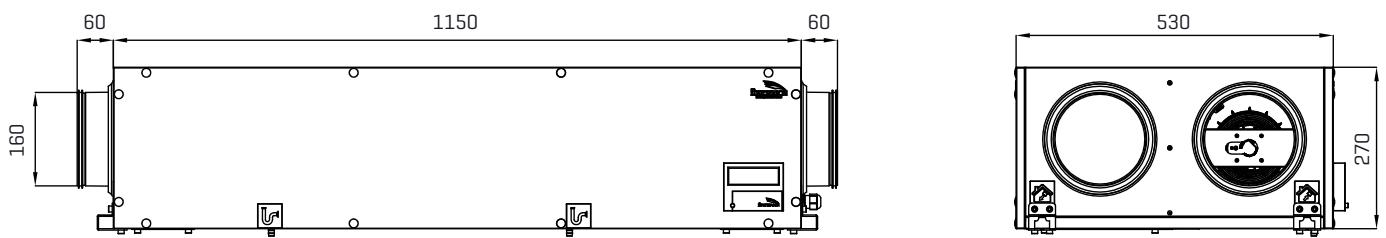
HOME 35 + 50



HOME 65 - 85

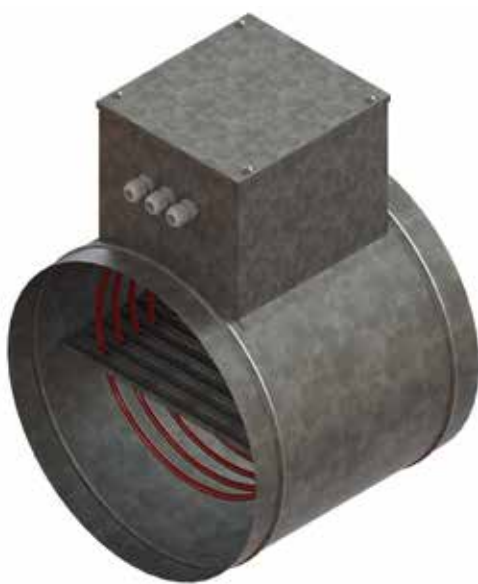


HOME CEILING 35 - 50



Operation	Description	Availability
On / Off	Control panel or external start stop function is available.	Standard
Display	Digital control panel is available.	Standard
Display	Wireless controller is available as option.	Optional
Fan Speed Control	3 steps fan speed control of supply and exhaust fan is available.	Standard
Fan Speed Control	Constant air flow is available with pressure sensors.	Optional
Fan Speed Control	Airflow control based on the air quality sensor is available.	Optional
Bypass Damper Function	Free cooling is available, by controlling the in door and outdoor air conditions.	Standard
Frost Protection Function	Where outdoor temperature is low, this function will be active by receiving information via humidity and temperature sensors.	Standard
ModBus	It controls all functions of unit via PC or BMS board.	Standard
Filter Function	There are 2 alternatives to control filters: 1: It records run time of the unit and when set time expires, control panel gives an alert for filter change. 2: Filter change time can be controlled with pressure switch mechanically. By this way, control panel gives an alert when filter needs to be changed.	Standard
Boost Function	It is used in order to increase fan speed: Alternative 1: Via boost button on the control panel. Alternative 2: Via dry contact or light power input [230V] on PCB board.	Standard
Safety	It automatically stops operating in case of interfering to the unit while it is working.	Standard
Fire Alarm Function	It will be active in case of fire.	Standard
Control and Sensor	Upon request, wireless CO ₂ , differential pressure, temperature and humidity sensors are available.	Optional

ACCESSORIES



Electrical Heater Circular electric heaters have two thermostats as standard.

The first thermostat is set to 70 ° C, the air in the electric heater cuts off the electric current when it reaches 70 ° C, allowing the device to restart automatically when the temperature drops.

The second thermostat used for safety purposes is activated at 110 ° C and cuts off the electric current.

The thermostat must be reset manually from the red button in order for the appliance to operate again.

	Air Flow [m ³ /h]	Diameter [mm]	ΔT=5	ΔT=10	ΔT=15
			kW	kW	kW
HOME 27	246	160	0,5	1	1,5
HOME 35	275	160	0,5	1	1,5
HOME 50	400	160	1	1,5	2
HOME 65	540	200	1	2	3
HOME 85	640	200	1	2	4

NOTES





We make the difference with
180 different types of products.



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İKLİMLENDİRME | HVAC SYSTEMS





UDK
Corner Type
Displacement Flow Unit

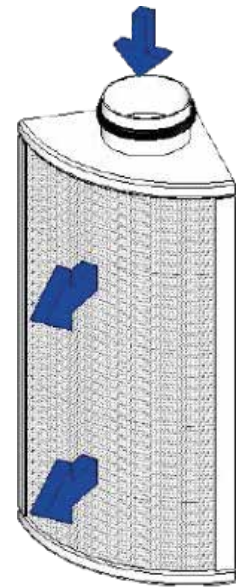
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DOGU HVAC founded in 1999, and ever since has been manufacturing energy and cost efficient products as Air Handling Units, Air Distribution & Management & Movement Systems [HVAC Components] and constantly enhancing to provide an integrated solution for well-being. DOGU HVAC's core business products which are subsumed under 6 major groups as Air Handling Units, Rooftop Units, Heat/Energy Recovery Units, Air Purifiers, Air Distribution & Management Products and Kitchen Ventilation Equipments 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 2 factories, in total area of 32.000 sqm in which 17.500 sqm indoor space that enables DOGU HVAC manufactures 180 various type of products. Additionally, DOGU HVAC has a powerful sales network with 4 sales offices located in İstanbul, Ankara, Antalya and Adana 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 55 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 TSEK, CE and GOST-R quality certifications.



- UDK – Corner Type Displacement Flow Unit provides maximum comfort for residents with low flow rates in large spaces such as hotel lobbies, factory areas, atriums and airports.
- It is recommended to use low speed units in cooling applications between -1°C and -6°C.
- It can be easily mounted on the wall junction corners and feeds air radiating from the corner to the environment where it is located.
- The velocity of the air leaving the unit is low. Thus, the fresh air cools the environment without disturbing the residents.
- Effectively removes the particles released by various pollutants from the space together with the heated air.
- TSE ISO EN 14644, DIN 1946/4, DIN 24194 and DIN 25414 hygiene quality standards.



MATERIAL

UDK – Corner Type Displacement Flow Unit is shaped from galvanized sheet metal. It is coated with electrostatic powder paint with high corrosion resistance. It can also be produced as stainless in line with customer preferences. There is a rubber gasket on the throat of the UDK that prevents air leakage.

DIMENSIONS

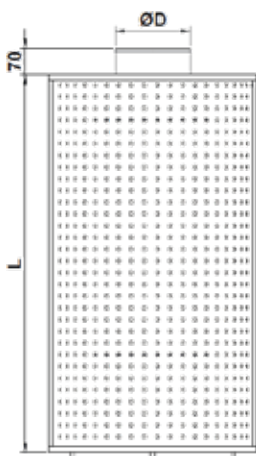
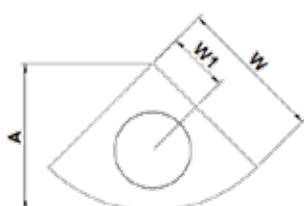


Table 1. Standard Dimensions

UDK	ØD [mm]	W [mm]	W1 [mm]	A [mm]	L [mm]
125	124	280	108	295	Between 200 mm and 1200
160	159	340	139	357	
200	199	390	163	410	
250	249	440	180	460	
315	314	515	214	540	
400	399	620	262	650	
500	499	750	325	790	
630	629	900	375	945	



PERFORMANCE DATA

Table 2. Performance

Debi [m³ / h]	L = 1000mm	ØD [mm]							
		125	160	200	250	315	400	500	630
100	Velocity [m/s]	0,0541	0,0519	0,0495	0,0466	0,0431	0,0389	0,0345	0,0295
	Pressure Drop [Pa]	0,2	0,2	0,2	0,1	0,1	<0,1	<0,1	<0,1
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	<15	<15
	Sound Power Level [dB(A)]	0,47	0,46	0,44	0,42	0,40	0,37	0,34	0,30
150	Velocity [m/s]	0,081	0,078	0,074	0,070	0,065	0,058	0,052	0,044
	Pressure Drop [Pa]	0,4	0,4	0,4	0,3	0,3	0,2	0	0
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	<15	<15
	Sound Power Level [dB(A)]	0,66	0,64	0,62	0,59	0,55	0,51	0,47	0,42
200	Velocity [m/s]	0,11	0,104	0,099	0,093	0,086	0,08	0,07	0,06
	Pressure Drop [Pa]	1	1	1	1	0,5	0,4	0,3	0
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	<15	<15
	Sound Power Level [dB(A)]	0,83	0,81	0,78	0,74	0,70	0,65	0,59	0,53
250	Velocity [m/s]	0,14	0,13	0,12	0,12	0,11	0,10	0,09	0,07
	Pressure Drop [Pa]	1	1	1	1	1	0,6	0,5	0,4
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	<15	<15
	Sound Power Level [dB(A)]	1	0,97	0,94	0,89	0,84	0,78	0,71	0,63
300	Velocity [m/s]	0,16	0,16	0,15	0,14	0,13	0,12	0,10	0,09
	Pressure Drop [Pa]	2	2	1	1	1	0,9	0,7	0,5
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	<15	<15
	Sound Power Level [dB(A)]	1,16	1,13	1,09	1,04	0,98	0,91	0,83	0,74
400	Velocity [m/s]	0,22	0,21	0,20	0,19	0,17	0,16	0,14	0,12
	Pressure Drop [Pa]	3	3	3	2	2	2	1	1
	Sound Power Level [dB(A)]	18	17	16	<15	<15	<15	<15	<15
	Sound Power Level [dB(A)]	1,47	1,43	1,38	1,32	1,24	1,15	1,05	0,93
500	Velocity [m/s]	0,27	0,26	0,25	0,23	0,22	0,19	0,17	0,15
	Pressure Drop [Pa]	5	4	4	4	3	2	2	1
	Sound Power Level [dB(A)]	25	24	22	21	18	15	<15	<15
	Sound Power Level [dB(A)]	1,77	1,71	1,65	1,58	1,49	1,38	1,26	1,12
600	Velocity [m/s]	0,32	0,31	0,30	0,28	0,26	0,23	0,21	0,18
	Pressure Drop [Pa]	7	6	6	5	4	4	3	2
	Sound Power Level [dB(A)]	31	29	28	26	24	21	17	<15
	Sound Power Level [dB(A)]	2,05	1,99	1,92	1,83	1,73	1,60	1,46	0,30
800	Velocity [m/s]	0,43	0,42	0,40	0,37	0,34	0,31	0,28	0,24
	Pressure Drop [Pa]	12	11	10	9	8	6	5	4
	Sound Power Level [dB(A)]	39	38	37	35	32	29	26	21
	Sound Power Level [dB(A)]	2,6	2,5	2,4	2,3	2,2	2	1,9	1,6
1000	Velocity [m/s]	0,54	0,52	0,49	0,47	0,43	0,39	0,35	0,30
	Pressure Drop [Pa]	19	18	16	14	12	10	8	6
	Sound Power Level [dB(A)]	46	45	43	42	39	36	32	28
	Sound Power Level [dB(A)]	3,12	3,02	2,92	2,79	2,63	2,44	2,23	1,98
1200	Velocity [m/s]	0,65	0,62	0,59	0,56	0,52	0,47	0,41	0,35
	Pressure Drop [Pa]	28	25	23	21	18	14	11	8
	Sound Power Level [dB(A)]	52	50	49	47	45	42	38	33
	Sound Power Level [dB(A)]	3,62	3,51	3,39	3,24	3,05	2,83	2,58	2,30
1400	Velocity [m/s]	0,76	0,73	0,69	0,65	0,60	0,54	0,48	0,41
	Pressure Drop [Pa]	38	35	32	28	24	19	15	11
	Sound Power Level [dB(A)]	56	55	54	52	49	46	43	38
	Sound Power Level [dB(A)]	4,11	3,99	3,84	3,67	3,47	3,21	2,93	2,61
1600	Velocity [m/s]	0,87	0,83	0,79	0,75	0,69	0,62	0,55	0,47
	Pressure Drop [Pa]	49	45	41	37	31	25	20	15
	Sound Power Level [dB(A)]	60	59	58	56	54	50	47	42
	Sound Power Level [dB(A)]	4,59	4,45	4,29	4,10	3,87	3,58	3,27	2,91
1800	Velocity [m/s]	0,97	0,93	0,89	0,84	0,78	0,70	0,62	0,53
	Pressure Drop [Pa]	62	57	52	46	40	32	25	19
	Sound Power Level [dB(A)]	64	63	61	59	57	54	50	46
	Sound Power Level [dB(A)]	5,06	4,90	4,72	4,52	4,26	3,94	3,60	3,21
2000	Velocity [m/s]	1,08	1,04	0,99	0,93	0,86	0,78	0,69	0,59
	Pressure Drop [Pa]	77	71	64	57	49	40	31	23
	Sound Power Level [dB(A)]	67	66	64	63	60	57	54	49
	Sound Power Level [dB(A)]	5,51	5,34	5,15	4,92	4,64	4,30	3,93	3,50
2500	Velocity [m/s]	1,35	1,30	1,24	1,16	1,08	0,97	0,86	0,74
	Pressure Drop [Pa]	120	111	100	89	76	62	49	36
	Sound Power Level [dB(A)]	74	73	71	69	67	64	60	54
	Sound Power Level [dB(A)]	6,62	6,41	6,19	5,91	5,58	5,16	4,72	4,20
3000	Velocity [m/s]	1,62	1,56	1,48	1,40	1,29	1,17	1,04	0,89
	Pressure Drop [Pa]	173	159	145	128	110	90	70	52
	Sound Power Level [dB(A)]	80	78	77	75	73	70	66	61
	Sound Power Level [dB(A)]	7,69	7,45	7,18	6,87	6,48	6	5,48	4,87

Table 3. Correction Factors

L [mm]	CORRECTION FACTOR			
	Velocity	Pressure	Sound	Throw
100	10	100	2,7	5,6
200	5	25	2,2	3,3
400	2,5	6,3	1,7	2
500	2	4	1,5	1,7
750	1,3	1,8	1,2	1,2
1000	1	1	1	1
1200	0,8	0,7	0,9	0,9

ORDER CODE

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

UDK. < A > . < B > . < C > . < D >

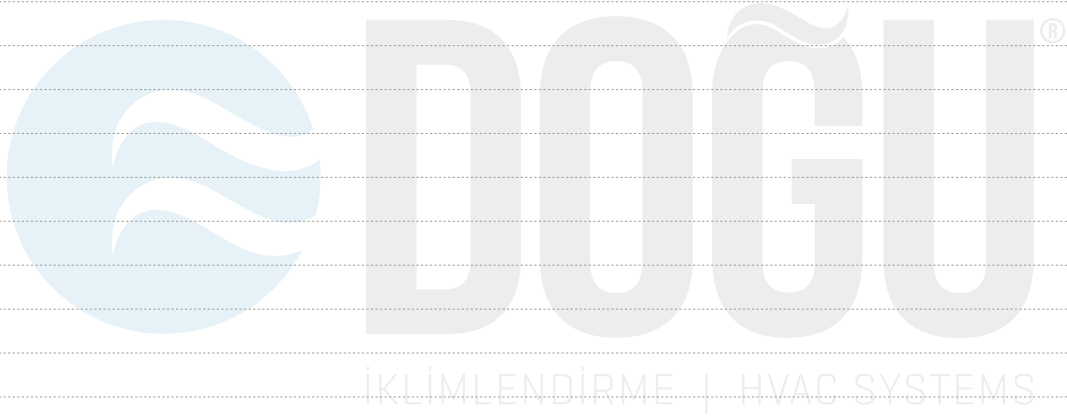
A	Material	
	GAL	Galvanized
	PAS	Stainless Steel
B	Dimension (ØD) [mm]	
		Ø125 - Ø160 - Ø200 - Ø250 - Ø315 - Ø400 - Ø500 - Ø630
C	Length (L) [mm]	
D	0000	Standard Dimensions
	Coating	
	00	Without Color
	S1	Standard Color - RAL 9010
	S2	Standard Color - RAL 9016
	XX	Special Color

Example; UDK.GAL.0500.1200.S1

NOTES



NOTES





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180 different types of products.



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FOUR-POOL-CRF
Pool Dehumidification Unit with
Cross Flow Heat Exchanger

FOUR-POOL-00
Pool Dehumidification Unit
without Plate Heat Exchanger

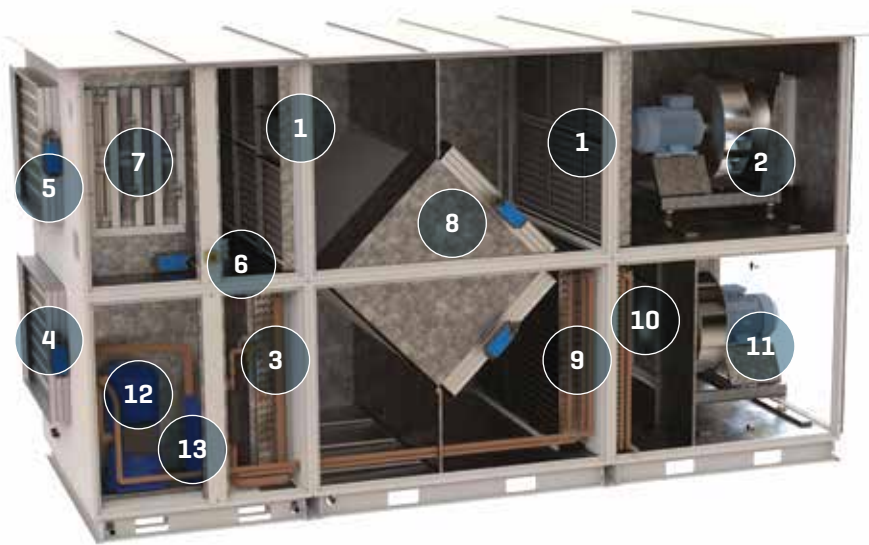
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1. ISO Course Filter
2. Aspirator Fan
3. Evaporator
4. Exhaust Damper
5. Fresh Air Damper
6. Mixing Damper
7. Automation Board
8. Cross Flow Heat Exchanger
9. Condenser
10. Water Heater
11. Ventilator Fan
12. Scroll Compressor
13. Accumulator

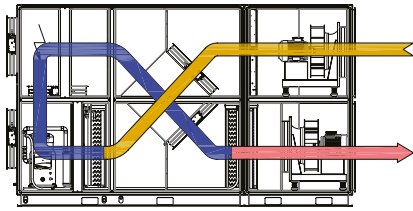


Devices Properties

- ☞ Standard galvanise sheet, optional painted sheet
- ☞ 50 mm rockwall insulation
- ☞ Corrosion-resistant coil;
 - Evaporator; hydrophilic coated fin and electrostatic powder coated
 - Condenser; epoxy coated fin and electrostatic powder coated
 - Water heater; epoxy coated fin and electrostatic powder coated
- ☞ Plug fan with frequency inventor or optional EC plug fan
- ☞ Dehumidification with fresh air mod for energy saving
- ☞ R410A refrigerant
- ☞ Thermostatic expansion valve or optional electrostatic expansion valve

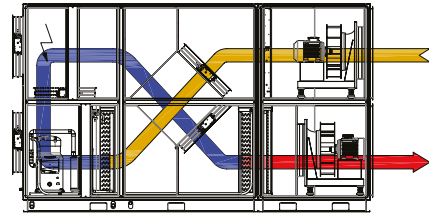
Working Principle

Wet Room Air



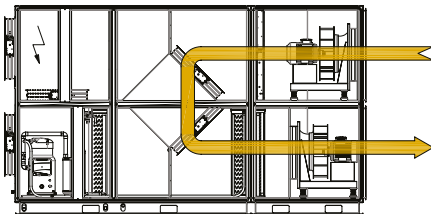
Wet and Warm Room Air

Recirculated Working

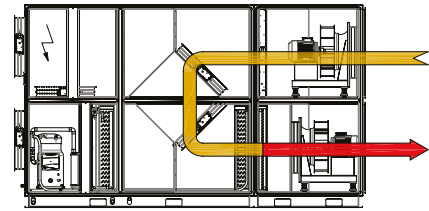


Wet and Cold Room Air

Dry Room Air

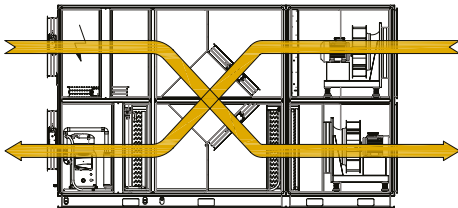


Dry and Warm Room Air

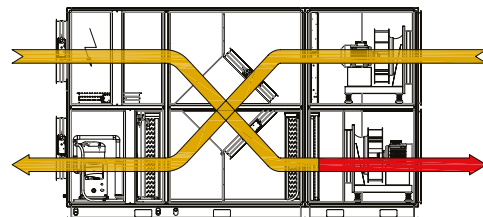


Dry and Cold Room Air

100% Outside Air Working

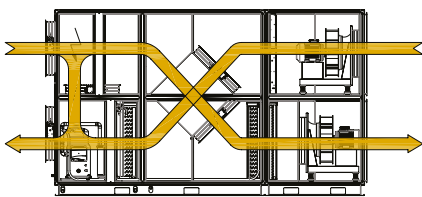


Dry and Warm Outside Air

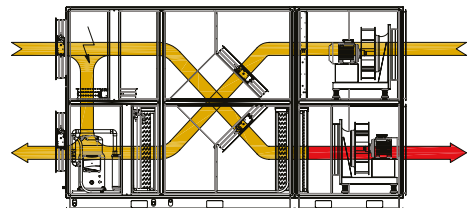


Dry and Cold Outside Air

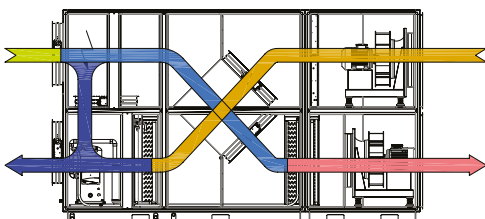
Mixed Air Working



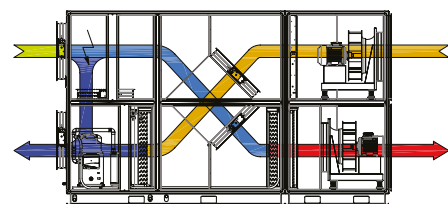
Dry-Warm Room and Outside Air



Dry-Cold Room and Outside Air



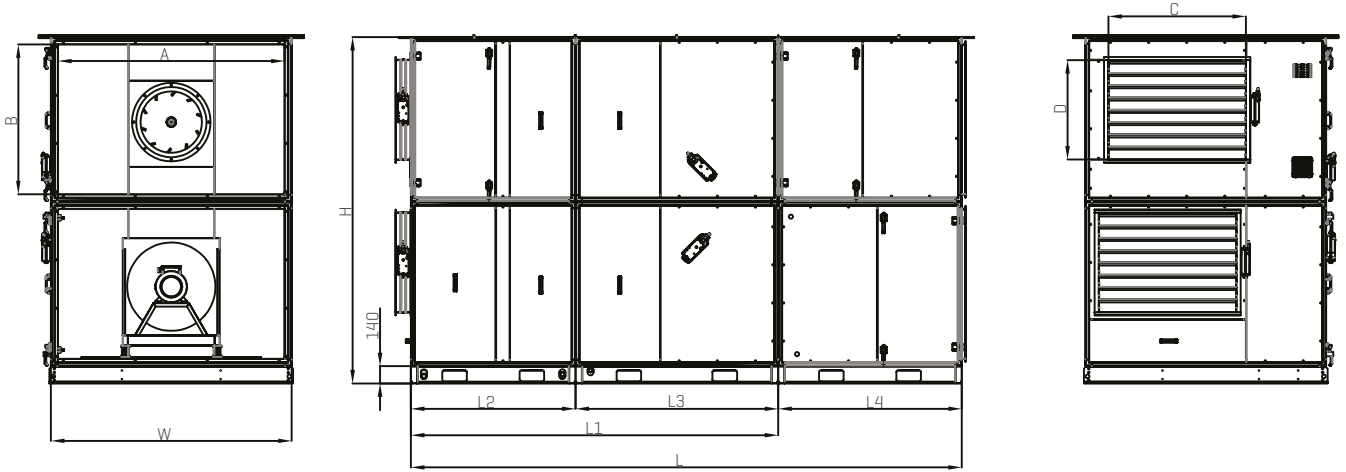
Dry-Warm Room and Outside Air



Wet-Cold Room and Outside Air

Dimensions and Technical Data

1) FOUR POOL CRF - POOL DEHUMIDIFICATION UNIT WITH CROSS FLOW HEAT EXCHANGER



	POOL CRF 030	POOL CRF 045	POOL CRF 060	POOL CRF 080	POOL CRF 100	POOL CRF 120	POOL CRF 160	POOL CRF 180	POOL CRF 200	POOL CRF 250
L	3225	3225	3535	3690	4000	4155	4485	4950	5725	5880
L1	2195	2195	2505	2505	2660	2815	-	-	-	-
L2	-	-	-	-	-	-	1340	1340	1805	1960
L3	-	-	-	-	-	-	1650	1960	2270	2270
L4	1030	1030	1030	1185	1340	1340	1495	1650	1650	1650
W	875	1030	1030	1340	1340	1650	1960	1960	1960	2270
H	1560	1870	2180	2180	2490	2490	2820	2820	3440	3440
A-B	760x600	910x760	910x910	1220x910	1220x1070	1530x1070	1840x1120	1840x1120	1840x1530	2150x1530
C-D	370x370	500x510	500x610	655x610	655x710	810x710	1120x810	1120x810	1120x910	1280x910

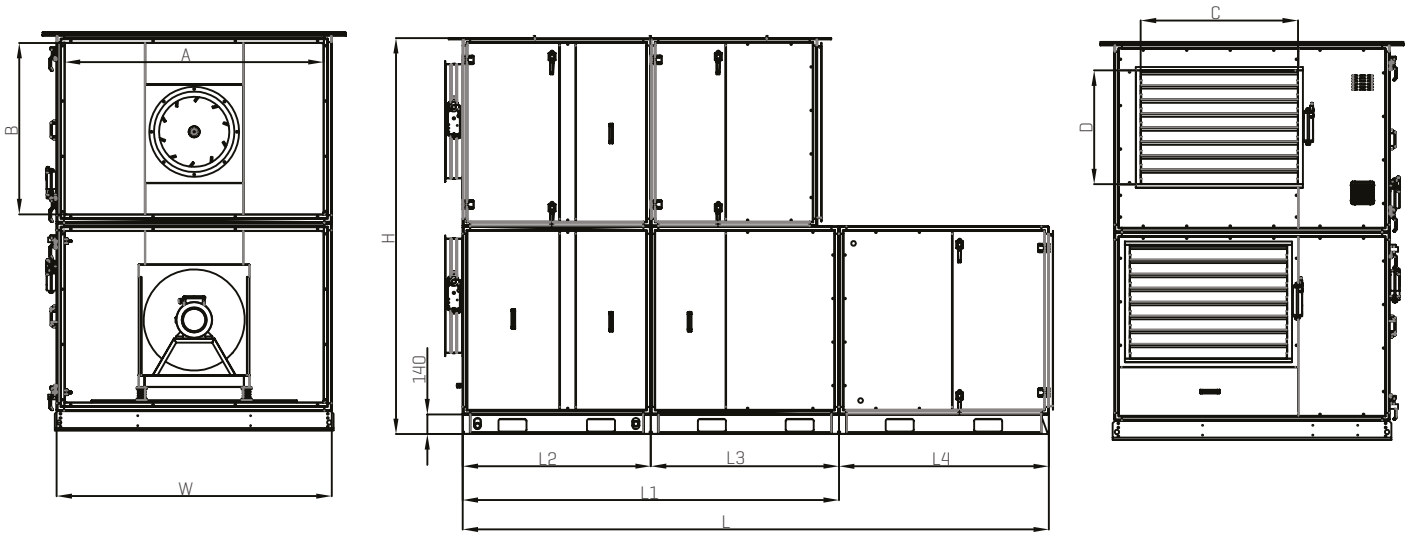
* All dimenions are mm.

Device Model	Unit	POOL-CRF-030	POOL-CRF-045	POOL-CRF-060	POOL-CRF-080	POOL-CRF-100	POOL-CRF-120	POOL-CRF-160	POOL-CRF-180	POOL-CRF-200	POOL-CRF-250
Air-flow	m³/h	3000	4500	6000	8000	10000	12000	16000	18000	20000	25000
External Static Pressure	Pa	450	450	450	450	450	450	450	450	450	450
ASP/VANT Motor Power	kW	1,5/1,5	2,2/2,2	5/5	5,5/5,5	5,5/5,5	5,5/5,5	7,5/7,5	11/11	11/11	15/15
Opsiyonel EC Fan ASP/VANT Motor Gücü	kW	1,14/1,14	1,85/1,85	3,47/3,47	3,51/3,51	4,7/4,7	6,75/6,75	7,7/7,7	12/12	11,6/11,6	11,6/11,6
Dehumidification Capacity according to VDI 2089	kg/h	19.1	28.6	38.2	50.9	63.7	76.3	101.8	114.5	127.2	159.0
Evaporator Capacity	kW	16.46	25.37	33.3	42.11	52	63.2	81.8	96.66	100.93	128.63
Condenser Capacity	kW	20.7	31.4	40.1	51.5	61.9	79.3	100	121.7	123.8	158.5
Water Heater Capacity	kW	27.5	43.8	56	76.7	96	120.2	162.8	175.3	200.2	247.9
Compressor-Circuit Number	kW	1-1	1-1	1-1	1-1	1-1	1-1	1-1	1-1	2-2	2-2
Total Absorbed Power	kW	5.987	9.195	13.094	17.72	19.9	25.2	31.23	38.75	38.02	51.32
Total Absorbed Power with Optional EC Fan	kW	5.267	8.495	10.034	13.74	18.3	27.7	32.63	40.75	39.22	44.52
Voltage/Hertz/Phase		400V / 50Hz / 3 Ph									

* Designed according to VDI 2089.

* Total absorbed power without electrical heater.

2) FOUR POOL 00- POOL DEHUMIDIFICATION UNIT WITHOUT PLATE HEAT EXCHANGER



	POOL 00 030	POOL 00 045	POOL 00 060	POOL 00 080	POOL 00 100	POOL 00 120	POOL 00 160	POOL 00 180	POOL 00 200	POOL 00 250
L	2915	2915	3225	3380	3690	3845	4175	4640	5415	5570
L1	1885	1885	2195	2195	2350	2505	-	-	-	-
L2	-	-	-	-	-	-	1340	1340	1805	1960
L3	-	-	-	-	-	-	1340	1650	1690	1690
L4	1030	1030	1030	1185	1340	1340	1495	1650	1650	1650
W	875	1030	1030	1340	1340	1650	1960	1960	1960	2270
H	1560	1870	2180	2180	2490	2490	2820	2820	3440	3440
A-B	760x600	910x760	910x910	1220x910	1220x1070	1530x1070	1840x1120	1840x1120	1840x1530	2150x1530
C-D	370x370	500x510	500x610	655x610	655x710	810x710	1120x810	1120x810	1280x910	1280x910

* All dimensions are mm.

Device Model	Unit	POOL-00-030	POOL-00-045	POOL-00-060	POOL-00-080	POOL-00-100	POOL-00-120	POOL-00-160	POOL-00-180	POOL-00-200	POOL-00-250
Air-flow	m³/h	3000	4500	6000	8000	10000	12000	16000	18000	20000	25000
External Static Pressure	Pa	450	450	450	450	450	450	450	450	450	450
ASP/VANT Motor Power	kW	1,5/1,5	2,2/2,2	3/3	3/3	1/1	5,5/5,5	7,5/7,5	7,5/7,5	11/11	11/11
Opsiyonel EC Fan ASP/VANT Motor Gücü	kW	1,14/1,14	1,85/1,85	2,73/2,73	3/3	3,51/3,51	4,7/4,7	6,75/6,75	6,75/6,75	11/11	12/12
Dehumidification Capacity according to VDI 2089	kg/h	19.1	28.6	38.2	50.9	63.7	76.3	101.8	114.5	127.2	159.0
Evaporator Capacity	kW	20.1	30.5	38	49	65.1	80.3	102	124.2	133.2	164
Condenser Capacity	kW	25.9	36.6	45.8	59.7	80.1	99.7	126	157.4	165	204
Water Heater Capacity	kW	27.6	43.6	57	77.9	93.4	116.6	158.9	175.3	200.2	249.2
Compressor-Circuit Number	kW	1-1	1-1	1-1	1-1	1-1	1-1	1-1	2-2	2-2	2-2
Total Absorbed Power	kW	6.351	10.043	13.368	16	21.14	25.49	31.79	41.49	41.08	53.08
Total Absorbed Power with Optional EC Fan	kW	5.631	9.343	12.828	16	20.16	23.89	30.29	39.99	41.08	55.08
Voltage/Hertz/Phase		400V / 50Hz / 3 Ph									

* Designed according to VDI 2089.

* Total absorbed power without electrical heater.

ELECTRIC BOARD AND AUTOMATION

Function - Equipment	Using Status
Emergency Stop Button 	STANDARD
Automation Card 	STANDARD
Duct Type Temperature and Humidity Sensor 	STANDARD
3 Way Valve Motor 	STANDARD
Damper Actuator 	STANDARD
Freezing Thermostat 	STANDARD
Communication Unit 	OPTIONAL
Differential Pressure Switch 	STANDARD
Cable Typ Temperature Sensors 	STANDARD
Room Panel 	STANDARD
Constant Flow	STANDARD



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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 standards. 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 standards], 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.



- ☞ DSU - Surface Mounted Adjustable Louvre allows its blades to be easily adjusted with the adjustment lever.
- ☞ It is an outdoor weather louvre preferred for surface mounted wall applications.
- ☞ If specified in the order code, expanded aluminum wire is mounted on the back of the louvre.



MATERIAL

- ☞ Frame and blades made of aluminum 6063 extruded profile

SURFACE COATING

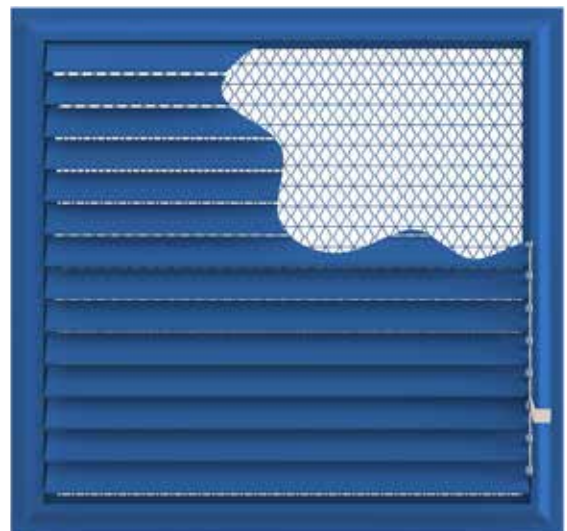
- ☞ RAL 9010 or RAL 9016 electrostatic powder paint as standard
- ☞ Optional
 - Different RAL color codes

MOUNTING OPTIONS

- ☞ Screw System
- ☞ Without Mounting Hole

ACCESSORIES

- ☞ Optional
 - Expanded aluminum wire



PRODUCT SELECTION

STANDARD DIMENSIONS

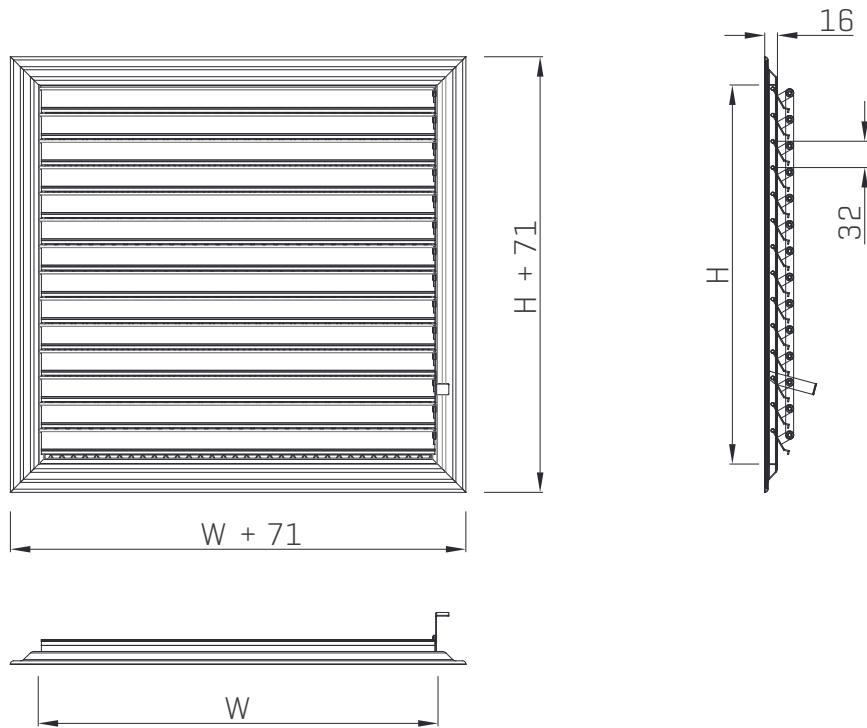
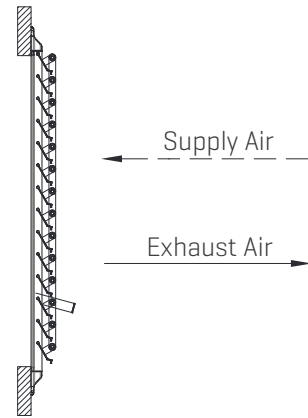


Table 1. Standard Dimensions

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	✓	✓	✓	✓	✓	✓	✓	✓	✓

PERFORMANCE DATA

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



EFFECTIVE AREA TABLE

Table 2. Effective Area

Effective Area [m ²]		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

FRESH AIR DATA

Table 3. Fresh Air Data

Flow Rate (m ³ /h)		Effective Velocity (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 [m ²]	0.0278	0.0139	0.0093								
	Pressure Drop [Pa]	<1	<1	2								
	Sound Power Level [dB(A)]	<15	<15	<15								
100	Effective Area [m ²]	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 [m ²]	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 [m ²]	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 [m ²]	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 [m ²]	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 [m ²]	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 [m ²]	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 [m ²]		0.222	0.148	0.111	0.089	0.074	0.063	0.056	0.049	0.0444	0.037
	Pressure Drop [Pa]		<1	2	4	8	13	22	32	47	64	113
	Sound Power Level [dB(A)]		<15	<15	<15	16	23	29	34	39	43	49
900	Effective Area [m ²]		0.250	0.167	0.125	0.100	0.083	0.071	0.063	0.056	0.500	0.042
	Pressure Drop [Pa]		<1	2	4	8	13	21	32	46	64	112
	Sound Power Level [dB(A)]		<15	<15	<15	17	24	30	35	39	43	50
1000	Effective Area [m ²]		0.278	0.185	0.139	0.111	0.093	0.079	0.069	0.062	0.556	0.046
	Pressure Drop [Pa]		<1	2	4	8	13	21	32	46	64	112
	Sound Power Level [dB(A)]		<15	<15	<15	17	24	30	35	39	43	50
1250	Effective Area [m ²]		0.347	0.231	0.174	0.139	0.116	0.099	0.087	0.077	0.0694	0.58
	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 [m ²]			0.278	0.208	0.167	0.139	0.119	0.104	0.926	0.833	0.069
	Pressure Drop [Pa]			2	4	8	13	21	32	45	63	110
	Sound Power Level [dB(A)]			<15	<15	19	26	32	37	41	45	52
1750	Effective Area [m ²]			0.324	0.243	0.194	0.162	0.139	0.122	0.1080	0.972	0.081
	Pressure Drop [Pa]			2	4	7	13	21	32	45	62	109
	Sound Power Level [dB(A)]			<15	<15	20	26	32	37	42	46	53
2000	Effective Area [m ²]			0.370	0.278	0.222	0.185	0.159	0.139	0.1235	0.1111	0.093
	Pressure Drop [Pa]			2	4	7	13	21	31	45	62	109
	Sound Power Level [dB(A)]			<15	<15	20	27	33	38	42	46	53
2500	Effective Area [m ²]				0.347	0.278	0.231	0.198	0.174	0.1543	0.1389	0.116
	Pressure Drop [Pa]				4	7	13	21	31	45	62	108
	Sound Power Level [dB(A)]				<15	21	28	34	39	43	47	54
3000	Effective Area [m ²]					0.333	0.778	0.2381	0.2083	0.1852	0.1667	0.139
	Pressure Drop [Pa]					7	13	21	31	44	61	107
	Sound Power Level [dB(A)]					22	29	34	39	44	48	55
4000	Effective Area [m ²]						0.370	0.3175	0.2778	0.2469	0.2222	0.185
	Pressure Drop [Pa]						13	20	31	44	61	106
	Sound Power Level [dB(A)]						30	36	41	45	49	56
5000	Effective Area [m ²]							0.3968	0.3472	0.3086	0.2778	0.231
	Pressure Drop [Pa]							20	30	44	60	105
	Sound Power Level [dB(A)]							36	41	46	50	57
7500	Effective Area [m ²]											0.347
	Pressure Drop [Pa]											104
	Sound Power Level [dB(A)]											58

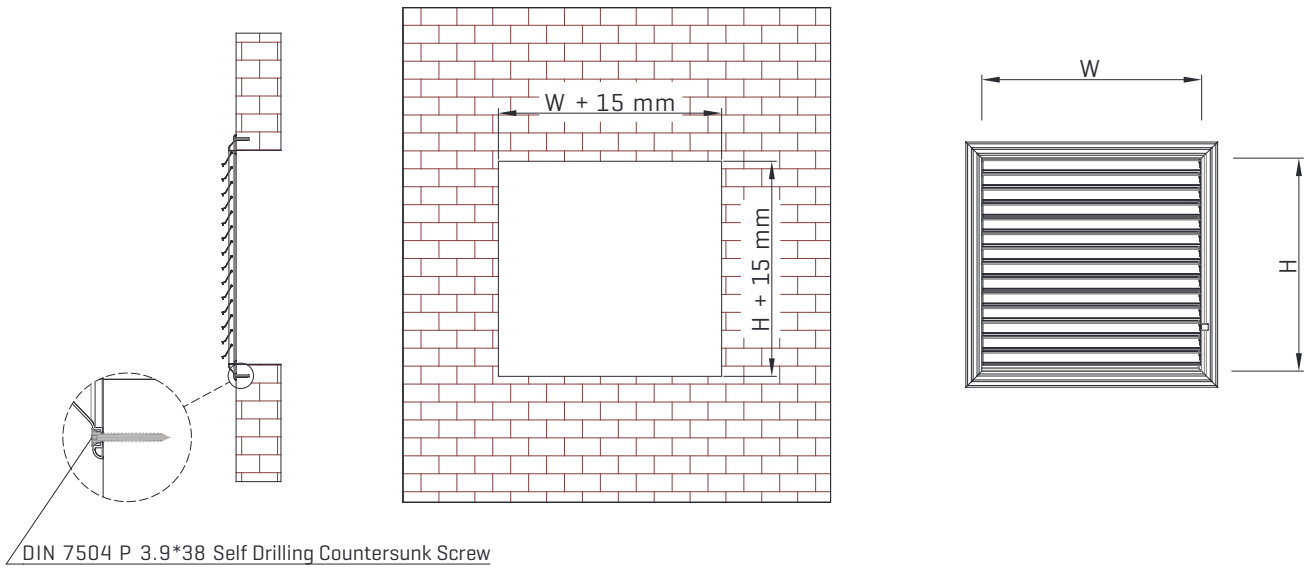
EXHAUST AIR DATA

Table 4. Exhaust Air Data

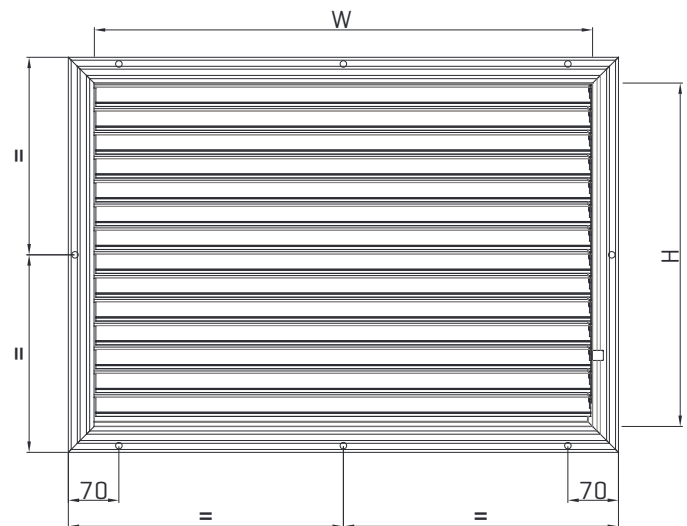
Flow Rate (m ³ /h)		Effective Velocity (m / s)										
		0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	6.0
50	Effective Area [m ²]	0.0278	0.0139	0.0093								
	Pressure Drop [Pa]	<1	3	6								
	Sound Power Level [dB(A)]	<15	<15	<15								
100	Effective Area [m ²]	0.0556	0.278	0.019	0.014	0.011	0.009					
	Pressure Drop [Pa]	<1	3	6	11	17	25					
	Sound Power Level [dB(A)]	<15	<15	<15	<15	16	21					
200	Effective Area [m ²]	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 [m ²]	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 [m ²]	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 [m ²]	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 [m ²]	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 [m ²]	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 [m ²]		0.222	0.148	0.111	0.089	0.074	0.063	0.056	0.049	0.0444	0.037
	Pressure Drop [Pa]		3	6	11	17	25	33	44	55	68	97
	Sound Power Level [dB(A)]		<15	<15	19	25	30	34	37	40	43	48
900	Effective Area [m ²]		0.250	0.167	0.125	0.100	0.083	0.071	0.063	0.056	0.500	0.042
	Pressure Drop [Pa]		3	6	11	17	25	33	44	55	68	97
	Sound Power Level [dB(A)]		<15	<15	20	26	30	34	38	41	44	48
1000	Effective Area [m ²]		0.278	0.185	0.139	0.111	0.093	0.079	0.069	0.062	0.556	0.046
	Pressure Drop [Pa]		3	6	11	17	25	33	44	55	68	97
	Sound Power Level [dB(A)]		<15	<15	20	26	31	35	385	41	44	49
1250	Effective Area [m ²]		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 [m ²]			0.278	0.208	0.167	0.139	0.119	0.104	0.926	0.833	0.069
	Pressure Drop [Pa]			6	11	17	25	33	44	55	68	97
	Sound Power Level [dB(A)]			<15	22	28	33	37	40	43	46	51
1750	Effective Area [m ²]			0.324	0.243	0.194	0.162	0.139	0.122	0.1080	0.972	0.081
	Pressure Drop [Pa]			6	11	17	25	33	44	55	68	97
	Sound Power Level [dB(A)]			15	23	29	33	37	41	44	47	51
2000	Effective Area [m ²]			0.370	0.278	0.222	0.185	0.159	0.139	0.1235	0.1111	0.093
	Pressure Drop [Pa]			6	11	17	25	33	44	55	68	97
	Sound Power Level [dB(A)]			16	23	29	34	38	41	44	47	52
2500	Effective Area [m ²]				0.347	0.278	0.231	0.198	0.174	0.1543	0.1389	0.116
	Pressure Drop [Pa]				11	17	25	33	44	55	68	97
	Sound Power Level [dB(A)]				24	30	35	39	42	45	48	53
3000	Effective Area [m ²]					0.333	0.2778	0.2381	0.2083	0.1852	0.1667	0.139
	Pressure Drop [Pa]					17	25	33	44	55	68	97
	Sound Power Level [dB(A)]					31	36	40	43	46	49	54
4000	Effective Area [m ²]						0.370	0.3175	0.2778	0.2469	0.2222	0.185
	Pressure Drop [Pa]						25	33	44	55	68	97
	Sound Power Level [dB(A)]						37	41	44	47	50	55
5000	Effective Area [m ²]							0.3968	0.3472	0.3086	0.2778	0.231
	Pressure Drop [Pa]							33	44	55	68	97
	Sound Power Level [dB(A)]							42	45	48	51	56
7500	Effective Area [m ²]											0.347
	Pressure Drop [Pa]											97
	Sound Power Level [dB(A)]											58

INSTALLATION

SCREW SYSTEM



The assembly of the product is done with or without screw holes, as shown in the figure.



When the width is 300 mm or less, there is a screw hole in the middle of the horizontally positioned profiles.

When the width is greater than 300 mm, there are 2 screw holes with 70 mm margins on the right and left of the horizontally positioned profiles.

When the height is greater than 600 mm, there is a screw hole in the middle of the vertical position profiles.

W [Width] [mm]	Number of Holes in Horizontal
$W \leq 300$	1
$300 < W \leq 900$	2

H [Height] [mm]	Number of Holes in Vertical
$600 < H \leq 900$	1

SIZE PARAMETERS

In the case of $W \leq 900 - H > 900$, the louvres are divided from the H dimension and produced as modules. During the assembly, a profile should be placed at the module junction as shown in Figure.1.

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

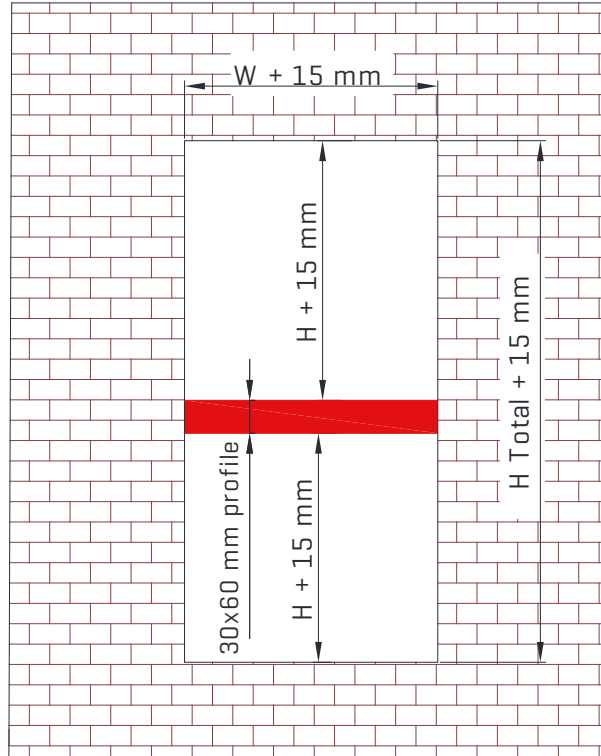
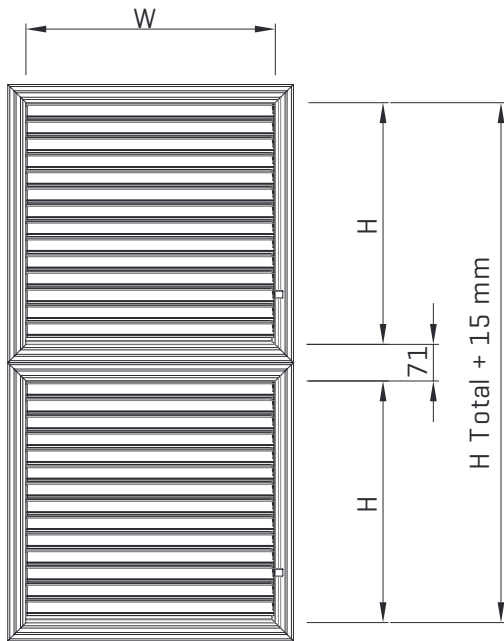


Figure 1

In the case of $W > 900 - H \leq 900$, the louvers are divided into W dimensions and produced as modules. During the assembly, a profile should be placed at the module junction as shown in Figure.2.

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

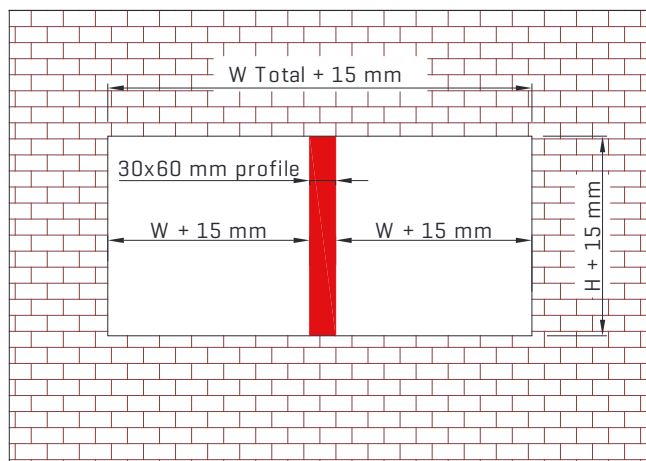
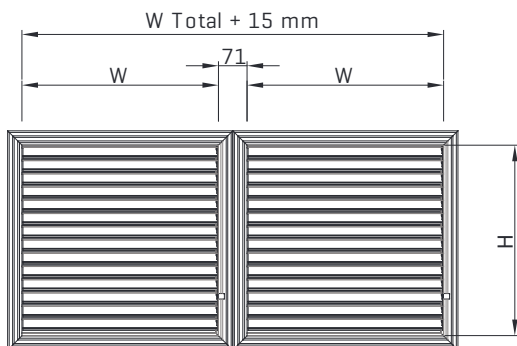


Figure 2

In the case of $W > 900 - H > 900$, the shutters are produced as modules by dividing both W and H dimensions. During the assembly, a profile should be placed at the module junction as shown in Figure.3.

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

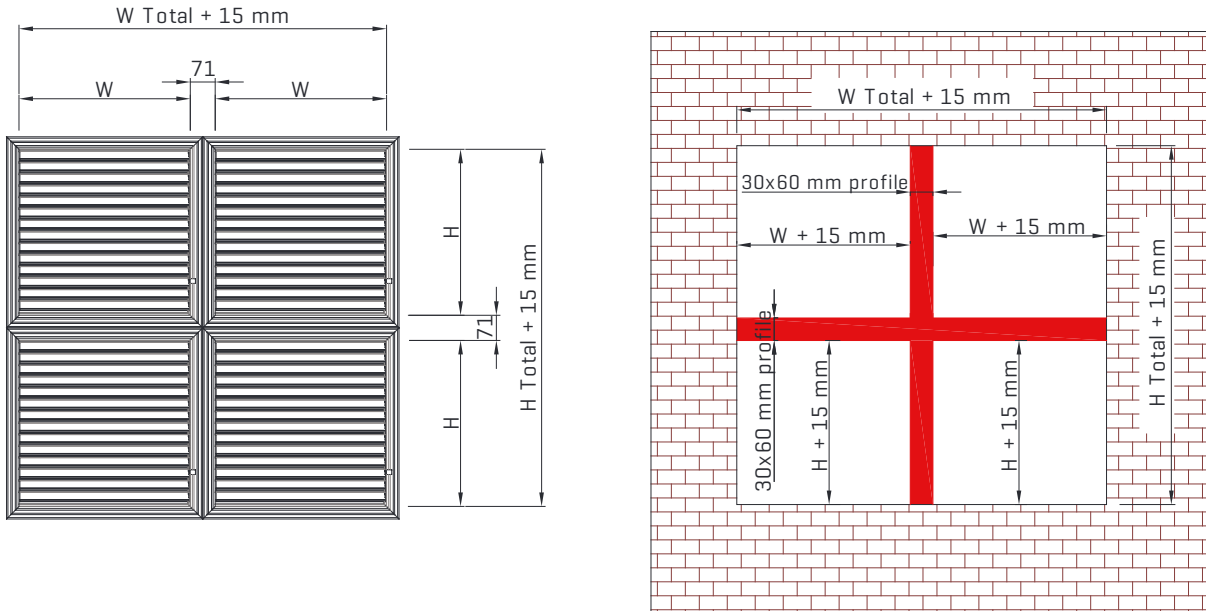


Figure 3

Module and Hole Size Calculation

$W \text{ Total} = W \times n + (n-1) \times 71 \text{ mm}$

W Total (mm): Module louvre throat size

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

n: Number of modules (indicated in the offer)

Example: What is the module size and mounting hole size of the 1600 mm x 1000 mm Surface Mounted Louvre?

$W \text{ Total} = 1600 \text{ mm}$

$1600 \text{ mm} = W \times n + (n-1) \times 71 \text{ mm}$

$n = 2$ (will be indicated in the offer)

It is found as $W = 765 \text{ mm}$.

$H \text{ Total} = 1000 \text{ mm}$

$1000 \text{ mm} = H \times n + (n-1) \times 71 \text{ mm}$

$n = 2$ (will be indicated in the offer)

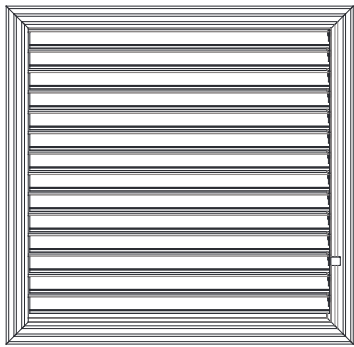
It is found as $H = 465 \text{ mm}$.

1 Module Size = $765 \text{ mm} \times 465 \text{ mm}$ (WxH)

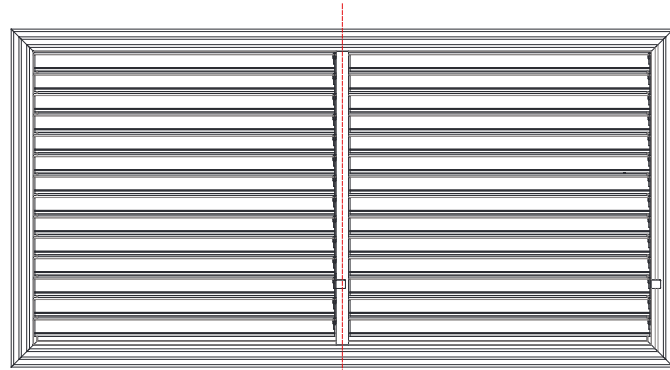
Hole size = $1615 \text{ mm} \times 1015 \text{ mm}$ [(W total+15 mm)x(H total+15 mm)]

SUPPORT COUNT PARAMETER

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

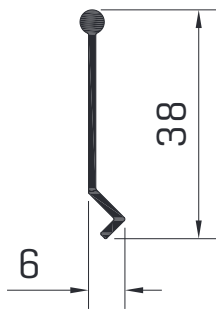


If $W < 600$
Without weft

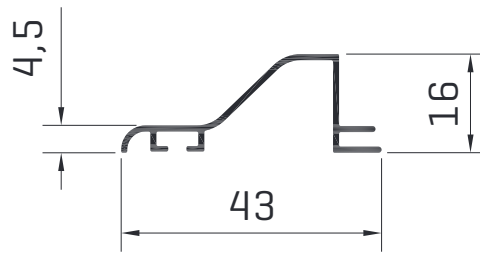


If $600 < W \leq 900$
1 Support

FRAME AND BLADE TYPE



Louvre Blade



Surface Mounted Frame

PRODUCT ORDER CODES

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

DSU.<A>..<C>.<D>.<E>.<F>.<G>

A	Raw Material Type	
	ALM	Aluminum
B	Frame Type	
	21	Surface Mounted Frame
C	Mounting Type	
	VD	Screw System
	MD	Without Mounting Hole
D	Accessories	
	AT	Aluminum Wire
	00	Without Accessories
E	Horizontal Size [W] [mm]	
	0000	You can look at standard sizes.
F	Vertical Size [H] [mm]	
	0000	You can look at standard sizes.
G	Paint	
	00	Unpainted
	S1	Standard Painted - RAL 9010
	S2	Standard Painted - RAL 9016
	XX	Special Painted

Sample Coding; DSU.ALM.21.VD.AT.0750.0550.S1



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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.



- ☞ DGK – Door Transfer Grille is a transfer grille with wings that offer low pressure loss with its aesthetic appearance.
- ☞ It has a double-sided structure.
- ☞ It is used in situations where air distribution is desired with pressure difference between spaces. Used for positioning on doors, since it consists of V-shaped wing group, it prevents visible light passage.



MATERIAL

- ☞ Frame and blades made of aluminum 6063 extruded profile

SURFACE COATING

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

MOUNTING OPTIONS

- ☞ Screw System
- ☞ Without Mounting Hole

STANDARD DIMENSIONS

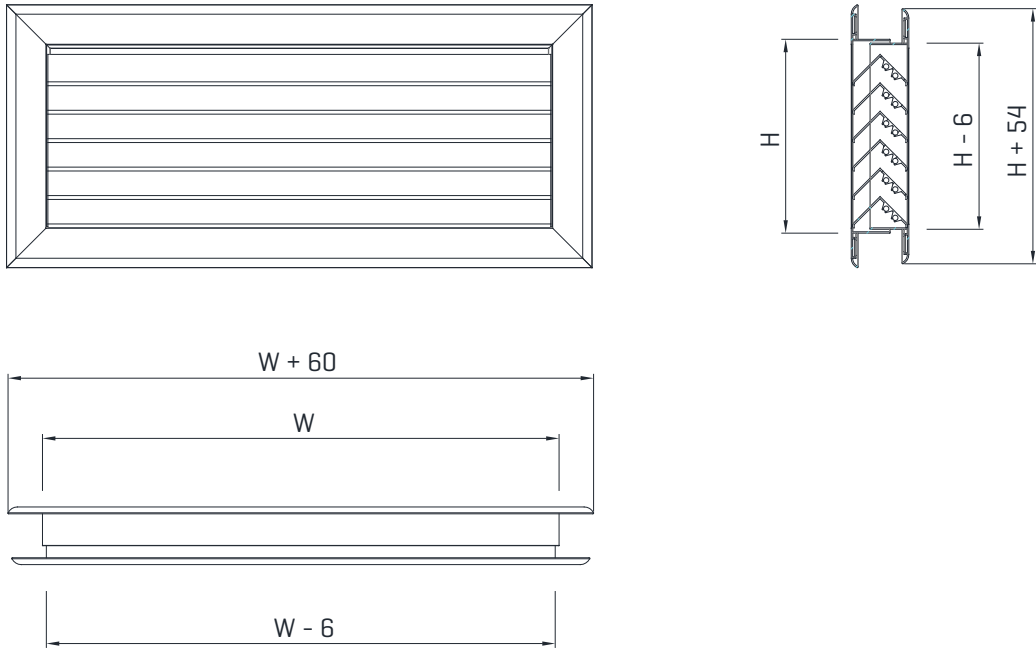


Table 1. Standard Sizes

W (mm) (Width)	200 - 300 - 400 - 500 - 600 - 700 - 800 - 900 - 1000 - 1100 - 1200
H (mm) (Height)	100 - 200 - 300 - 400 - 500 - 600 - 700 - 800 - 900

PERFORMANCE DATA

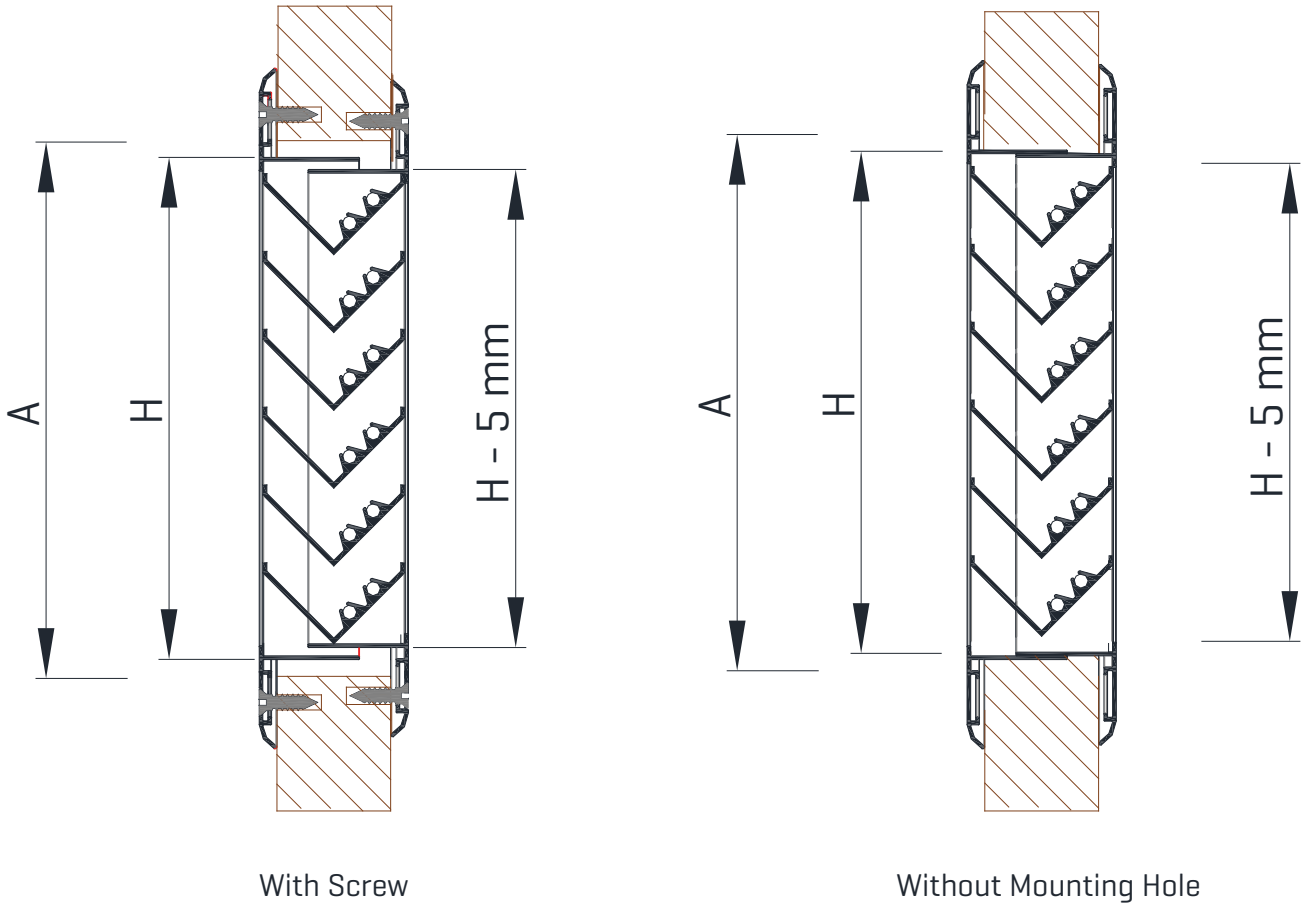
Table 2. Effective Areas

Effective Areas (m ²)		H (mm)												
		100	150	200	250	300	350	400	450	500	600	700	800	900
W (mm)	W x H													
	200	0.020	0.029	0.039	0.048	0.056	0.065	0.074	0.083	0.091	0.108	0.125	0.142	0.158
	250	0.025	0.036	0.048	0.059	0.070	0.080	0.091	0.102	0.112	0.133	0.154	0.175	0.195
	300	0.029	0.043	0.056	0.070	0.083	0.095	0.108	0.121	0.133	0.158	0.183	0.207	0.231
	350	0.034	0.050	0.065	0.080	0.095	0.110	0.125	0.140	0.154	0.183	0.211	0.240	0.267
	400	0.039	0.056	0.074	0.091	0.108	0.125	0.142	0.158	0.175	0.207	0.240	0.271	0.303
	450	0.043	0.063	0.083	0.102	0.121	0.140	0.158	0.177	0.195	0.231	0.267	0.303	0.339
	500	0.048	0.070	0.091	0.112	0.133	0.154	0.175	0.195	0.215	0.256	0.295	0.335	0.374
	550	0.052	0.076	0.100	0.123	0.146	0.169	0.191	0.213	0.236	0.279	0.323	0.366	0.409
	600	0.056	0.083	0.108	0.133	0.158	0.183	0.207	0.231	0.256	0.303	0.350	0.397	0.443
	700	0.065	0.095	0.125	0.154	0.183	0.211	0.240	0.267	0.295	0.350	0.405	0.459	0.512
	800	0.074	0.108	0.142	0.175	0.207	0.240	0.271	0.303	0.335	0.397	0.459	0.520	0.581
	900	0.083	0.121	0.158	0.195	0.231	0.267	0.303	0.339	0.374	0.443	0.512	0.581	0.649
1000	0.091	0.133	0.175	0.215	0.256	0.295	0.335	0.374	0.413	0.490	0.566	0.641	0.716	
1200	0.108	0.158	0.207	0.256	0.303	0.350	0.397	0.443	0.490	0.581	0.671	0.761	0.850	

Table 3. Performance Data

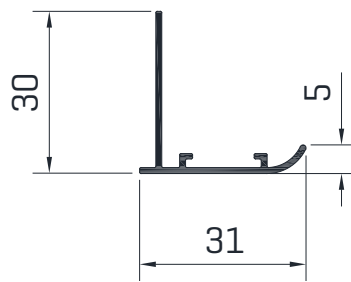
Flow Rate [m³/h]		Effective Speed [m/s]					
		0.5	1.0	1.5	2.0	2.5	3.0
50	Effective Area [m²]	0.0278					
	Pressure Drop [Pa]	5					
	Sound Pressure Level [dB(A)]	<15					
100	Effective Area [m²]	0.0556	0.0278				
	Pressure Drop [Pa]	5	18				
	Sound Pressure Level [dB(A)]	<15	<15				
200	Effective Area [m²]	0.111	0.056	0.037	0.028	0.022	
	Pressure Drop [Pa]	4	18	40	71	112	
	Sound Pressure Level [dB(A)]	<15	16	26	34	40	
300	Effective Area [m²]	0.167	0.083	0.056	0.042	0.033	0.028
	Pressure Drop [Pa]	4	17	39	70	110	158
	Sound Pressure Level [dB(A)]	<15	17	28	35	41	46
400	Effective Area [m²]	0.222	0.111	0.074	0.056	0.044	0.037
	Pressure Drop [Pa]	4	17	39	69	108	156
	Sound Pressure Level [dB(A)]	<15	18	29	36	42	47
500	Effective Area [m²]	0.278	0.139	0.093	0.069	0.056	0.046
	Pressure Drop [Pa]	4	17	38	68	107	154
	Sound Pressure Level [dB(A)]	<15	19	30	37	43	48
600	Effective Area [m²]	0.333	0.167	0.111	0.083	0.067	0.056
	Pressure Drop [Pa]	4	17	38	67	106	153
	Sound Pressure Level [dB(A)]	<15	20	30	38	44	49
700	Effective Area [m²]	0.389	0.194	0.130	0.097	0.078	0.065
	Pressure Drop [Pa]	4	17	37	67	105	151
	Sound Pressure Level [dB(A)]	<15	20	31	38	44	49
800	Effective Area [m²]	0.444	0.222	0.148	0.111	0.089	0.074
	Pressure Drop [Pa]	4	16	37	66	104	150
	Sound Pressure Level [dB(A)]	<15	21	31	39	45	50
900	Effective Area [m²]	0.500	0.250	0.167	0.125	0.100	0.083
	Pressure Drop [Pa]	4	16	37	66	103	149
	Sound Pressure Level [dB(A)]	<15	21	32	39	45	50
1000	Effective Area [m²]	0.556	0.278	0.185	0.139	0.111	0.093
	Pressure Drop [Pa]	4	16	37	65	103	148
	Sound Pressure Level [dB(A)]	<15	22	32	40	46	50
1250	Effective Area [m²]	0.694	0.347	0.231	0.174	0.139	0.116
	Pressure Drop [Pa]	4	16	36	65	101	147
	Sound Pressure Level [dB(A)]	<15	22	33	41	46	51
1500	Effective Area [m²]	0.833	0.417	0.278	0.208	0.167	0.139
	Pressure Drop [Pa]	4	16	36	64	100	145
	Sound Pressure Level [dB(A)]	<15	23	34	41	47	52
1750	Effective Area [m²]		0.486	0.324	0.243	0.194	0.162
	Pressure Drop [Pa]		16	36	64	100	144
	Sound Pressure Level [dB(A)]		24	34	42	48	53
2000	Effective Area [m²]		0.556	0.370	0.278	0.222	0.185
	Pressure Drop [Pa]		16	35	63	99	143
	Sound Pressure Level [dB(A)]		24	35	42	48	53
2500	Effective Area [m²]		0.694	0.463	0.347	0.278	0.231
	Pressure Drop [Pa]		15	35	62	98	141
	Sound Pressure Level [dB(A)]		25	36	43	49	54
3000	Effective Area [m²]		0.833	0.556	0.417	0.333	0.278
	Pressure Drop [Pa]		15	35	62	97	140
	Sound Pressure Level [dB(A)]		26	36	44	50	55
4000	Effective Area [m²]			0.741	0.556	0.444	0.370
	Pressure Drop [Pa]			34	61	95	138
	Sound Pressure Level [dB(A)]			37	45	51	56
5000	Effective Area [m²]				0.694	0.556	0.4630
	Pressure Drop [Pa]				60	94	136
	Sound Pressure Level [dB(A)]				46	52	56

INSTALLATION



A: Installation Opening $(W+10 \text{ mm}) \times (H+10 \text{ mm})$

FRAME TYPE

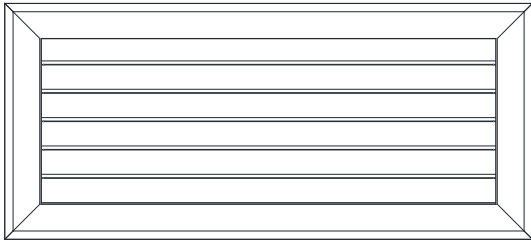


31 mm Frame

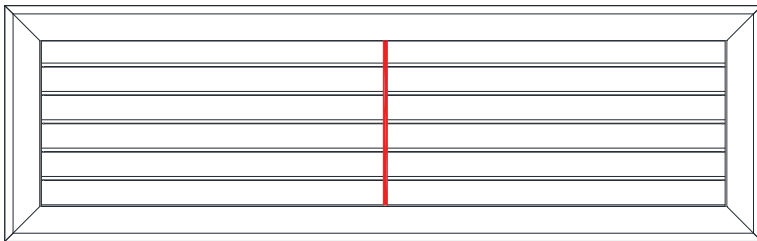
SIZE PARAMETERS

It has size limits of 200x100 mm and 1200x900 mm. Support is applied when the product width is longer than 600 mm.

If $0 < W \leq 600$, without support



If $600 < W \leq 1200$, with 1 support



PRODUCT SELECTION

Example: The air flow to be transferred from the door at the site has been determined as 500 m³/h. Pressure loss below 20 Pa is requested. 1 door passage grille will be used. Make your product selection.

Solution: For 500 m³/h air flow, effective areas corresponding to the appropriate pressure loss, throw distance and flow rate values are selected from the performance data table [Table 3].

For example, in an effective area of 0.139 m², the pressure loss is 17 Pa and the sound pressure is 19 dB(A). The appropriate grille size is selected from the effective area table [Table 2] as 800 mm x 200 mm, corresponding to the value of 0.139 m².

PRODUCT ORDER CODES

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

DGK.<A>..<C>.<D>.<E>.<F>

A	Raw Material Type	
	ALM	Aluminum
	EAL	Eloxal Aluminum
B	Frame Type	
	05	31 mm Frame
C	Type of Mounting	
	VD	Screw System
	MD	Without Mounting Hole
D	Width (W) [mm]	
	0000	You can look at the standard sizes
E	Height (H) [mm]	
	0000	You can look at the standard sizes
F	Paint	
	00	Unpainted
	S1	Standard Painted - RAL 9010
	S2	Standard Painted - RAL 9016
	XX	Special Painted

Sample Coding; DGK.ALM.05.VD.1000.0900.S1



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FOUR
SEASONS®

 **DOĞU**
İKLİMLENDİRME | HVAC SYSTEMS





FOUR-AAP / FOUR-RAP
Unit Heater & Unit Cooler

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, Rooftop 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 5 major groups as Air Handling Units, Rooftop Units, Heat/Energy Recovery Units, Air Distribution & Management Products and Kitchen Ventilation Equipment are all produced under the compliance with EU standards. Particularly AHU, Rooftop 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 2 factories, in total area of 32.500 sqm in which 18.000 sqm indoor space that enables DOGU HVAC manufactures 180 various type of products. Additionally, DOGU HVAC has a powerful sales network with 4 sales offices located in İstanbul, Ankara, Antalya and Adana 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 55 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 standards], CE, TSEK, GOST-R certifications; Fire Dampers have EN 1366-2 and EN EN 15650:2010 CE certifications; Smoke Control Dampers have EN 1366-10 and 12101-8 CE certifications; Kitchen Ventilation Products have TSEK, CE and GOST-R quality certifications.



Devices can be used in large volumes where need heating needs such as factories, workshops, garages, hangars, gyms. As source, hot water, vapor and electrical energy with different regime are used. Four AAP series with axial fans is more convenient to use in place where the devices will work in room height up to 4 m, in case of room height is higher than 4m, Four RAP series with radial fans is more convenient.

TECHNICAL SPECIFICATIONS

CASE

Unit heaters of Four AAP and Four RAP series are formed by combining specially designed covers made of galvanized sheet. Internal and external surfaces are painted with electrostatic powder paint.



RADIAL AND AXIAL FANS

In Four RAP series, sparsely bladed fans are used. Due to the wing structure of the fans, the drawn air is compressed better between the blades. Therefore, its forward launch capacity is high. Due to this working style, blowing distance is high. The fans, which work silent and safe, work with 230V 50Hz mains electricity. In Four AAP series, axial type fans, which have silent operation feature, are used. It provides the safety with protection grill. It works with 230V 50Hz main electricity.



HEATING COIL

Copper tube aluminum fin heater coils are used in Four AAP and Four RAP series. In the use of 90/70 °C hot water and 3 bar steam, standard copper pipe and thick flesh copper pipe up to 6 bar steam are used. In case of using 10 bar steam, steel pipe, steel finned serpentines are used. As a standard, input and output connection is bushed. For vaporous systems, it is manufactured flanged.



Four AAP series unit heaters with axial fan are convenient for connection from top or bottom with bracket. The brackets are optional. In Four RAP series unit heaters with radial fan, there are 4 connection points.

EX-PROOF FAN OPTIONS



FOUR RAP SERIES HOT WATER CAPACITY TABLE

WITH RADIAL FAN

Models	Air Flow (m³/h)	Input Air (°C)	Hot Water Capacity (kcal/h)						
			B1	S	S	S	S	S	
			110/80°C	90/70°C	80/60°C	70/50°C	60/40°C	50/30°C	45/40°C
Four RAP 6	1050	18	7600	6200	4800	3100	1700	950	2500
		15	8000	6600	5200	3600	1900	1200	2950
		10	8700	7300	5900	4300	2300	1500	3550
		5	9400	8000	6500	5000	3200	1900	4200
Four RAP 10	1400	18	11900	10200	8100	5900	3400	1600	4100
		15	12500	10800	8700	6500	4100	1900	4700
		10	13500	11800	9800	7600	5300	2400	5800
		5	14500	12800	10800	8600	6300	3400	6700
Four RAP 15	1800	18	18800	15300	12400	9400	6300	2200	6100
		15	19800	16200	13300	10300	7200	3300	6900
		10	21300	17700	14800	11800	8700	5300	8400
		5	22900	19200	16300	13300	10200	6900	9800
Four RAP 19	2400	18	24000	20100	16100	12200	8000	2700	8000
		15	25200	21200	17200	13300	9100	3500	9100
		10	27200	23200	19300	15300	11200	6500	1100
		5	29200	25200	21200	17300	13100	8700	12900
Four RAP 24	3400	18	29600	24200	19500	14400	10200	3500	9600
		15	31000	25500	20900	16300	11500	6200	10900
		10	33400	27900	23100	18600	13800	8800	13300
		5	35800	30200	25500	20900	16200	11200	15400
Four RAP 28	3750	18	34900	28200	23000	17800	12400	6400	11300
		15	36500	29900	24700	19400	14000	8200	12800
		10	39300	32600	27400	22000	16700	11000	15300
		5	42000	35300	30000	24700	19400	13800	18000
Four RAP 38	5200	18	47100	38100	31300	24400	17300	9800	15200
		15	49300	40300	33400	26500	19400	12000	17200
		10	53000	43900	37000	30000	23000	15600	20700
		5	56700	47500	40600	33600	26500	19200	24100
Four RAP 50	5400	18	61400	52000	42600	32900	22900	10900	20600
		15	64300	55000	45500	35800	25800	14700	23400
		10	69200	60100	50400	40700	30800	20200	28200
		5	74300	65300	55700	45800	35700	25300	33100

FOUR AAP SERIES HOT WATER CAPACITY TABLE

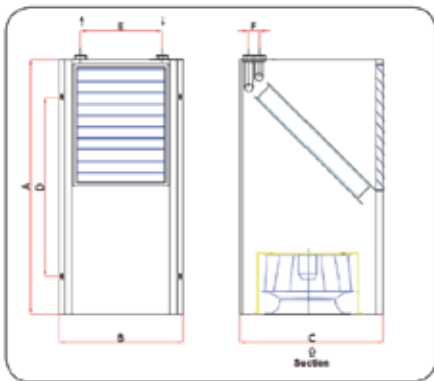
WITH AXIAL FAN

Models	Air Flow (m ³ /h)	Input Air (°C)	Hot Water Capacity (kcal/h)						
			B1	S	S	S	S	S	S
			110/80°C	90/70°C	80/60°C	70/50°C	60/40°C	50/30°C	45/40°C
Four AAP 6	1000	18	7900	7100	5900	4700	3500	2200	2800
		15	8300	7500	6400	5000	3800	2600	3200
		10	9000	8100	6900	5700	4500	3200	3800
		5	9600	8800	7500	6300	5100	3900	4400
Four AAP 9	1200	18	11300	9600	7900	6300	4700	3000	3800
		15	12000	10000	8400	6800	5200	3600	4300
		10	12900	11000	9300	7700	6000	4400	5100
		5	13900	12000	10200	8500	6900	5200	5900
Four AAP 12	1250	18	15000	12200	9800	7500	4900	2100	4900
		15	15700	12900	10500	8200	5600	2500	5500
		10	17000	14000	11700	9400	6800	3900	6700
		5	18200	15300	12900	10600	8100	5300	7900
Four AAP 16	2100	18	20200	16900	13500	10000	6300	2500	6700
		15	21200	17800	14500	11000	7300	3000	7700
		10	23000	19500	16100	12800	9100	4300	9400
		5	24700	21200	17900	14400	10800	6700	11000
Four AAP 20	2300	18	25100	21200	17700	14100	10500	6900	8400
		15	26300	22400	18800	15200	11600	8000	9400
		10	28400	24300	20700	17100	13500	9900	11300
		5	30400	26300	22600	19000	15400	11700	13100
Four AAP 25	2800	18	31300	25300	20600	15900	11000	5200	10000
		15	32700	26700	22000	17300	12400	7100	11400
		10	35200	29200	24500	19700	14900	9700	13700
		5	37800	31700	26900	22200	17300	12200	16100
Four AAP 30	3100	18	36600	30100	24700	19200	13600	7400	11900
		15	38600	31700	26300	20800	15200	9300	13500
		10	51200	34600	29200	23700	18100	12200	16300
		5	44200	37500	32000	26500	20900	15100	18900
Four AAP 40	4100	18	50500	40900	33300	25600	17500	6300	16200
		15	52900	43200	35600	27900	19900	10300	18500
		10	57000	47200	39500	31800	23800	15000	22200
		5	61200	51300	43500	35800	27800	19300	26000

FOUR RAP / AAP SERIES CUPPER PIPE STEAM HEATER DIMENSION TABLE

Models	Power Current [W/A]	Supply V/Hz	Pressure Drop in Water Regime kPa	Dimensions [mm]						Input/Output Diameter	Sound Level dB(A)	Weight kg
				A Height	B Length	C Width	D	E	F			
Four RAP 6	150/0,65	230/50	1,1	700	395	400	450	224	26	1/2"	70	19
Four RAP 10	200/0,9	230/50	2,9	800	460	430	500	290	26	1/2"	70	23
Four RAP 15	250/1,1	230/50	7,4	950	460	550	650	290	35	3/4"	79	29
Four RAP 19	210/1	230/50	9,9	1100	520	550	800	341	35	3/4"	60	36
Four RAP 24	500/1,8	230/50	7,2	1100	585	650	800	318	45	1"	66	43
Four RAP 28	500/1,8	230/50	11	1195	585	665	950	383	45	1"	66	47
Four RAP 38	800/3,7	230/50	22	1195	650	725	950	432	55	1 1/4"	-	56
Four RAP 50	800/3,7	230/50	10,3	1195	650	725	950	432	55	1 1/4"	-	60
Four AAP 6	90/0,38	230/50	1,9	420	460	380	280	222	26	1/2"	55	13
Four AAP 9	90/0,38	230/50	2,8	420	460	380	280	353	26	1/2"	55	14
Four AAP 12	90/0,38	230/50	5,2	500	470	380	280	416	35	3/4"	55	17
Four AAP 16	138/0,68	230/50	7,3	500	510	385	280	414	35	3/4"	62	19
Four AAP 20	138/0,68	230/50	12,4	620	540	385	280	536	43	3/4"	62	22
Four AAP 25	180/0,81	230/50	9,4	620	610	395	280	536	45	1"	67	26
Four AAP 30	180/0,81	230/50	14,1	690	655	395	280	583	45	1"	67	29
Four AAP 40	250/1,15	230/50	7,1	620	725	395	280	496	45	1 1/4"	70	33

Four RAP with Radial Fan



Four RAP

6

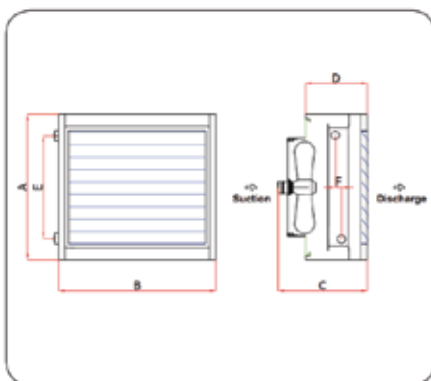
S

- **S:** Copper pipe aluminum fin, hot watery
- **B1:** Copper pipe aluminum fin, superheating water and 3 bar
- **B2:** Copper pipe aluminum fin, 5 and 6 bar vaporous
- **C:** Steel pipe-steel fin, vaporous

→ Model

→ Unit Heater with Radial Fan

Four AAP with Axial Fan



Four AAP

6

S

- **S:** Copper pipe aluminum fin, hot watery
- **B1:** Copper pipe aluminum fin, superheating water and 3 bar
- **B2:** Copper pipe aluminum fin, 5 and 6 bar vaporous
- **C:** Steel pipe-steel fin, vaporous

→ Model

→ Unit Heater with Axial Fan

FOUR RAP SERIES STEAM CAPACITY TABLE

WITH RADIAL FAN

Models	Air Flow (m³/h)	Input Air (°C)	Vapour Capacity kcal/h							
			B1	B2	B2	BC	BC	BC	BC	BC
			3 Bar	5 Bar	6 Bar	3 Bar	5 Bar	6 Bar	8 Bar	10 Bar
Four RAP 6	1050	18	7500	10400	10900	11700	13200	13900	14800	15500
		15	7700	10600	11200	12000	13500	14200	15100	15900
		10	8000	11000	11600	12400	14000	14700	15600	16400
		5	8300	11500	12000	13100	14800	15500	16500	17300
Four RAP 10	1400	18	10800	12600	13200	13800	15600	16300	17400	18300
		15	11100	12900	13500	14100	16000	16700	17800	18700
		10	11600	13400	14000	14600	16500	17300	18400	19300
		5	12100	13900	14500	15400	17400	18300	19400	20400
Four RAP 15	1800	18	15700	17200	18100	19900	22500	23600	25100	26400
		15	16100	17600	18500	20400	23000	24200	25700	27000
		10	16800	18300	19200	21100	23800	25000	26600	27900
		5	17500	19000	19900	22200	25100	26400	28100	29500
Four RAP 19	2400	18	19500	21100	22200	23000	26000	27300	29000	30500
		15	20000	21600	22700	23600	26600	28000	29800	31200
		10	20900	22500	23600	24400	27500	28900	30800	32300
		5	21800	23300	24400	25700	29100	30500	32500	34100
Four RAP 24	3400	18	25100	29900	31400	26500	30000	31500	33500	35200
		15	25700	30600	32100	27200	30700	32300	34300	36000
		10	26800	31700	33300	28100	31800	33400	35500	37300
		5	27900	32900	34400	29700	33500	35200	37400	39300
Four RAP 28	3750	18	29800	38100	40000	37100	42000	44000	46900	49200
		15	30600	39000	40900	38100	43000	45100	48000	50400
		10	31900	40400	42400	39300	44500	46700	49700	52200
		5	33200	41900	43900	41500	46900	49300	52400	55000
Four RAP 38	5200	18	39000	49600	52100	46100	52100	54700	58200	61100
		15	40000	50700	53300	47300	53400	56100	59700	62600
		10	41700	52600	55200	48900	55200	58000	61700	64800
		5	43400	54600	57100	51600	58300	61200	65100	68300
Four RAP 50	5400	18	49100	53000	55800	51500	58200	61100	65000	68300
		15	50400	54300	57100	52800	59600	62600	66600	70000
		10	52600	56400	59200	54600	61700	64800	68900	72300
		5	54800	58600	61300	57600	65100	68300	72700	76300

NOTE:

B1 with copper pipe is enduring up to 3 bars.
 B2 with copper pipe is enduring up to 6 bars.
 BC with steel pipe is enduring up to 10 bars.

FOUR RAP SERIES STEAM CAPACITY TABLE

WITH AXIAL FAN

Models	Air Flow (m³/h)	Input Air (°C)	Vapour Capacity kcal/h							
			B1	B2	B2	BC	BC	BC	BC	BC
			3 Bar	5 Bar	6 Bar	3 Bar	5 Bar	6 Bar	8 Bar	10 Bar
Four AAP 6	1000	18	8100	9700	10200	10800	12200	12800	13600	14300
		15	8300	9900	10400	11100	12500	13100	14000	14700
		10	8700	10300	10800	11400	12900	13600	14400	15200
		5	9100	10700	11200	12100	13600	14300	15200	16000
Four AAP 9	1200	18	9800	12300	13000	13300	15100	15800	16800	17700
		15	10000	12600	13300	13700	15400	16200	17200	18100
		10	10400	13100	13800	14100	16000	16700	17800	18700
		5	10900	13600	14300	14900	16800	17700	18800	19700
Four AAP 12	1250	18	12000	15000	15700	15000	17000	17800	18900	19900
		15	12300	15300	16100	15400	17400	18200	19400	20400
		10	12800	15900	16700	15900	18000	18900	20100	21100
		5	13400	16500	17300	16800	19000	19900	21200	22200
Four AAP 16	2100	18	16800	21300	22400	16900	19100	20100	21300	22400
		15	17300	21800	22900	17300	19600	20600	21900	23000
		10	18000	22700	23800	17900	20200	21300	22600	23700
		5	18700	23500	24600	18900	21400	22400	23900	25000
Four AAP 20	2300	18	20200	24000	25300	21400	24200	25400	27000	28400
		15	20700	24600	25800	22000	24800	26000	27700	29100
		10	21600	25600	26800	22700	25700	26900	28700	30100
		5	22500	26500	27800	24000	27100	28400	30200	31700
Four AAP 25	2800	18	25100	29900	31500	25600	29000	30300	32300	33900
		15	25700	30700	32300	26200	29600	31100	33100	34700
		10	26800	31900	33500	27100	30600	32200	34200	35900
		5	27900	33100	34700	28600	32300	33900	36100	37900
Four AAP 30	3100	18	29000	32300	34000	34200	38600	40600	43200	45300
		15	29800	33100	34800	35100	39600	41600	44300	46500
		10	31100	34400	36100	36200	41000	43000	45800	48000
		5	32400	35700	37400	38200	43200	45400	48300	50700
Four AAP 40	4100	18	40900	41800	44000	40800	46100	48400	51500	54100
		15	41800	42800	45000	41800	47300	49600	52800	55400
		10	43800	44500	46700	43200	48900	51300	54600	57300
		5	45700	46200	48400	45600	51500	54100	57600	60500

NOTE:

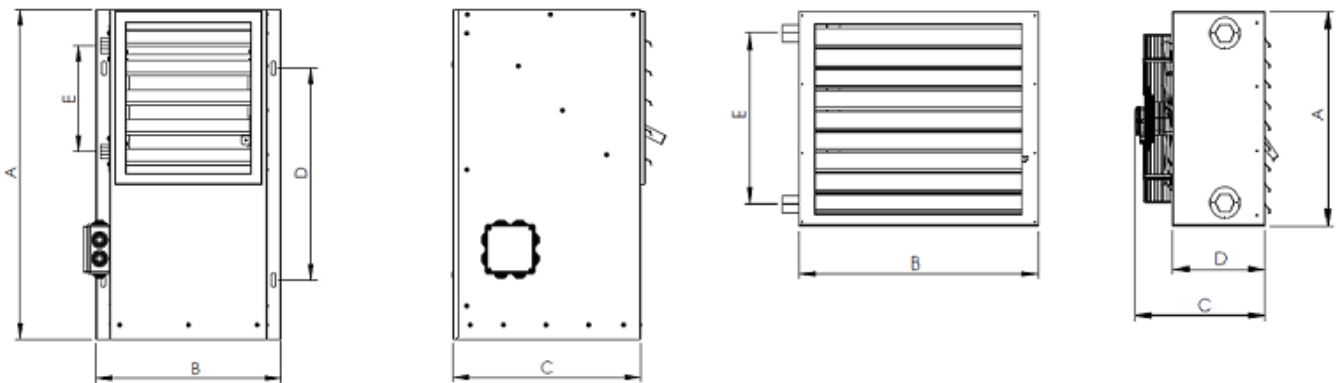
B1 with copper pipe is enduring up to 3 bars.

B2 with copper pipe is enduring up to 6 bars.

BC with steel pipe is enduring up to 10 bars.

FOUR RAP / AAP SERIES CUPPER PIPE STEAM HEATER DIMENSION TABLE

Models	Power/Current W/A	Supply V/Hz	Dimensions (mm)						Connection (B1) 3 bar	Connection (B2) 4-6 bar	Sound Level dB(A)
			A Height	B Length	C Width	D	E	F			
Four RAP 6	150/0,65	230/50	700	430	400	450	224	26	1/2"	3/4" - 3/4"	70
Four RAP 10	200/0,9	230/50	800	460	430	500	290	26	1/2"	3/4" - 3/4"	70
Four RAP 15	250/1,1	230/50	950	460	530	650	290	35	3/4"	1" - 3/4"	79
Four RAP 19	210/1	230/50	1100	520	550	800	341	35	3/4"	1" - 3/4"	60
Four RAP 24	500/1,8	230/50	1100	585	650	800	318	45	1"	1 1/4" - 1"	66
Four RAP 28	500/1,8	230/50	1250	585	665	950	383	45	1"	1 1/4" - 1"	66
Four RAP 38	800/3,7	230/50	1350	660	725	1050	432	55	1 1/4"	1 1/2" - 1 1/4"	-
Four RAP 50	800/3,7	230/50	1350	660	760	1050	432	55	2 1/4"	1 1/2" - 1 1/4"	-
Four AAP 6	90/0,38	230/50	440	460	380	280	367	26	1/2"	3/4" - 3/4"	55
Four AAP 9	90/0,38	230/50	440	460	380	280	367	26	1/2"	1" - 3/4"	55
Four AAP 12	90/0,38	230/50	520	470	380	280	450	35	3/4"	1" - 3/4"	55
Four AAP 16	138/0,68	230/50	630	550	385	260	414	35	3/4"	1 1/4" - 1"	62
Four AAP 20	138/0,68	230/50	690	580	385	260	536	35	3/4"	1 1/4" - 1"	62
Four AAP 25	180/0,81	230/50	690	610	425	280	536	45	1"	1 1/4" - 1"	67
Four AAP 30	180/0,81	230/50	760	680	425	280	583	45	1"	1 1/2" - 1 1/4"	67
Four AAP 40	250/1,15	230/50	700	760	425	300	496	45	1 1/4"	1 1/2" - 1 1/4"	71



HEATING AND COOLING UNIT

WITH AXIAL FAN

Models	Air Flow [m³/h]	Input Air °C	Cooling Capacity kcal/h		Input Air °C	Heating Capacity kcal/h		
			7/12°C	10/15°C		80/60°C	60/50°C	45/40°C
Four AAP 5 CH	2000	30°C-%55 RH	7300	5600	18 °C	16300	11600	7700
		28°C-%55 RH	6100	4600	15 °C	17300	12600	8700
		26°C-%55 RH	5100	3800	10 °C	19100	14300	10400
Four AAP 10 CH	2500	30°C-%55 RH	14000	10200	18 °C	30000	21600	14400
		28°C-%55 RH	11000	7600	15 °C	32000	23700	16400
		26°C-%55 RH	8300	5300	10 °C	35800	27100	19700
Four AAP 15 CH	3600	30°C-%55 RH	22100	16800	18 °C	42500	30300	20000
		28°C-%55 RH	18200	13200	15 °C	45400	33100	22700
		26°C-%55 RH	14500	10100	10 °C	50300	37800	27300
Four AAP 20 CH	4800	30°C-%55 RH	25000	18700	18 °C	51000	36750	24400
		28°C-%55 RH	20300	14700	15 °C	54500	40000	27700
		26°C-%55 RH	16200	11500	10 °C	60500	45850	33300
Four AAP 25 CH	6100	30°C-%55 RH	33650	25400	18 °C	66850	47900	31750
		28°C-%55 RH	27500	20000	15 °C	71400	52300	36000
		26°C-%55 RH	22100	15700	10 °C	79150	59700	43300
Four AAP 30 CH	7200	30°C-%55 RH	39800	30100	18 °C	78450	56150	37200
		28°C-%55 RH	32700	23850	15 °C	83800	61250	42150
		26°C-%55 RH	26250	18700	10 °C	92700	69900	50650

WITH RADIAL FAN

Models	Air Flow [m³/h]	Input Air °C	Cooling Capacity kcal/h		Input Air °C	Heating Capacity kcal/h		
			7/12°C	10/15°C		80/60°C	60/50°C	45/40°C
Four RAP 5 CH	1800	30 °C-%55	7100	5400	18°C	15900	11300	7500
		28 °C-%55	5900	4500	15°C	16800	12300	8500
		26 °C-%55	5000	3700	10°C	18600	13900	10100
Four RAP 10 CH	2400	24 °C-%55	13800	10100	18°C	29600	21300	14200
		22 °C-%55	10900	7500	15°C	31600	23400	16200
		20 °C-%55	8200	5200	10°C	35300	26700	19400
Four RAP 15 CH	3700	18 °C-%55	22300	16900	18°C	42800	30500	20100
		16 °C-%55	18300	13300	15°C	45700	33300	22900
		14 °C-%55	14600	10200	10°C	50700	38100	27500
Four RAP 20 CH	5000	12 °C-%55	25300	18900	18°C	51600	37200	24700
		10 °C-%55	20500	14900	15°C	55200	40500	28000
		8 °C-%55	16400	11600	10°C	61200	46400	33700
Four RAP 25 CH	5800	6 °C-%55	33200	25000	18°C	65900	47200	31300
		4 °C-%55	27100	19700	15°C	70400	51600	35500
		2 °C-%55	21800	15500	10°C	78000	58900	42700
Four RAP 30 CH	7000	0 °C-%55	39500	29800	18°C	77800	55700	36900
		2 °C-%55	32400	23700	15°C	83100	60700	41800
		4 °C-%55	26000	18500	10°C	91900	69300	50200

NOTES





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180 different types of products.**



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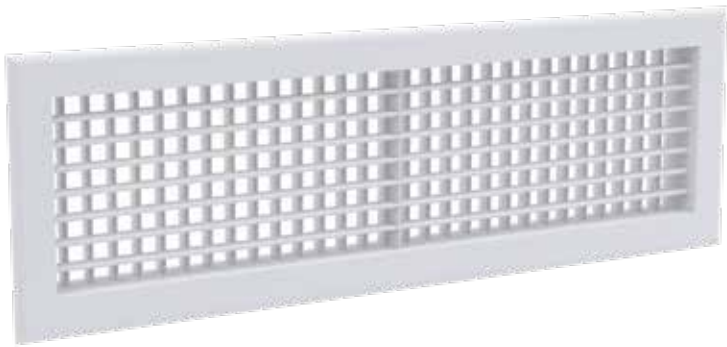
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FOUR
SEASONS®

 **DOĞU**
İKLİMLENDİRME | HVAC SYSTEMS





DMD
Double Deflection Grille

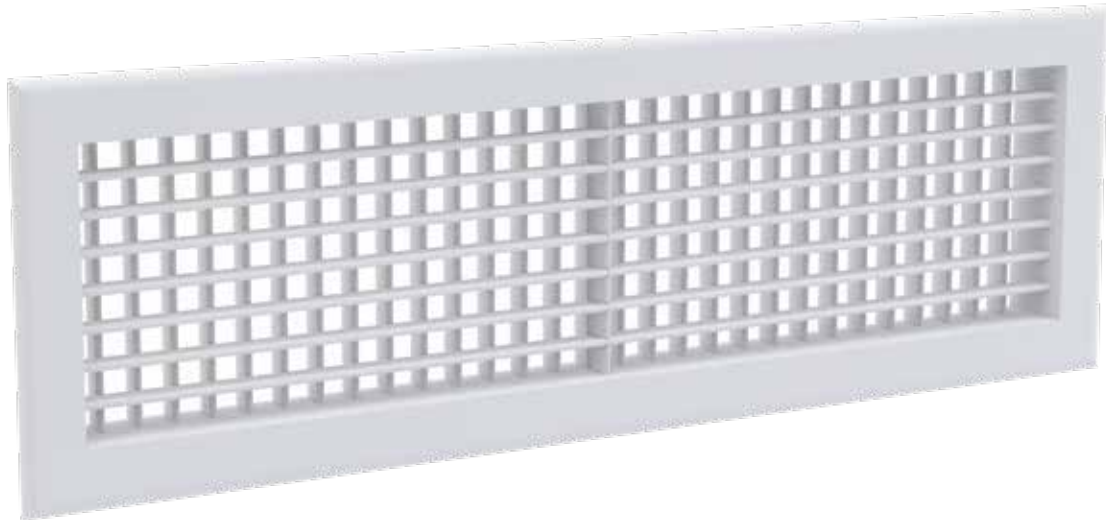
Venues Breathe with DOGU HVAC Systems!

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.



- ☞ DMD – Double Deflection Grille has aerodynamic blades that can be adjusted horizontally from the front and vertically from the rear.
- ☞ It is used in ventilation and air conditioning systems to distribute the supply air in both directions within the space.



MATERIAL

- ☞ Aluminum 6063 extrusion profile production
- ☞ Optional AISI 304 quality stainless steel production

SURFACE COATING

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

INSTALLATION OPTIONS

- ☞ Screw System
- ☞ Suspended Ceiling
- ☞ Clip-In Ceiling
- ☞ Mounting Bracket
- ☞ Without Mounting Hole
- ☞ Concealed
- ☞ Long Spring Clip
- ☞ Subframe Short Spring Clip

ACCESSORIES

Optional

-ZKD-Opposed Blade Air Adjustment Damper (Production from aluminum 6063 extrusion profile)

PRODUCT SELECTION

STANDARD DIMENSIONS

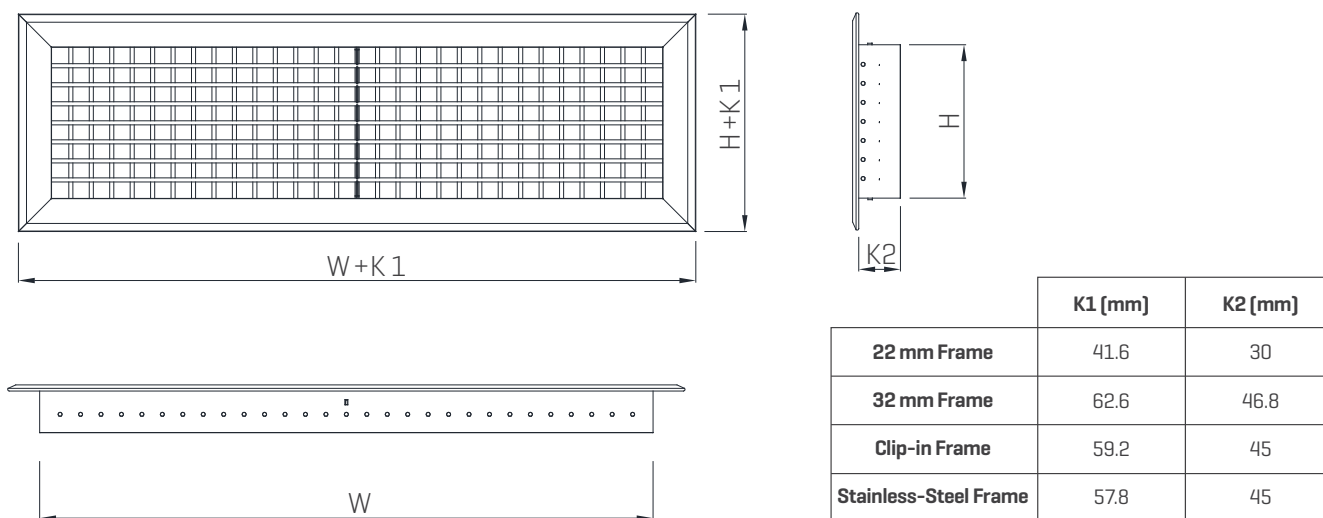


Table 1. Standard Dimensions

Standard Dimensions		H Height [mm]											
		50	100	200	300	400	500	600	700	800	900	1000	
W Width [mm]	100	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	200	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	300	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	400	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	500	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	600	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	700	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	800	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	900	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1000	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1100	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1200	✓	✓	✓	✓	✓	✓	✓					
	1300	✓	✓	✓	✓	✓	✓	✓					
	1400	✓	✓	✓	✓	✓	✓	✓					
	1500	✓	✓	✓	✓	✓	✓	✓					
	1600	✓	✓	✓	✓	✓	✓	✓					
	1700	✓	✓	✓	✓	✓	✓	✓					
	1800	✓	✓	✓	✓	✓	✓	✓					

Note: Maximum dimension for the stainless steel production is 1200 mm x 600 mm.

PERFORMANCE DATA

Table 2. Effective Area

Effective Area [m ²]		H (Height) [mm]										
		50	100	200	300	400	500	600	700	800	900	1000
W (Width) [mm]	100	0.003	0.006	0.012	0.018	0.024	0.030	0.036	0.042	0.048	0.054	0.060
	200	0.006	0.012	0.024	0.036	0.048	0.060	0.072	0.084	0.096	0.108	0.120
	300	0.009	0.018	0.036	0.054	0.072	0.090	0.108	0.126	0.144	0.162	0.180
	400	0.012	0.024	0.048	0.072	0.096	0.120	0.144	0.168	0.192	0.216	0.240
	500	0.015	0.030	0.060	0.090	0.120	0.150	0.180	0.210	0.240	0.270	0.299
	600	0.018	0.036	0.072	0.108	0.144	0.180	0.216	0.252	0.288	0.323	0.359
	700	0.021	0.042	0.084	0.126	0.168	0.210	0.252	0.294	0.335	0.377	0.419
	800	0.024	0.048	0.096	0.144	0.192	0.240	0.288	0.335	0.383	0.431	0.479
	900	0.027	0.054	0.108	0.162	0.216	0.270	0.323	0.377	0.431	0.485	0.539
	1000	0.030	0.060	0.120	0.180	0.240	0.299	0.359	0.419	0.479	0.539	0.599
	1100	0.033	0.066	0.132	0.198	0.264	0.329	0.395	0.461	0.527	0.593	0.659
	1200	0.036	0.072	0.144	0.216	0.288	0.359	0.431				
	1300	0.039	0.078	0.156	0.234	0.311	0.389	0.467				
	1400	0.042	0.084	0.168	0.252	0.335	0.419	0.503				
	1500	0.045	0.090	0.180	0.270	0.359	0.449	0.539				
	1600	0.048	0.096	0.192	0.288	0.383	0.479	0.575				
	1700	0.051	0.102	0.204	0.305	0.407	0.509	0.611				
	1800	0.054	0.108	0.216	0.323	0.431	0.539	0.647				

Table 3. Supply Data

Flow Rate [m³ / h]		Effective Velocity [m/s]														
		0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	6.0	7.0	8.0	9.0	10.0
50	Effective Area [m²]	0.0278	0.0139	0.009	0.007	0.006	0.005	0.004	0.004	0.003						
	Pressure Drop [Pa]	0	1	2	3	5	7	10	13	17						
	Throw Distance [m]	1	2	2	3	3	3	4	4	4						
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	<15	<15	<15	15					
100	Effective Area [m²]	0.0556	0.0278	0.019	0.014	0.011	0.009	0.008	0.007	0.006	0.006	0.005	0.004	0.004	0.003	
	Pressure Drop [Pa]	0	1	2	3	5	7	10	13	17	21	30	42	55	70	
	Throw Distance [m]	1	2	2	3	3	4	4	4	4	5	5	6	6	6	
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	<15	15	18	21	26	30	34	37	
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	0.008	0.007	0.006	0.006
	Pressure Drop [Pa]	0	1	2	3	5	7	10	13	17	21	31	42	56	71	88
	Throw Distance [m]	1	2	2	3	3	4	4	4	5	5	6	6	7	7	
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	<15	18	22	24	29	33	37	40	43
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	0.012	0.010	0.009	0.008
	Pressure Drop [Pa]	0	1	2	3	5	7	10	13	17	21	31	42	56	71	89
	Throw Distance [m]	1	2	3	3	3	4	4	4	5	5	6	6	7	7	
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	17	20	23	26	31	35	39	42	45
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	0.016	0.014	0.012	0.011
	Pressure Drop [Pa]	0	1	2	3	5	7	10	13	17	21	31	42	56	71	89
	Throw Distance [m]	1	2	3	3	3	4	4	4	5	5	6	6	7	7	
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	18	21	25	27	32	37	40	43	46
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	0.020	0.017	0.015	0.014
	Pressure Drop [Pa]	0	1	2	3	5	7	10	13	17	21	31	42	56	71	89
	Throw Distance [m]	1	2	3	3	3	4	4	4	5	5	6	6	7	7	
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	19	22	26	28	33	37	41	44	47
600	Effective Area [m²]	0.333	0.167	0.111	0.083	0.067	0.056	0.048	0.042	0.037	0.033	0.028	0.024	0.021	0.019	0.017
	Pressure Drop [Pa]	0	1	2	3	5	7	10	13	17	21	31	43	56	72	89
	Throw Distance [m]	1	2	3	3	3	4	4	4	5	4,9	6	6	7	7	
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	16	20	23	26	29	34	38	42	45	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	0.028	0.024	0.022	0.019
	Pressure Drop [Pa]	0	1	2	3	5	7	10	13	17	21	31	43	56	72	89
	Throw Distance [m]	1	2	3	3	3	4	4	4	5	5,0	6	6	7	7	
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	16	20	24	27	30	35	39	43	46	49
800	Effective Area [m²]	0.444	0.222	0.148	0.111	0.089	0.074	0.064	0.056	0.049	0.0444	0.037	0.032	0.028	0.025	0.022
	Pressure Drop [Pa]	0	1	2	3	5	7	10	13	17	21	31	43	56	72	89
	Throw Distance [m]	1	2	3	3	3	4	4	4	5	5,0	6	6	7	7	
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	17	21	25	28	31	35	40	43	46	49
900	Effective Area [m²]	0.500	0.250	0.167	0.125	0.100	0.083	0.071	0.063	0.056	0.0500	0.042	0.036	0.031	0.028	0.025
	Pressure Drop [Pa]	0	1	2	3	5	7	10	13	17	21	31	43	56	72	89
	Throw Distance [m]	1	2	3	3	3	4	4	4	5	5,0	6	6	7	7	
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	17	21	25	28	31	36	40	44	47	50
1000	Effective Area [m²]	0.556	0.278	0.185	0.139	0.111	0.093	0.079	0.069	0.062	0.0556	0.046	0.040	0.035	0.031	0.028
	Pressure Drop [Pa]	0	1	2	3	5	7	10	13	17	21	31	43	56	72	90
	Throw Distance [m]	1	2	3	3	3	4	4	4	5	5,0	6	6	7	7	
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	18	22	25	29	32	36	41	44	47	50
1250	Effective Area [m²]		0.347	0.232	0.174	0.139	0.116	0.099	0.087	0.077	0.0694	0.058	0.050	0.043	0.039	0.035
	Pressure Drop [Pa]		1	2	3	5	7	10	13	17	21	31	43	56	72	90
	Throw Distance [m]		2	3	3	3	4	4	4	5	5,1	6	6	7	7	8
	Sound Power Level [dB(A)]		<15	<15	<15	<15	19	23	27	30	33	37	42	45	48	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	0.060	0.052	0.046	0.042
	Pressure Drop [Pa]		1	2	3	5	7	10	13	17	21	31	43	57	72	90
	Throw Distance [m]		2	3	3	4	4	4	5	4,8	5,1	6	6	7	7	8
	Sound Power Level [dB(A)]		<15	<15	<15	<15	20	24	27	30	33	38	42	46	49	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	0.069	0.061	0.054	0.049
	Pressure Drop [Pa]		1	2	3	5	7	10	13	17	21	31	43	57	72	90
	Throw Distance [m]		2	3	3	4	4	4	5	5	6	6	7	7	8	
	Sound Power Level [dB(A)]		<15	<15	<15	15	20	24	28	31	34	39	43	47	50	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	0.079	0.069	0.062	0.056
	Pressure Drop [Pa]		1	2	3	5	7	10	13	17	21	31	43	57	72	90
	Throw Distance [m]		2	3	3	4	4	4	5	5	6	6	7	7	8	
	Sound Power Level [dB(A)]		<15	<15	<15	16	21	25	29	32	35	40	44	47	50	53
2500	Effective Area [m²]			0.463	0.347	0.278	0.232	0.198	0.174	0.1543	0.1389	0.116	0.099	0.087	0.077	0.069
	Pressure Drop [Pa]			2	3	5	7	10	14	17	21	31	43	57	73	90
	Throw Distance [m]			3	3	4	4	4	5	5	6	6	7	7	8	
	Sound Power Level [dB(A)]			<15	<15	17	22	26	30	33	36	40	45	48	51	54
3000	Effective Area [m²]			0.556	0.417	0.333	0.278	0.238	0.2083	0.1852	0.1667	0.139	0.119	0.104	0.093	0.0833
	Pressure Drop [Pa]			2	3	5	7	10	14	17	21	31	43	57	73	90
	Throw Distance [m]			3	3	4	4	4	5	5	6	6	7	7	8	
	Sound Power Level [dB(A)]			<15	<15	18	23	27	30	34	36	41	45	49	52	55
4000	Effective Area [m²]				0.556	0.444	0.370	0.3175	0.2778	0.2469	0.2222	0.185	0.159	0.139	0.1235	0.1111
	Pressure Drop [Pa]				3	5	7	10	14	17	22	31	43	57	73	91
	Throw Distance [m]				3	4	4	4	5	5	6	6	7	7	8	
	Sound Power Level [dB(A)]				<15	19	24	28	32	35	38	43	47	50	53	56
5000	Effective Area [m²]					0.556	0.4630	0.3968	0.3472	0.3086	0.2778	0.232	0.198	0.1736	0.1543	0.1389
	Pressure Drop [Pa]					5	7	10	14	17	22	31	43	57	73	91
	Throw Distance [m]					4	4	4	5	5	6	6	7	7	8	
	Sound Power Level [dB(A)]					20	25	29	33	36	39	44	48	51	54	57
7500	Effective Area [m²]							0.595	0.521	0.4630	0.4167	0.347	0.298	0.260	0.232	0.208
	Pressure Drop [Pa]							10	14	17	22	32	43	57	73	91
	Throw Distance [m]							4	5	5	6	7	7	8	8	
	Sound Power Level [dB(A)]							31	34	38	40	45	50	53	56	59
10000	Effective Area [m²]									0.6173	0.5556	0.463	0.397	0.347	0.309	0.2778
	Pressure Drop [Pa]									17	22	32	44	57	73	91
	Throw Distance [m]									5	6	6	7	7	8	8
	Sound Power Level [dB(A)]									39	42	47	51	54	58	60

Table 4. Extract Data

Flow Rate [m ³ /h]		Effective Velocity (m/s)														
		0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	6.0	7.0	8.0	9.0	10.0
50	Effective Area [m ²]	0.0278	0.0139	0.0093	0.0069	0.006	0.005	0.004	0.003	0.003						
	Pressure Drop [Pa]	<1	1	2	3	5	8	10	14	17						
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	<15	<15	<15	16					
100	Effective Area [m ²]	0.0556	0.0278	0.019	0.014	0.011	0.009	0.008	0.007	0.006	0.006	0.005	0.004	0.0035	0.0031	
	Pressure Drop [Pa]	<1	1	2	3	5	8	10	14	18	22	32	44	58	74	
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	<15	16	19	22	27	31	34	38	
200	Effective Area [m ²]	0.111	0.056	0.037	0.028	0.022	0.019	0.016	0.014	0.012	0.011	0.009	0.008	0.007	0.0062	0.0056
	Pressure Drop [Pa]	<1	1	2	3	5	8	11	14	18	22	32	44	58	74	93
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	15	19	22	25	30	34	38	41	44
300	Effective Area [m ²]	0.167	0.083	0.056	0.042	0.033	0.028	0.024	0.021	0.019	0.017	0.014	0.012	0.010	0.009	0.008
	Pressure Drop [Pa]	<1	1	2	3	5	8	11	14	18	22	32	44	59	75	93
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	17	21	24	27	32	36	39	43	45
400	Effective Area [m ²]	0.222	0.111	0.074	0.056	0.044	0.037	0.032	0.028	0.025	0.022	0.019	0.016	0.014	0.012	0.011
	Pressure Drop [Pa]	<1	1	2	3	5	8	11	14	18	22	32	44	59	75	93
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	18	22	25	28	33	37	41	44	47
500	Effective Area [m ²]	0.278	0.139	0.093	0.069	0.056	0.046	0.040	0.035	0.031	0.028	0.023	0.020	0.017	0.015	0.014
	Pressure Drop [Pa]	<1	1	2	3	5	8	11	14	18	22	32	45	59	75	93
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	15	19	23	26	29	34	38	42	45	48
600	Effective Area [m ²]	0.333	0.167	0.111	0.083	0.067	0.056	0.048	0.042	0.037	0.0333	0.028	0.024	0.021	0.019	0.017
	Pressure Drop [Pa]	<1	1	2	3	5	8	11	14	18	22	32	45	59	75	94
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	16	20	24	27	30	35	39	42	46	48
700	Effective Area [m ²]	0.389	0.194	0.130	0.097	0.078	0.065	0.056	0.049	0.043	0.0389	0.032	0.028	0.024	0.022	0.019
	Pressure Drop [Pa]	<1	1	2	3	5	8	11	14	18	22	32	45	59	75	94
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	17	21	24	28	30	35	40	43	46	49
800	Effective Area [m ²]	0.444	0.222	0.148	0.111	0.089	0.074	0.063	0.056	0.049	0.0444	0.037	0.032	0.028	0.025	0.022
	Pressure Drop [Pa]	<1	1	2	3	5	8	11	14	18	22	33	45	59	75	94
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	17	21	25	28	31	36	40	44	47	50
900	Effective Area [m ²]	0.500	0.250	0.167	0.125	0.100	0.083	0.071	0.063	0.056	0.0500	0.042	0.036	0.031	0.028	0.025
	Pressure Drop [Pa]	<1	1	2	3	5	8	11	14	18	22	33	45	59	75	94
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	18	22	26	29	32	36	41	44	47	50
1000	Effective Area [m ²]	0.556	0.278	0.185	0.139	0.111	0.093	0.079	0.069	0.062	0.0556	0.046	0.040	0.035	0.031	0.028
	Pressure Drop [Pa]	<1	1	2	3	5	8	11	14	18	22	33	45	59	76	94
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	18	22	26	29	32	37	41	45	48	51
1250	Effective Area [m ²]		0.347	0.231	0.174	0.139	0.116	0.099	0.087	0.077	0.0694	0.058	0.050	0.043	0.039	0.035
	Pressure Drop [Pa]		1	2	3	5	8	11	14	18	22	33	45	59	76	94
	Sound Power Level [dB(A)]		<15	<15	<15	<15	19	23	27	30	33	38	42	46	49	52
1500	Effective Area [m ²]		0.417	0.278	0.208	0.167	0.139	0.119	0.104	0.0926	0.0833	0.069	0.060	0.052	0.046	0.0417
	Pressure Drop [Pa]		1	2	3	5	8	11	14	18	22	33	45	59	76	94
	Sound Power Level [dB(A)]		<15	<15	<15	15	20	24	28	31	34	39	43	46	50	52
1750	Effective Area [m ²]		0.486	0.324	0.243	0.194	0.162	0.139	0.122	0.1080	0.0972	0.081	0.069	0.061	0.054	0.0486
	Pressure Drop [Pa]		1	2	3	5	8	11	14	18	22	33	45	59	76	94
	Sound Power Level [dB(A)]		<15	<15	<15	16	21	25	29	32	35	39	44	47	50	53
2000	Effective Area [m ²]		0.556	0.370	0.278	0.222	0.185	0.159	0.139	0.1235	0.1111	0.093	0.079	0.069	0.062	0.0556
	Pressure Drop [Pa]		1	2	3	5	8	11	14	18	22	33	45	60	76	95
	Sound Power Level [dB(A)]		<15	<15	<15	16	21	26	29	32	35	40	44	48	51	54
2500	Effective Area [m ²]			0.463	0.347	0.278	0.231	0.198	0.174	0.1543	0.1389	0.116	0.099	0.087	0.077	0.0694
	Pressure Drop [Pa]			2	3	5	8	11	14	18	23	33	45	60	76	95
	Sound Power Level [dB(A)]			<15	<15	17	22	27	30	33	36	41	45	49	52	55
3000	Effective Area [m ²]			0.556	0.417	0.333	0.278	0.238	0.2083	0.1852	0.1667	0.139	0.119	0.104	0.0926	0.0833
	Pressure Drop [Pa]			2	3	5	8	11	14	18	23	33	45	60	76	95
	Sound Power Level [dB(A)]			<15	<15	18	23	27	31	34	37	42	46	50	53	56
4000	Effective Area [m ²]				0.556	0.444	0.370	0.3175	0.2778	0.2469	0.2222	0.185	0.159	0.1389	0.1235	0.1111
	Pressure Drop [Pa]				3	5	8	11	14	18	23	33	45	60	76	95
	Sound Power Level [dB(A)]				<15	19	24	29	32	35	38	43	47	51	54	57
5000	Effective Area [m ²]					0.556	0.4630	0.3968	0.3472	0.3086	0.2778	0.231	0.1984	0.1736	0.1543	0.1389
	Pressure Drop [Pa]					5	8	11	14	18	23	33	45	60	77	95
	Sound Power Level [dB(A)]					21	25	30	33	36	39	44	48	52	55	58
7500	Effective Area [m ²]							0.5952	0.5208	0.4630	0.4167	0.347	0.298	0.2604	0.2315	0.2083
	Pressure Drop [Pa]							11	14	18	23	33	46	60	77	96
	Sound Power Level [dB(A)]							31	35	38	41	46	50	54	57	60
10000	Effective Area [m ²]									0.6173	0.5556	0.463	0.3968	0.3472	0.3086	0.2778
	Pressure Drop [Pa]									18	23	33	46	60	77	96
	Sound Power Level [dB(A)]									39	42	47	51	55	58	61

Note: Data were obtained with the air distribution equipment when the ambient air temperature difference is T=8 K

Table 5. Throw Distance Correction

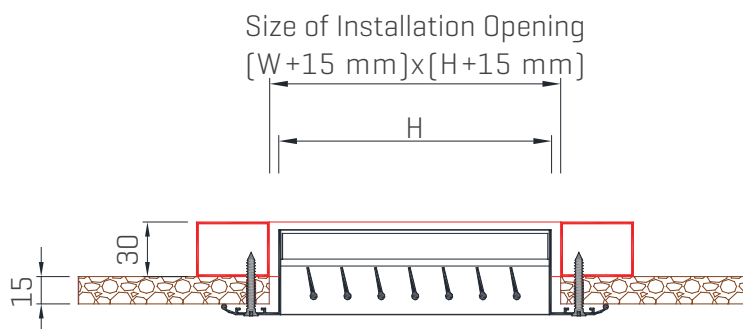
Heating Mode [ΔT]	4	6	8	10	12
Throw Distance Coefficient	1.07	1.02	1	0.90	0.83
Cooling Mode [ΔT]	4	6	8	10	12
Throw Distance Coefficient	1.31	1.36	1.42	1.48	1.54

Table 6. Damper Pressure Correction

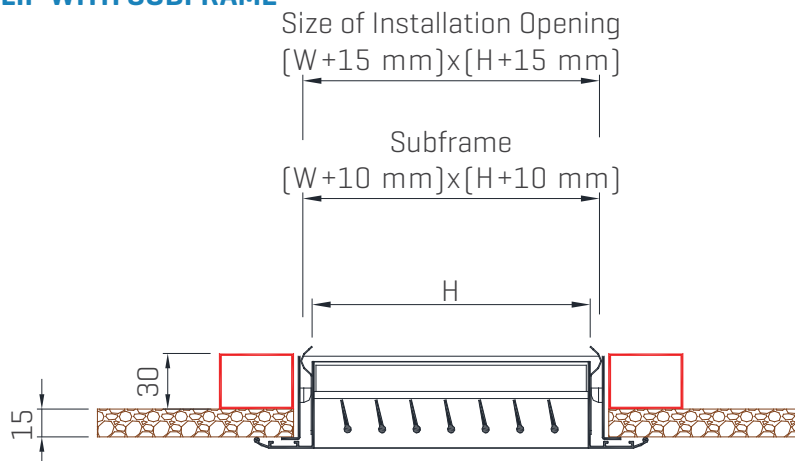
Damper Position	Pressure Correction Factor	Noise Generation [dB(A)]
Open	1.1	+1
25% Closed	1.14	+4
50% Closed	2.48	+14
75% Closed	5.11	+29

INSTALLATION

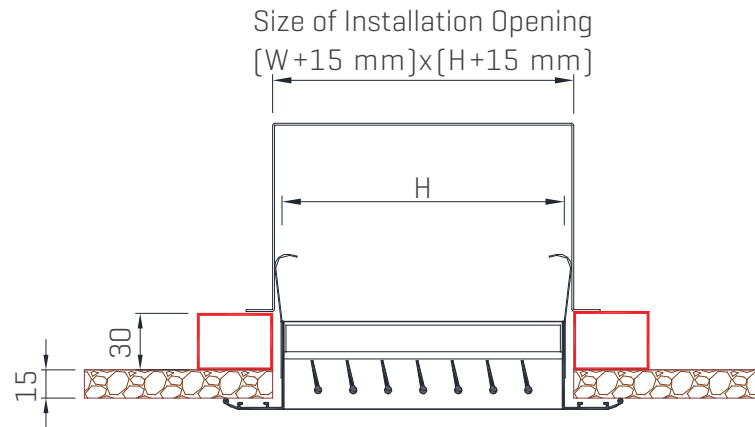
1. SCREW SYSTEM



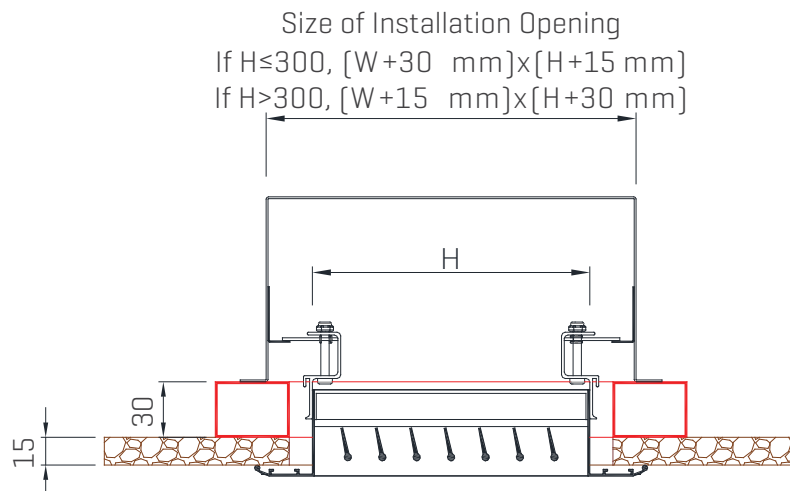
2. SHORT SPRING CLIP WITH SUBFRAME



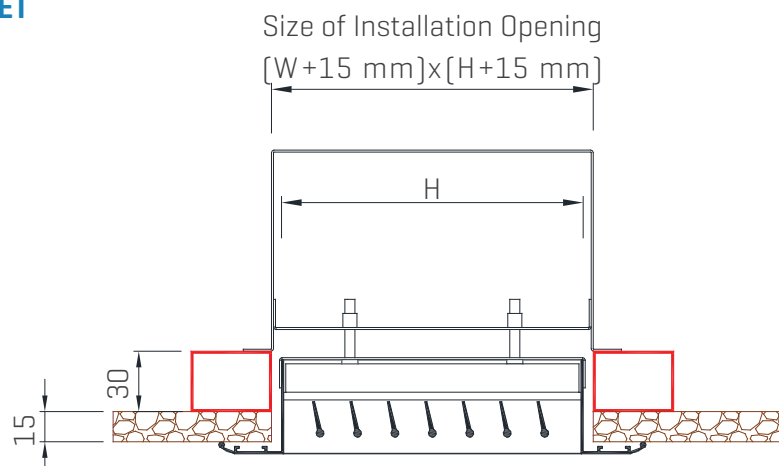
3. LONG SPRING CLIP



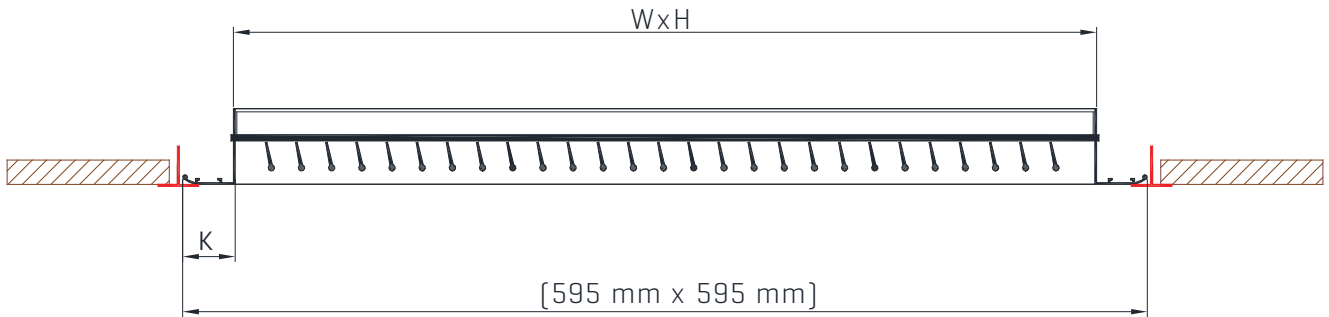
4. CONCEALED



5. MOUNTING BRACKET



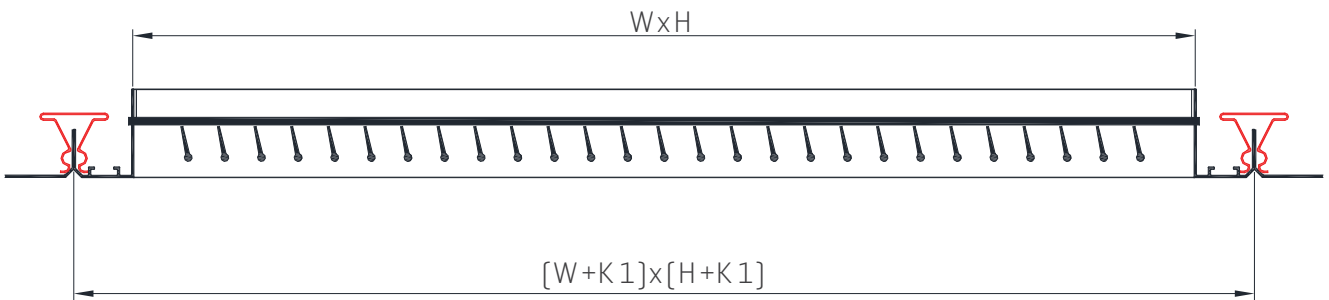
6. SUSPENDED CEILING



W and H dimensions that can be selected according to the frame sizes specified in the product selection, are shown in the adjacent table.

	W (mm)	H (mm)
22 mm Frame	553.4	553.4
32 mm Frame	532.4	532.4
Stainless-Steel Frame	542	542

7. CLIP-IN CEILING

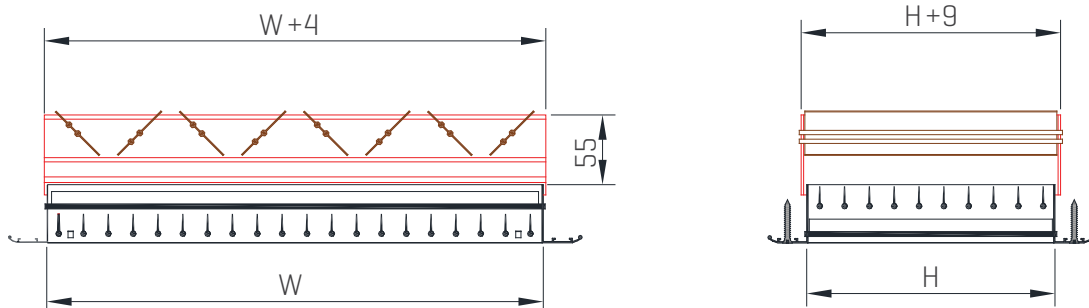


Note:

When the product material is selected as stainless steel, clip-in installation can not be done.

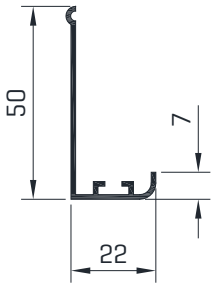
Clip-In Frame K1 = 59 mm	W (mm)	H (mm)
600x600	541	541
300x300	241	241

8. WITH DAMPER

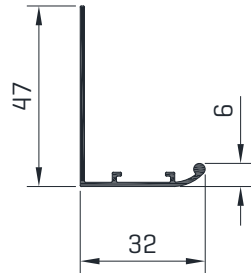


FRAME TYPES

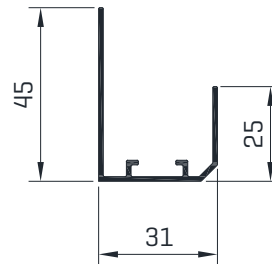
22 mm Frame



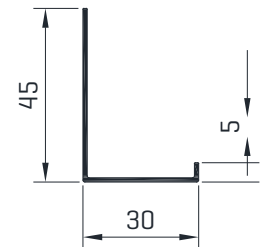
32 mm Frame



Clip-In Frame



Stainless Steel Frame



SIZE PARAMETERS

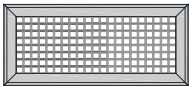
MAXIMUM MODULE SIZE

The standard dimensions of one module can be selected between 100 mm x 50 mm and 1800 mm x 1000 mm. For the stainless-steel production, maximum module dimension is 1200 mm x 600 mm. If the order dimension exceeds the module length, grilles will be produced by modular.

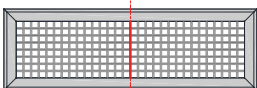
SUPPORT NUMBER PARAMETERS

Support is used only in aluminum products.

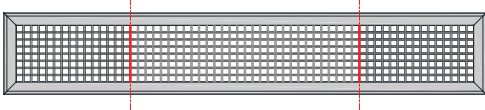
If $W < 600$, without support



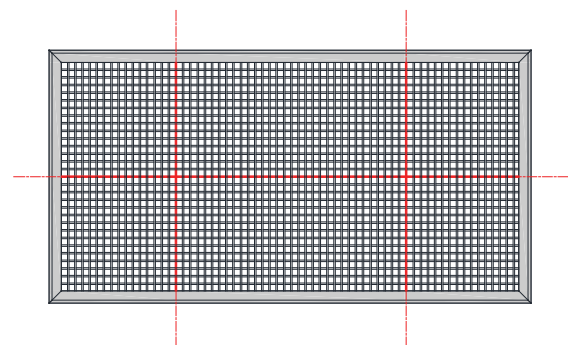
If $600 \leq W \leq 1200$, with 1 support



If $1200 \leq W \leq 1800$, with 2 support



If $600 < H \leq 1000$, with 1 support



PRODUCT SELECTION

Example: The air flow distributed in the space has been determined as 5000 m³/h. 10 double deflection grille will be used for blowing. The temperature difference in heating mode is 8K. Make your product selection.

Solution: Air flow rate for a grille, $5000/10=500$ m³/h

Effective areas corresponding to appropriate pressure drop and flow rate values are selected from the blow data table [Table 3]

For example, in an effective area of 0.04 m², the effective velocity is 3.5 m/s, pressure drop 10 Pa, throw distance 4 m and sound power 19 dB[A].

The appropriate grille size can be selected from the effective area table [Table 2] as 300 mm x 200 mm corresponding to the value of 0.04 m².

Throw Distance Correction Chart

In the previous example, the throw distance was found to be 4 m for the heating mode 8K. Refer to Throw Distance Correction Chart for 10K heating mode. The multiplier value is 0.9.

Corrected throw distance=4 m x 0.9=3.6 m

Opposed Blade Damper Condition

The pressure drop and sound power level changes in the damper product. Damper Correction Table [Table 6] should be used. For example, for the tipper product with the damper closed at 50%, the corresponding pressure factor in the table is 2.48 and sound production is +14 dB[A]

Total static pressure drop: $10 \times 2.48 = 24.8$ Pa

Total sound power level: $19 + 14 = 33$ dB[A]

PRODUCT ORDER CODES

You can place your orders for aluminum or stainless products according to the coding style by looking at the separate tables given below.

ALUMINUM PRODUCT ORDER CODE

DMD.<A>..<C>.<D>.<E>.<F>.<G>

A	Raw Material Type	
	ALM	Aluminum
B	Frame Type	
	02	22 mm Frame
	01	32 mm Frame
	09	Clip-In Frame
C	Damper	
	ZD	Opposed Blade Damper
	DZ	Without Damper
D	Installation Type	
	VD	Screw System
	KR	Suspended Ceiling
	KL	Clip-In Ceiling
	KP	Mounting Bracket
	MD	Without Mounting Hole
	MN	Concealed
	UK	Long Spring Clip
	KO	Subframe Short Spring Clip
	KK	Short Clips
E	Horizontal Dimension (W) (mm)	
	0000	You can view it from standard dimensions.
F	Vertical Dimension (H) (mm)	
	0000	You can view it from standard dimensions.
G	Paint	
	00	Unpainted
	S1	Standard Painted - RAL 9010
	S2	Standard Painted - RAL 9016
	XX	Special Painted

Sample Coding; DMD.ALM.01.DZ.VD.0500.0200.S1

STAINLESS-STEEL PRODUCT ORDER CODE

DMD. < PAS > . < 32 > . < A > . < B > . < C > . < D > . < 00 >

A	Damper	
	ZD	Opposed Blade Damper
	DZ	Without Damper
B	Installation Type	
	VD	Screw System
	KR	Suspended Ceiling
	KP	Mounting Bracket
	MD	Without Mounting Hole
	MN	Concealed
	UK	Long Spring Clip
	KO	Subframe Short Spring Clip
	KK	Short Clips
C	Horizontal Dimension (W) (mm)	
	0000	You can view it from standard dimensions.
D	Vertical Dimension (H) (mm)	
	0000	You can view it from standard dimensions.

Sample Coding; DMD.PAS.32.DZ.VD.0500.0200.00



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- ☞ DMK - Access Grille; It is a suction grille with blades that form a square, honeycomb-shaped mesh.
- ☞ Since its effective area is higher than other grilles, it has a low pressure loss value. Therefore, it is used as a return grille in ventilation systems.

MATERIAL

- ☞ Frame and blades made of aluminum 6063 extrusion profile.
- ☞ Without Frame, 22 mm, snap and clip-in case options.
- ☞ Mesh blades made of aluminum 1050 sheet.

SURFACE COATING

- ☞ RAL 9010 electrostatic powder paint as standard
- ☞ Optional
 - Different RAL Codes
 - Without paint

SURFACE COATING

- ☞ With Screw
- ☞ Tile Ceiling
- ☞ Clip-in
- ☞ Installation from inside

ACCESSORIES

- ☞ Optional
 - Fiber Filter
 - Polyurethane Filter
 - 10 x 10 Mesh Wire

STANDARD DIMENSIONS

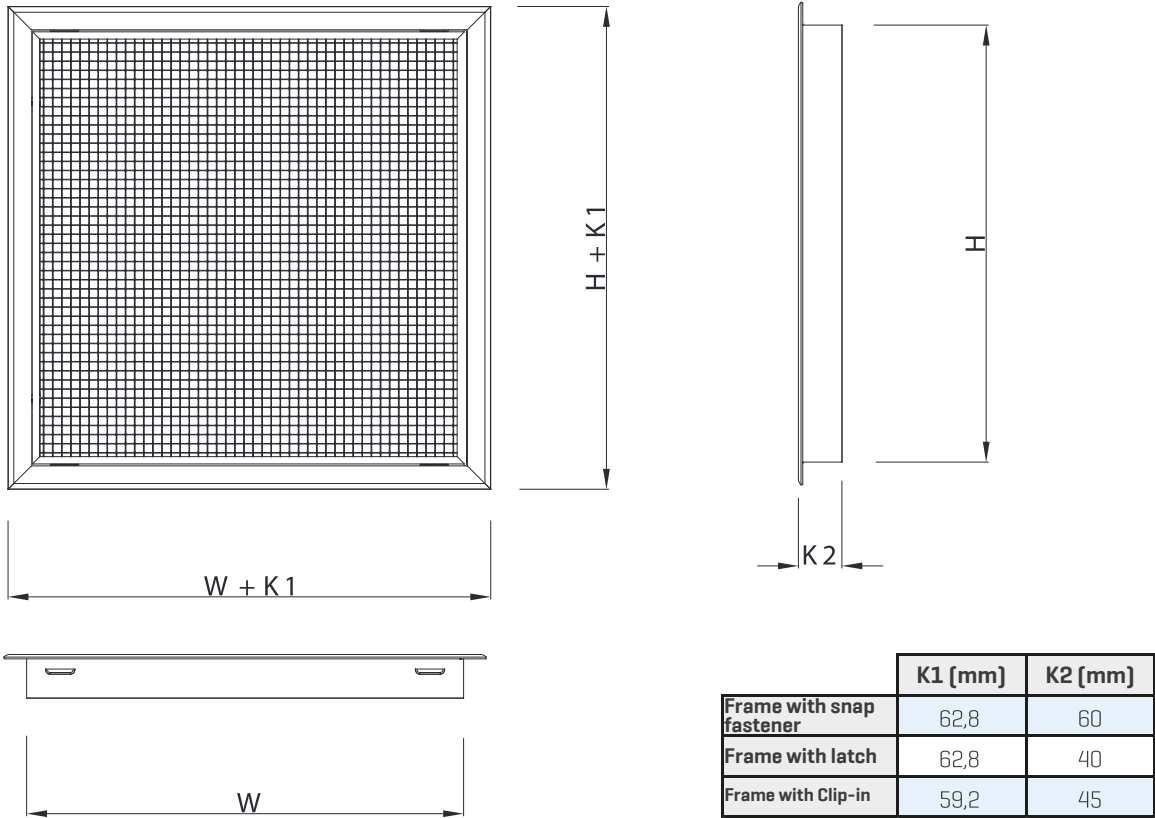


Table 1. Standard Dimensions

W(mm) (Width)	200 - 300 - 400 - 500 - 600 - 700 - 800 - 900 - 1000 - 1100 - 1200
H(mm) (Height)	200 - 300 - 400 - 500 - 600 - 700 - 800 - 900 - 1000

Note: When W=H is ordered, production is made in [W] x [H +3 mm] dimensions.

PERFORMANCE DATA

Table 2. Effective Area Table

Effective Area	H [mm]																	
	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	
W [mm]	200	0,037	0,046	0,055	0,064	0,074	0,083	0,092	0,101	0,110	0,119	0,129	0,138	0,147	0,156	0,165	0,175	0,184
	250	0,046	0,057	0,069	0,080	0,092	0,103	0,115	0,126	0,138	0,149	0,161	0,172	0,184	0,195	0,207	0,218	0,230
	300	0,055	0,069	0,083	0,097	0,110	0,124	0,138	0,152	0,165	0,179	0,193	0,207	0,221	0,234	0,248	0,262	0,276
	350	0,064	0,080	0,097	0,113	0,129	0,145	0,161	0,177	0,193	0,209	0,225	0,241	0,257	0,273	0,290	0,306	0,322
	400	0,074	0,092	0,110	0,129	0,147	0,165	0,184	0,202	0,221	0,239	0,257	0,276	0,294	0,313	0,331	0,349	0,368
	450	0,083	0,103	0,124	0,145	0,165	0,186	0,207	0,228	0,248	0,269	0,290	0,310	0,331	0,352	0,372	0,393	0,414
	500	0,092	0,115	0,138	0,161	0,184	0,207	0,230	0,253	0,276	0,299	0,322	0,345	0,368	0,391	0,414	0,437	0,460
	550	0,101	0,126	0,152	0,177	0,202	0,228	0,253	0,278	0,303	0,329	0,354	0,379	0,404	0,430	0,455	0,480	0,506
	600	0,110	0,138	0,165	0,193	0,221	0,248	0,276	0,303	0,331	0,358	0,386	0,414	0,441	0,469	0,496	0,524	0,552
	650	0,119	0,149	0,179	0,209	0,239	0,269	0,299	0,329	0,358	0,388	0,418	0,448	0,478	0,508	0,538	0,568	0,597
	700	0,129	0,161	0,193	0,225	0,257	0,290	0,322	0,354	0,386	0,418	0,450	0,483	0,515	0,547	0,579	0,611	0,643
	750	0,138	0,172	0,207	0,241	0,276	0,310	0,345	0,379	0,414	0,448	0,483	0,517	0,552	0,586	0,620	0,655	0,689
	800	0,147	0,184	0,221	0,257	0,294	0,331	0,368	0,404	0,441	0,478	0,515	0,552	0,588	0,625	0,662	0,699	0,735
	850	0,156	0,195	0,234	0,273	0,313	0,352	0,391	0,430	0,469	0,508	0,547	0,586	0,625	0,664	0,703	0,742	0,781
	900	0,165	0,207	0,248	0,290	0,331	0,372	0,414	0,455	0,496	0,538	0,579	0,620	0,662	0,703	0,745	0,786	0,827
	950	0,175	0,218	0,262	0,306	0,349	0,393	0,437	0,480	0,524	0,568	0,611	0,655	0,699	0,742	0,786	0,830	0,873
	1000	0,184	0,230	0,276	0,322	0,368	0,414	0,460	0,506	0,552	0,597	0,643	0,689	0,735	0,781	0,827	0,873	0,919
1100	0,202	0,253	0,303	0,354	0,404	0,455	0,506	0,556	0,607	0,657	0,708	0,758	0,809	0,859	0,910	0,961	1,011	
1200	0,221	0,276	0,331	0,386	0,441	0,496	0,552	0,607	0,662	0,717	0,772	0,827	0,882	0,938	0,993	1,048	1,103	

PERFORMANCE DATA

Table 3. Performance Data

Air Flow (m³/h)		Effective Velocity(m/s)										
		0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	6.0
100	Effective Area (m²)	0,0556										
	Pressure Drop (Pa)	<1										
	Throw Distance (m)	1										
	Sound Level (dB(A))	<15										
200	Effective Area (m²)	0,1111	0,0556	0,037								
	Pressure Drop (Pa)	<1	<1	2								
	Throw Distance (m)	2	3	3								
	Sound Level (dB(A))	<15	<15	<15								
300	Effective Area (m²)	0,1667	0,0833	0,0556	0,0417							
	Pressure Drop (Pa)	<1	<1	2	4							
	Throw Distance (m)	2	3	4	5							
	Sound Level (dB(A))	<15	<15	<15	<15							
400	Effective Area (m²)	0,2222	0,1111	0,0741	0,0556	0,0444	0,037					
	Pressure Drop (Pa)	<1	<1	2	4	6	8					
	Throw Distance (m)	2	3	4	5	6	6					
	Sound Level (dB(A))	<15	<15	<15	<15	<15	15					
500	Effective Area (m²)	0,2778	0,1389	0,0926	0,0694	0,0556	0,0463	0,0397				
	Pressure Drop (Pa)	<1	<1	2	4	6	8	11				
	Throw Distance (m)	2	3	4	5	6	7	8				
	Sound Level (dB(A))	<15	<15	<15	<15	<15	16	20				
600	Effective Area (m²)	0,3333	0,1667	0,1111	0,0833	0,0667	0,0556	0,0476	0,0417	0,037		
	Pressure Drop (Pa)	<1	<1	2	4	6	8	11	15	19		
	Throw Distance (m)	2	4	5	6	7	7	8	9	10		
	Sound Level (dB(A))	<15	<15	<15	<15	<15	17	21	24	27		
700	Effective Area (m²)	0,3889	0,1944	0,1296	0,0972	0,0778	0,0648	0,0556	0,0486	0,0432	0,0389	
	Pressure Drop (Pa)	<1	<1	2	4	6	8	11	15	19	23	
	Throw Distance (m)	2	4	5	6	7	8	9	9	10	10.9	
	Sound Level (dB(A))	<15	<15	<15	<15	<15	17	22	25	28	31	
800	Effective Area (m²)	0,4444	0,2222	0,1481	0,1111	0,0889	0,0741	0,0635	0,0556	0,0494	0,0444	0,037
	Pressure Drop (Pa)	<1	<1	2	4	6	8	11	15	19	23	33
	Throw Distance (m)	3	4	5	6	7	8	9	10	11	11.4	13
	Sound Level (dB(A))	<15	<15	<15	<15	<15	18	22	26	29	31	36
900	Effective Area (m²)	0,5	0,25	0,1667	0,125	0,1	0,0833	0,0714	0,0625	0,0556	0,05	0,0417
	Pressure Drop (Pa)	<1	<1	2	4	6	8	11	15	19	23	33
	Throw Distance (m)	3	4	5	7	8	9	9	10	11	11.9	13
	Sound Level (dB(A))	<15	<15	<15	<15	<15	19	23	26	29	32	37
1000	Effective Area (m²)	0,5556	0,2778	0,1852	0,1389	0,1111	0,0926	0,0794	0,0694	0,0617	0,0556	0,0463
	Pressure Drop (Pa)	<1	<1	2	4	6	8	11	15	19	23	33
	Throw Distance (m)	3	4	6	7	8	9	10	11	12	12.3	14
	Sound Level (dB(A))	<15	<15	<15	<15	<15	19	23	27	30	32	37
1250	Effective Area (m²)	0,6944	0,3472	0,2315	0,1736	0,1389	0,1157	0,0992	0,0868	0,0772	0,0694	0,0579
	Pressure Drop (Pa)	<1	<1	2	4	6	8	11	15	19	23	33
	Throw Distance (m)	3	5	6	7	8	9	11	11	12	13.2	15
	Sound Level (dB(A))	<15	<15	<15	<15	15	20	24	27	31	33	38
1500	Effective Area (m²)	0,8333	0,4167	0,2778	0,2083	0,1667	0,1389	0,119	0,1042	0,0926	0,0833	
	Pressure Drop (Pa)	<1	<1	2	4	6	8	11	15	18	23	
	Throw Distance (m)	3	5	6	8	9	10	11	12	13.1	14.1	
	Sound Level (dB(A))	<15	<15	<15	<15	16	21	25	28	31	34	
1750	Effective Area (m²)	0,9722	0,4861	0,3241	0,2431	0,1944	0,162	0,1389	0,1215	0,108	0,0972	
	Pressure Drop (Pa)	<1	<1	2	4	6	8	11	15	18	23	
	Throw Distance (m)	3	5	7	8	9	11	12	13	14	15	
	Sound Level (dB(A))	<15	<15	<15	<15	17	21	25	29	32	35	
2000	Effective Area (m²)	0,5556	0,3704	0,2778	0,2222	0,1852	0,1587	0,1389	0,1235			
	Pressure Drop (Pa)	<1	2	4	6	8	11	15	18			
	Throw Distance (m)	5	7	8	10	11	12	13	15			
	Sound Level (dB(A))	<15	<15	<15	17	22	26	29	33			
2500	Effective Area (m²)	0,6944	0,463	0,3472	0,2778	0,2315	0,1984	0,1736				
	Pressure Drop (Pa)	<1	2	4	6	8	11	14				
	Throw Distance (m)	6	8	9	11	12	13	14				
	Sound Level (dB(A))	<15	<15	<15	18	23	27	30				
3000	Effective Area (m²)	0,8333	0,5556	0,4167	0,3333	0,2778	0,2381					
	Pressure Drop (Pa)	<1	2	4	6	8	11					
	Throw Distance (m)	6	8	10	11	13	14					
	Sound Level (dB(A))	<15	<15	<15	19	24	28					
4000	Effective Area (m²)			0,7407	0,5556	0,4444	0,3704					
	Pressure Drop (Pa)			2	4	6	8					
	Throw Distance (m)			9	11	12	14					
	Sound Level (dB(A))			<15	<15	20	25					

Note: The data were obtained when the air collecting equipment and the room air temperature difference was DT = 8 K.
 Throw distance: It is the vertical distance between the air dispersing equipment and the point where the air in the comfort zone reaches 0.25 m/s velocity.

THROW DISTANCE CORRECTION TABLE

Table 4. Throw Distance Correction Table

Heating Mode (ΔT)	4	6	8	10	12
Throw Distance Multiplier	1,07	1,02	1	0,90	0,83
Cooling Mode (ΔT)	4	6	8	10	12
Throw Distance Multiplier	1,31	1,36	1,42	1,48	1,54

DAMPER PRESSURE DROP TABLE

Table 5. Damper Pressure Drop Table

Damper Position	Pressure Drop Multiplier	Sound Generation
Open	1,1	+1
25% Close	1,14	+4
50% Close	2,48	+14
75% Close	5,11	+29

FILTER PRESSURE DROP TABLE

Table 6. Filter Pressure Drop Table

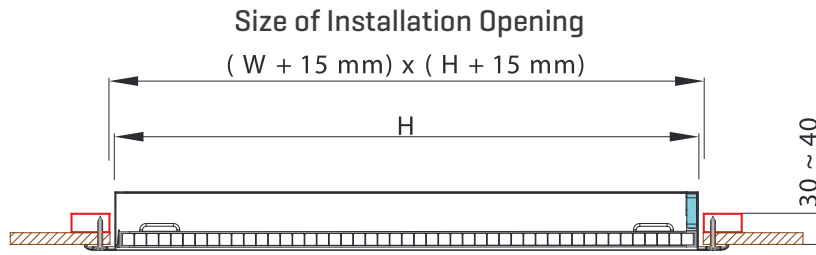
		Air Velocity [m/s]														
		0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	6.0	7.0	8.0	9.0	10.0
Pressure Drop [Pa]	Polyurethane Filter	1	3	5	8	11	15	19	24	29	35	48	63	81	100	121
	Fiber Filter	15	28	40	51	62	73	84	94	105	115	135	155	174	193	212

Polyurethane Filter: 20 PPL polyester based polyurethane filter with 6 mm thickness.

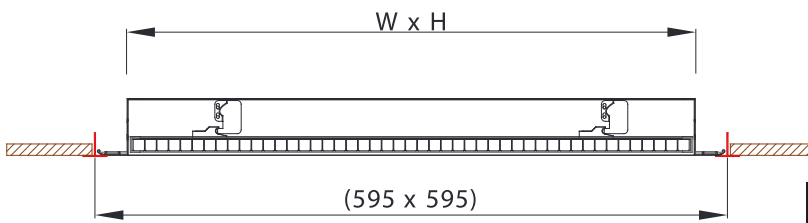
Fiber Filter: EN 16890 ISO COARSE 80% class 10 mm thick fiber filter.

INSTALLATION OPTIONS

WITH SCREW



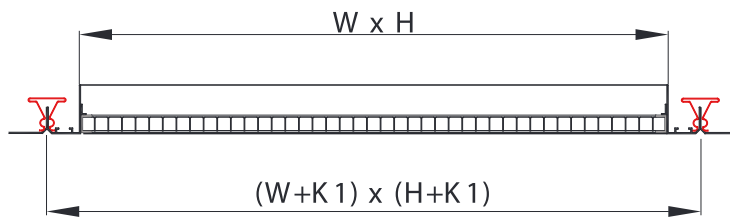
TILE CEILING



	W (mm)	H (mm)
Frame With Snap Fastener	529	529
Frame with latch	529	529

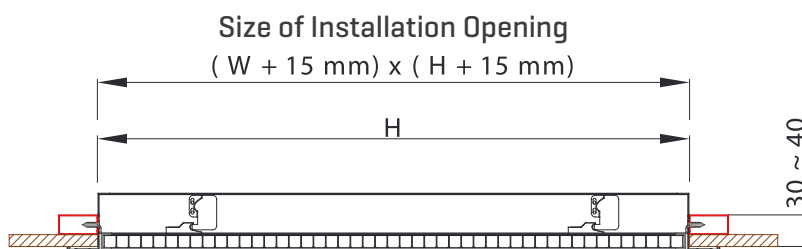
W and H dimensions that can be selected according to the frame dimensions specified in the product selection are shown in the table above.

CLIP-IN

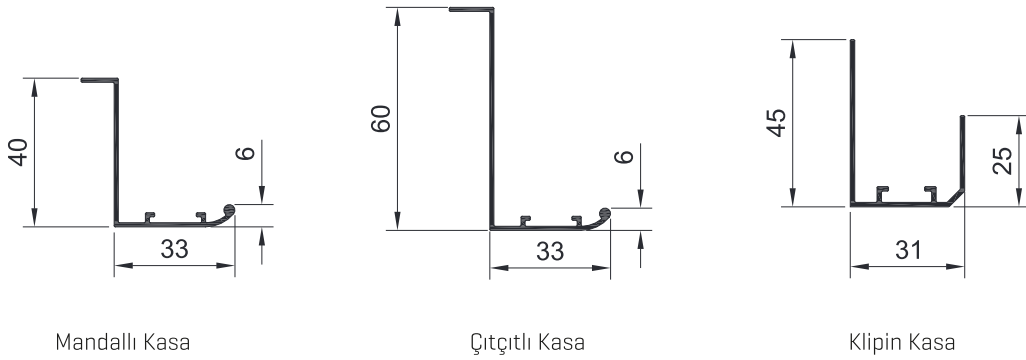


Frame with Clip-in = 59.2 mm	W (mm)	H (mm)
600x600	541	541
300x300	241	241

INSTALLATION FROM INSIDE



FRAME TYPES



DIMENSION PARAMETERS

The standard size of the one-piece product is between 200x200 and 1200x1000 mm. If the order is placed over the standard dimensions, the grilles will be produced more than once as a whole piece.

PRODUCT SELECTION

Example: The air flow rate distributed in the space is determined as 3000 m³/h. 3 access grilles will be used for return. Make the product selection.

Solution: Return air flow rate for a grill, 3000/3 = 1000 m³/h

Effective areas corresponding to appropriate pressure loss and flow rates are selected from the performance table [Table 3]. For example: In an effective area of 0.0794 m², the effective speed is 3.5 m/s, the pressure loss is 11 Pa, and the sound levels 23 dB[A]. The appropriate grill size can be selected from the effective area table [Table 2] as 350 x 250 mm, which corresponds to 0.0794 m².

OPPOSITE BLADE DAMPER SITUATION

In the product with damper, pressure loss and sound power level change. Damper pressure loss table [Table 5] should be used.

For example, in a product with a damper in the 50% closed position, the pressure multiplier is 2.48 corresponding to the table, and the sound generation that needs to be added is +14 dB[A].

Total static pressure loss: 11 x 2.48 = 27.3 Pa

Total sound generation is 37 dB[A].

PRODUCT ORDER CODES

You can place your orders according to the coding style by looking at the separate tables given below.

DMK.<A>..<C>.<D>.<E>.<F>.<G>

A	Raw Material Type	
	ALM	Aluminum
B	Frame Type	
	07	Frame With Snap Fastener
	08	Frame With Latch
	55	Clip-In Frame - With Snap Fastener
	56	Clip-in Frame - Latch
C	Installation Type	
	VD	With Screw
	KR	Tile Ceiling
	KL	Clip-In
	IC	Installation From Inside
D	Accessories	
	00	without Accessories
	10	10 x 10 Mesh Wire
	EF	Fiber Filter
	PF	Polyurethane Filter
E	Width (W) (mm)	
	0000	You Can Look at Standard Sizes
F	Height (H) (mm)	
	0000	You Can Look at Standard Sizes
G	Paint	
	00	Paintless
	S1	Standard painted - RAL 9010
	S2	Standard painted- RAL 9016
	XXT	Special painted

Sample Coding: DMK.ALM.07.IC.PF.0500.0500.S1

NOTES





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VDD
CIRCULAR DAMPER

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 standards. 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.

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- ☞ VDD - Circular Damper is used to adjust the amount of air passing through circular air ducts.
- ☞ Product options are available with plastic, metal and motor connection.

MATERIAL

- ☞ The casing and blade are made of galvanized sheet, optional stainless steel.
- ☞ For type plastic, plastic lever is made of ABS material.
- ☞ For type metal, metal lever mechanism is made of galvanized sheet.

COATING

- ☞ Standard RAL 9010 or RAL 9016 electrostatic powder paint.
- ☞ Optional
 - Different RAL color codes
 - Aluminium anodizing
 - Without color

DIMENSIONS

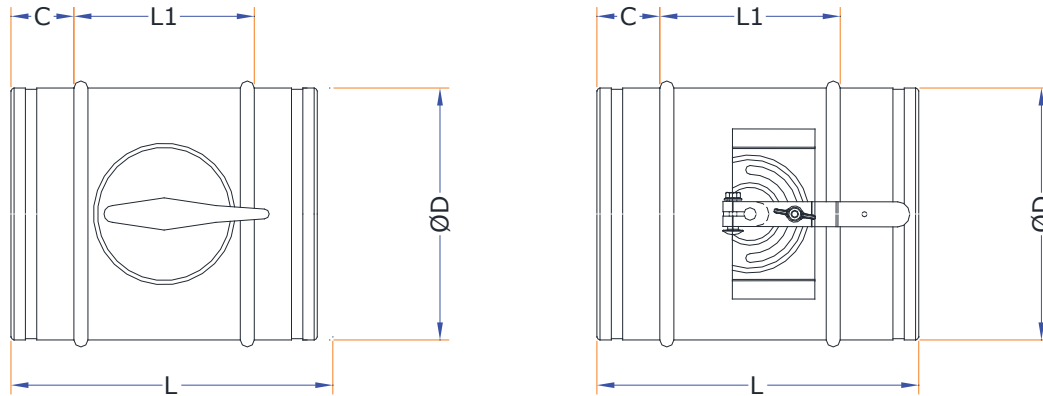
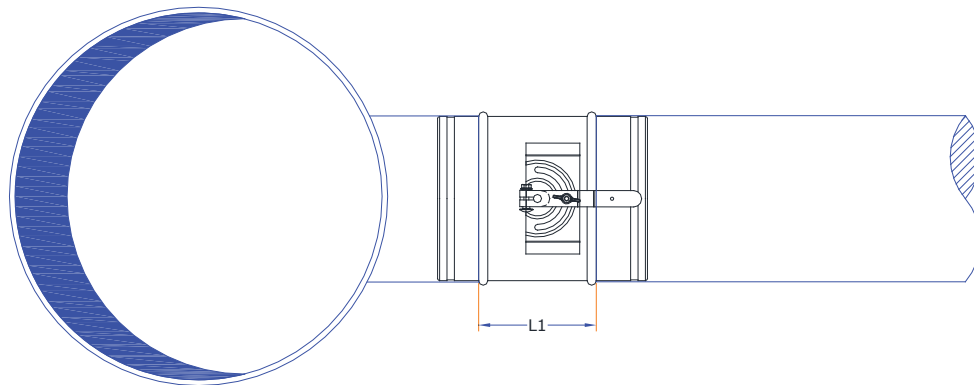


Table 1

Dimension [mm]	100	125	150	160	180	200	225	250	280	300	315	355	400	450	500
ØD	98	123	148	158	178	198	223	248	278	298	313	353	398	448	498
L	240	240	240	240	240	280	280	280	360	360	360	400	500	500	530
L1	160	160	160	160	160	180	180	180	230	230	230	270	370	370	400
C	50	50	50	50	50	50	50	50	65	65	65	65	65	65	65

Note: Up to ØD = 250 mm, plastic or metal kit products can be selected optionally. After ØD > 250 mm size, products are motorized as standard.

INSTALLATION

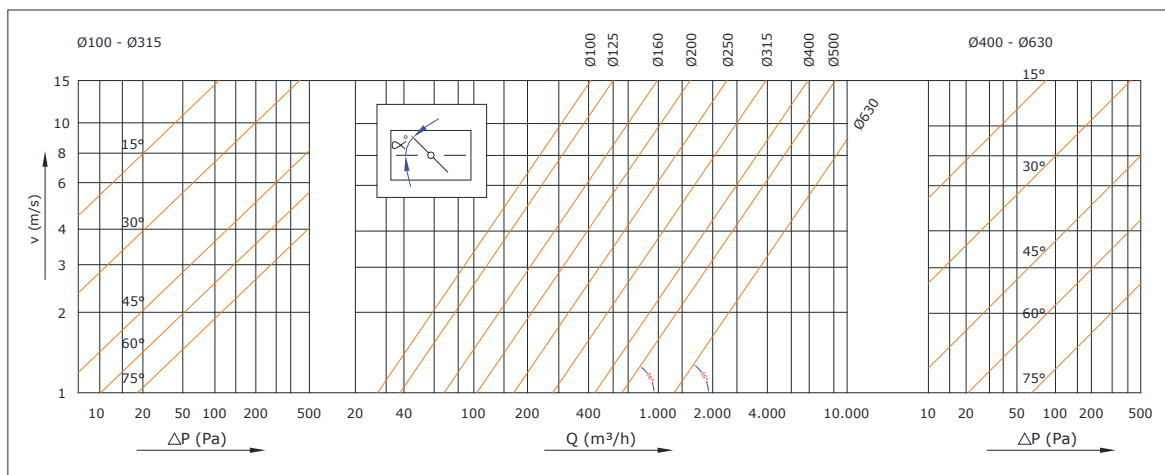


The circular damper is installed in such a way that it passes into the circular duct. It must be fixed with a screw after it is inserted into the channel.

PERFORMANCE DATA

The pressure drop value is calculated by using the air velocity in the duct and the angle of the damper blade. The duct size is calculated on the graph using the air flow and velocity values in the duct.

QUICK SELECTION



NOISE DATA

$$L_{wa}[dB(A)] = L + L_1 + L_2$$

L Value								
	α°	Frequency (Hz)						
		125	250	500	1000	2000	4000	8000
100 - 355	15	37	26	22	18	11	11	10
	30	43	32	28	24	19	19	18
	45	48	43	38	34	31	30	31
	60	54	51	48	46	45	43	42
	75	58	55	54	52	52	51	50
400 - 500	15	39	29	24	20	14	14	12
	30	46	35	31	27	22	22	21
	45	52	47	42	38	35	34	34
	60	59	56	53	51	50	48	47
	75	64	62	61	59	59	59	58

Table 2

Dimension	100	125	160	200	250	315	400	500
L1 [dB]	-2	-1	0	1	2	3	4	5

Table 3

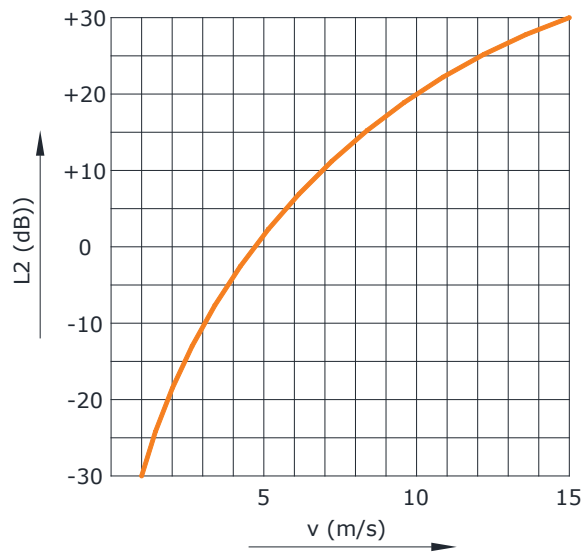


Figure 1

Calculation Method

For Q = [1500 m³/h] flow rate, v = 3 [m/s] air velocity and $\alpha^\circ = 45^\circ$ damper blade angle;

From Table 1, Q, v and desired pressure loss values and duct size are determined as Ø400.

For sound pressure calculations, L, L1 and L2 values are determined with Table 1, Table 2 and Figure 1 and their sum is equal to the sound power.

$$LWA = L + L1 + L2 \text{ [dB (A)]}$$

$$LWA = 47 + 4 + [- 10] = 41 \text{ [dB (A)]}.$$

ACTUATOR CONNECTION

- ☞ After ØD> 250 mm size, products will be actuator type as standard.
- ☞ On-Off or Proportional Damper Motor options are available. It must be notified before manufacturing.
- ☞ Optionally, 220V or 24V motor options are available.

ORDER CODE

VDD.<A>..<C>.<D>.<E>.

A	Material	
	GAL	Galvanized
	PAS	AISI 304 Stainless Steel
B	Mechanism	
	PLS	Plastic Type
	MTL	Metal Type
	MBU	Actuator Connection, [Without Actuator]
	S59	LM24A-5Nm
	S66	LM230A-5Nm
	S61	LM24A-SR 5Nm
	S64	LMQ24A-4NM
	S49	LF24 4Nm
	S40	GQD126.1A
	S35	GDB131.1E
	S85	GSD121.1A
	S82	CM24-L 2Nm
	S81	TF230
	S80	TF24 2Nm
C	Installation	
	KG	Duct Mounting
D	Dimension (ØD) [mm]	
	100 - 125 - 150 - 160 - 180 - 200 - 225 - 250 - 280 - 300 - 315 - 355 - 400 - 450 - 500	
E	Color	
	00	Without Color
	S1	Standart Color - RAL 9010
	S2	Standart Color - RAL 9016
	XX	Special Color

Example Order Code; VDD.GAL.MTL.KG.300.00

NOTES





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General Specifications

- High efficient plug fans with backward-curved blades for low energy consumption.
- High efficient aluminum heat exchanger
- Low sound level
- High static pressure
- ISO Coarse 55% Filters
- Optional duct type water heater or electric heater
- Optional duct type attenuator
- Optional automation solutions

Operation

In venues where air conditioned by heating or cooling, low grade climatized indoor air which includes high quantity carbon dioxide and other harmful gases, occur. While this poor quality of air is exhausted, the heat load of the exhaust air is collected on the heat exchanger. Afterwards, conditioning of the supply air is ensured by this energy load. Thus, the heat load of the air is recycled in the ratio of 50-60%, while poor quality indoor air is exhausted. IGK-Heat Recovery Units perform quietly and efficiently by means of plug fans . Unit can operate at desired air flow by speed control which is delivered as standard.

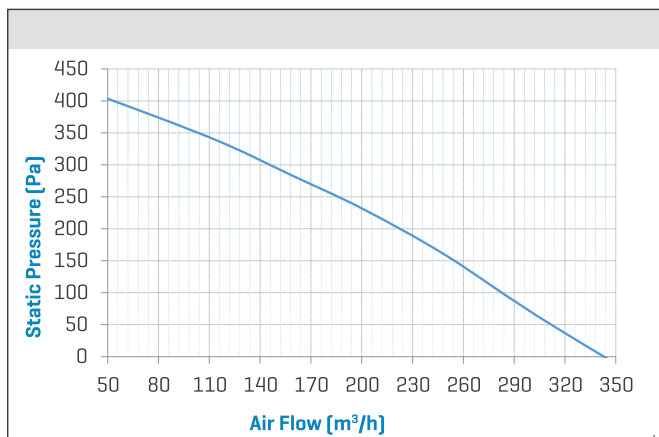


Material

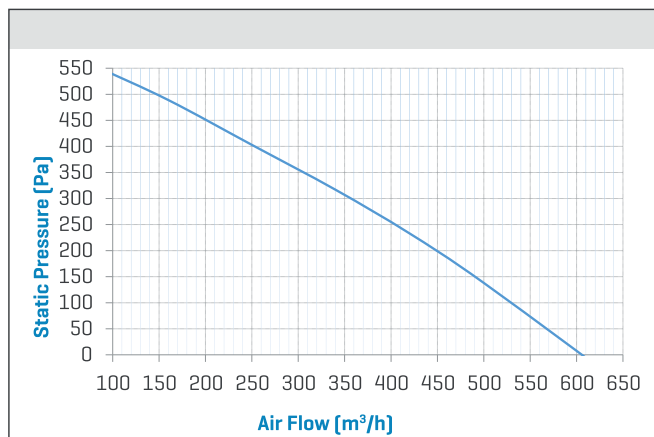
IGK-Heat Recovery Units are comprised 6 main parts. The case [1] is manufactured from galvanized steel. Inner insulation is 9 mm rubber . Thus, the sound and heat insulation is ensured. The lifetime and visuality are increased by powder. Supply and exhaust fans are plug type [2]. Service doors for easy maintenance for fans[3].ISO Coarse %55 filters [4] in both exhaust and fresh air inlet. Thus, aluminum heat exchanger [5], which is main component of the unit, is kept clear and efficient operation is ensured. The electric connection box [6], which has the terminal connections of the fans, is fixed on the case of unit for easy connection of the unit to the network.



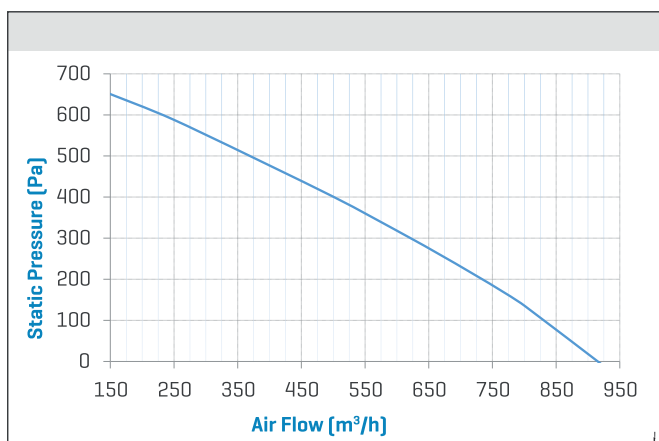
IGK-04



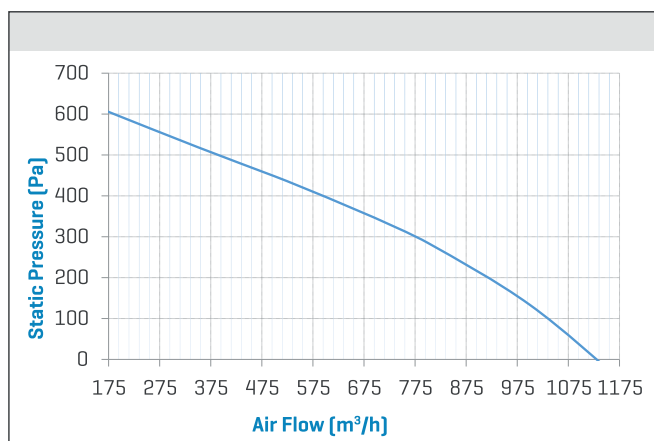
IGK-07



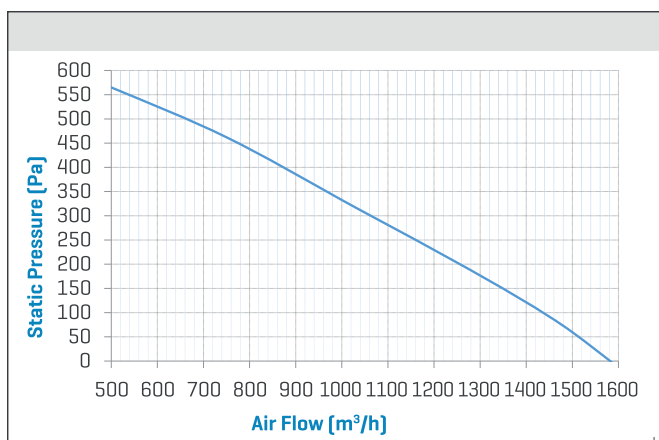
IGK-10



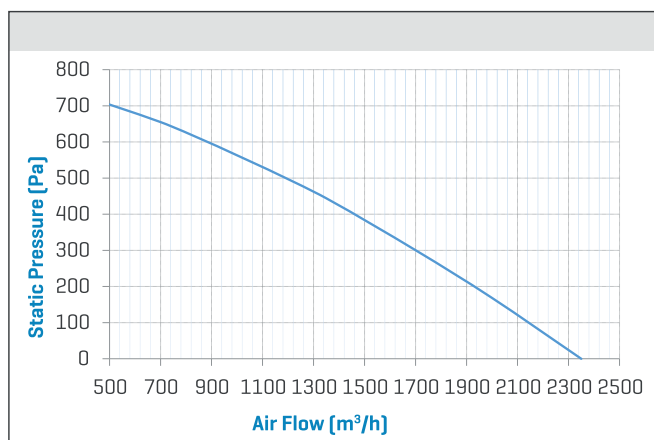
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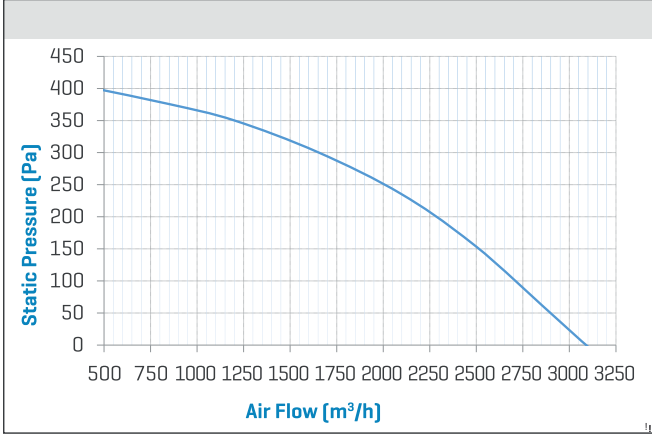
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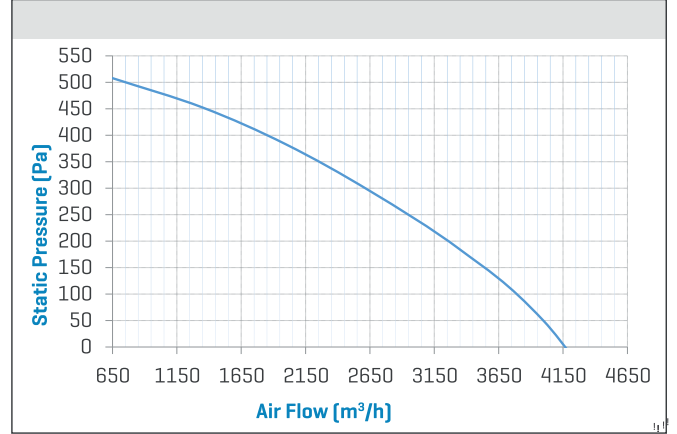
IGK-30



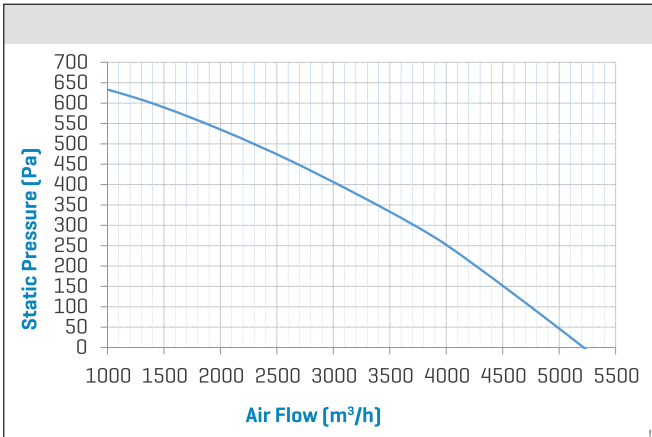
IGK-40



IGK-50



IGK-60

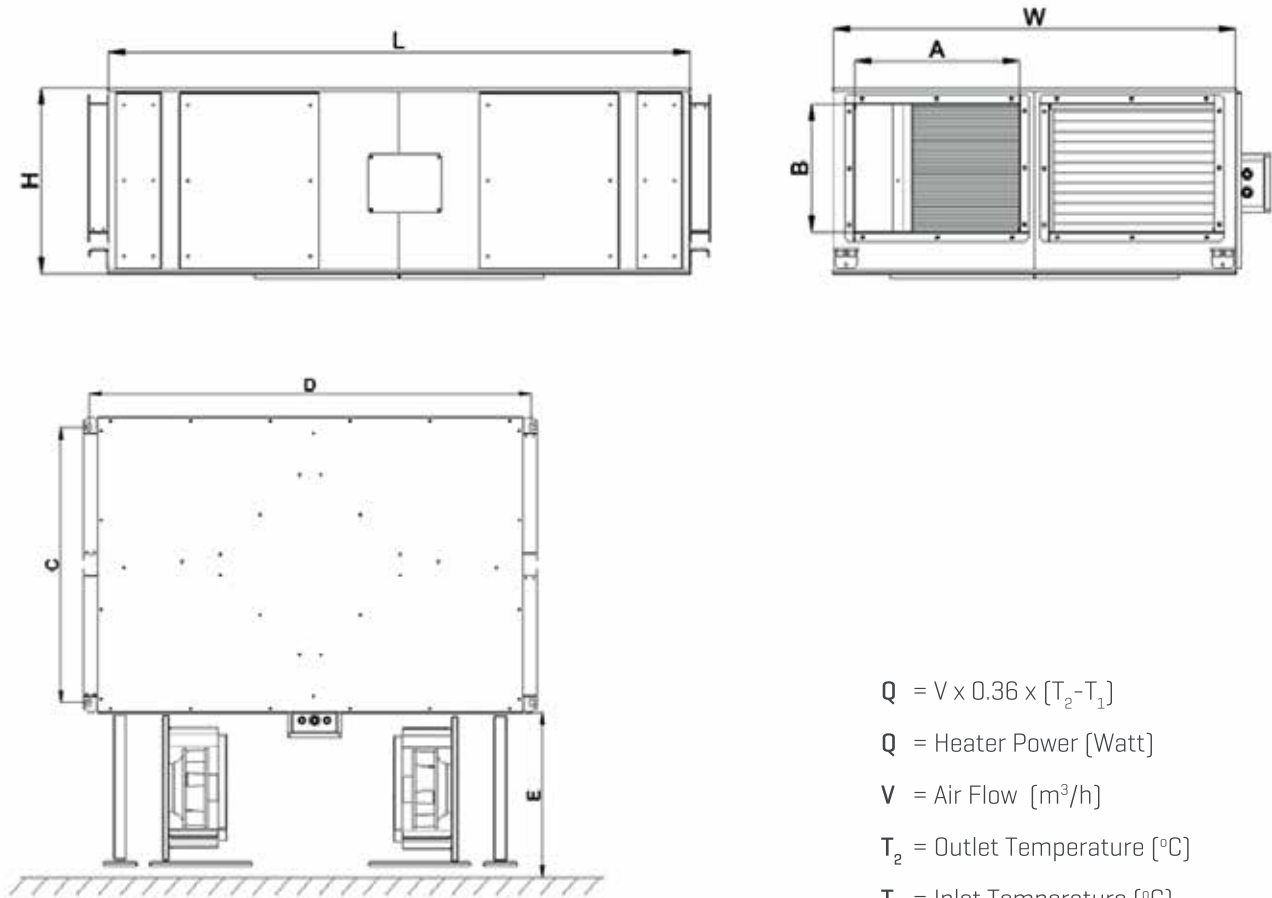


TECHNICAL DATA

Unit Models		IGK-04	IGK-07	IGK-10	IGK-15	IGK-20	IGK-30	IGK-40	IGK-50	IGK-60
Air Flow [0 Pa ESP]	m³/h	345	610	910	1125	1580	2350	3150	4155	5250
Air Flow [150 Pa ESP]	m³/h	250	500	800	1000	1350	2000	2500	3500	4500
Total Power	W	128	270	414	424	634	1006	916	1388	2600
Sound Power	dB[A]	48	59	63	58	65	64	65	67	68

Note:
Sound power values are 1 meter from the unit.

Dimensions



$$Q = V \times 0.36 \times [T_2 - T_1]$$

Q = Heater Power [Watt]

V = Air Flow [m³/h]

T₂ = Outlet Temperature [°C]

T₁ = Inlet Temperature [°C]

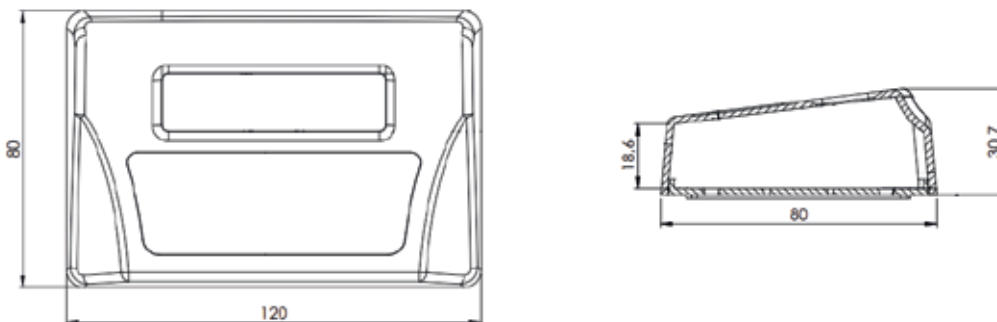
	Unit	Capacity				L	W	H	A	B	C	D	E	Weight	ELECTRICAL HEATER
		Air Flow	Pressure	Air Flow	Pressure										
		m ³ /h	Pa	m ³ /h	Pa	mm	mm	mm	mm	mm	mm	mm	mm	kg	Capacity
MODELS	IGK-04	345	0	250	150	960	600	305	200	150	530	1026	320	35	1 kW-1Stg
	IGK-07	620	0	500	150	980	650	355	230	200	580	1046	350	45	2 kW-1Stg
	IGK-10	910	0	800	150	1120	720	355	260	210	650	1086	400	55	3 kW-2Stg
	IGK-15	1125	0	1000	150	1160	800	385	300	240	730	1126	440	60	4 kW-2Stg
	IGK-20	1570	0	1350	150	1430	980	450	390	300	910	1496	550	105	6 kW-3Stg
	IGK-30	2350	0	2000	150	1590	1100	510	450	350	1030	1656	610	130	9 kW-3Stg
	IGK-40	3100	0	2500	150	1900	1126	620	510	460	1156	1966	660	160	10 kW-3Stg
	IGK-50	4155	0	3500	150	1930	1300	675	550	520	1230	1996	700	210	15 kW-3Stg
IGK-60	5550	0	5000	150	1930	1300	675	550	520	1230	1996	700	210	15 kW-3Stg	

Control Panel

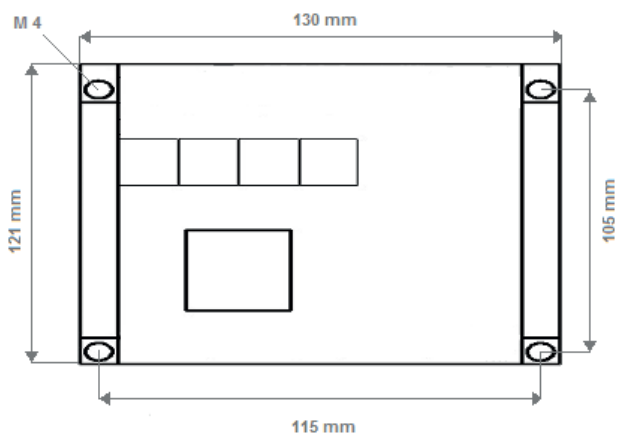
The control panel, which is has been designed with thinking all details of the heat recovery units, takes the control of the heat recovery unit one step further. Nowadays as energy costs increase day by day, energy saving is gained importance in air conditioning. It plays a big role in the operating cost decrease with energy saving raise to high levels.

- 220V AC supply
- Instant motoring of room temperature
- User-friendly screen interface
- Summer or winter mode
- Automatic or manual operation
- Motoring the fan stages in manual mode
- Ability to communicate between the control unit and the heat recovery device at a distance up to 50 meters

DCP-6 (Room Panel)



M1002 (Control Card)



NOTES





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Four Eco Details

Venues Breathe with Dogu HVAC Systems!

Dogu HVAC Systems which had started to produce ventilation and air-conditioning equipments in İzmir in 1999, produce two main segments as air outlet equipments and air handling units in accordance with European norms [DIN,EN]. Dogu puts the devices on the market with "Four Season" brand.

Dogu HVAC Systems which is in business within 45.000m² open area with 2 factory, has 120 different types of products. It brings new products to the sector producing Make-up Kitchen Hoods, Laminar Flow Ceiling, One Piece Square Ceiling Diffuser.

Our R&D journey started in 2004 with the first project of producing Make-up Kitchen Hood is followed by producing dozens of other new products that were designed by special software like Ansys Fluent[®] and Solidworks[®] today.



Four Eco Details



İKLİMLENDİRME | HVAC SYSTEMS



Four Eco





Four Eco

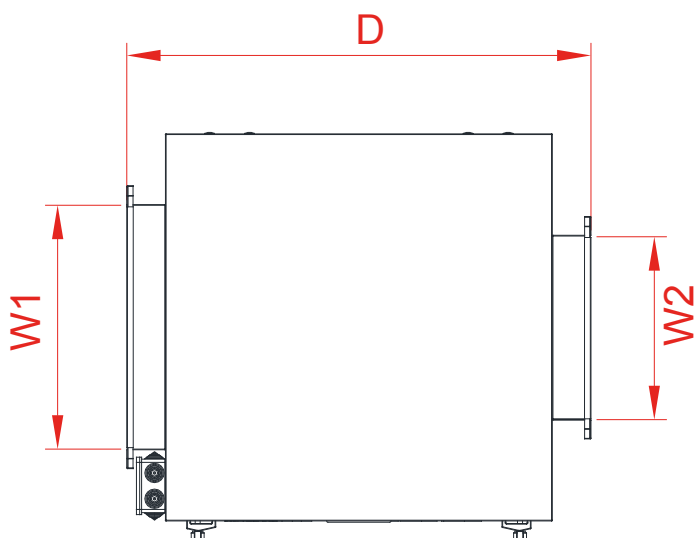
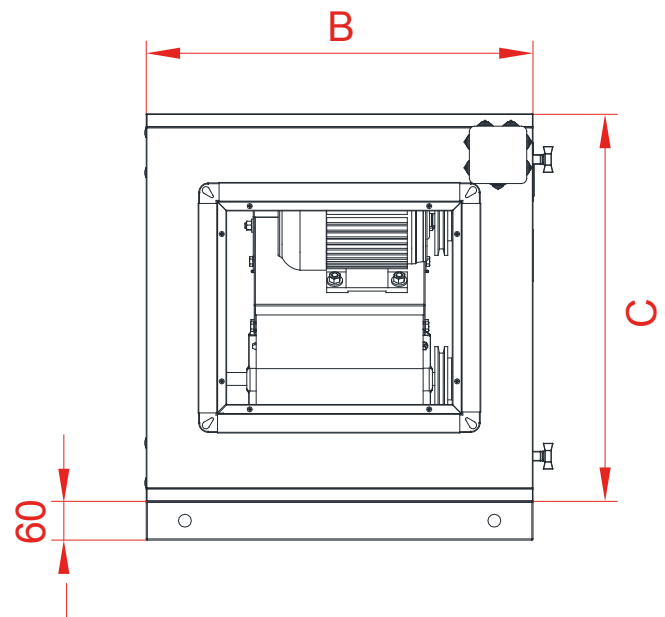
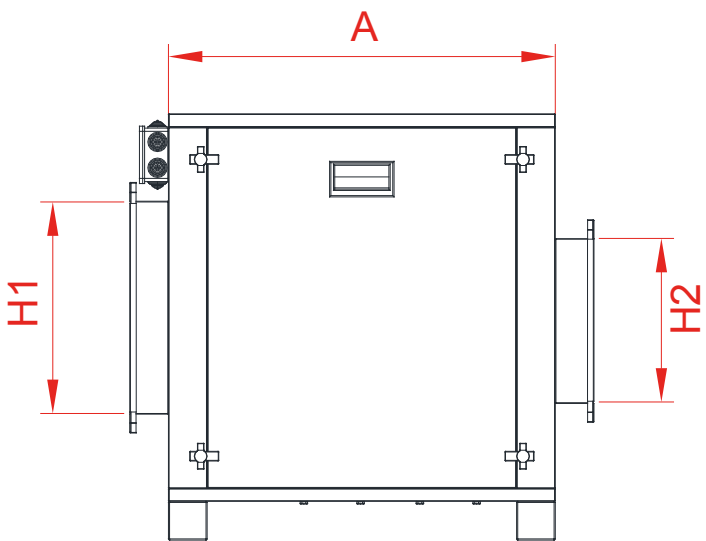
Contents

- Four Eco
- Quick Selection
- Table
- Features



Quick Selection

Type	Air Flow M ³ / H	External Static Pressure Pa	Total Pressure Pa	Motor Kw - D/d	Dimensions mm						Weight
					A	B	C	D	W1xH1 Return	W2xH2 Supply	Kg
FOUR ECO 1	2500	270	400	0.75 - 1500	600	600	600	720	380x330	285x255	43
FOUR ECO 2	3500	400	500	1.1 - 1500	750	600	600	870	425x375	325x285	48
FOUR ECO 3	5000	320	450	1.5 - 1500	800	700	700	920	500x425	360x315	55
FOUR ECO 4	7500	300	450	2.2 - 1500	850	800	800	990	525x500	420x370	65
FOUR ECO 5	10000	400	530	3 - 1500	900	900	900	1060	775x525	500x430	80
FOUR ECO 6	12500	345	444	3 - 1500	1500	1050	1050	1210	825x575	580x500	170
FOUR ECO 7	15000	294	436	4 - 1500	1500	1050	1050	1210	825x575	580x500	170



- 7 different capacities
- Direct delivery from the stock,
- Silent fans - motor assembly [curved blade with double inlet fan - 3 phase motors]
- Acoustic insulation
- Vibration isolator base,
- Low energy consumption,
- Corrosion-resistant body with powder-coating
- Unassembled shipping possibilities



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VDM
RECTANGULAR VOLUME
CONTROL DAMPER

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 4 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 standards. 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 2 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 4 sales offices located in İstanbul, Ankara, Antalya and Adana 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 standards], 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 TSEK, CE and GOST-R quality certifications.



- ☞ VDM - Rectangular Volume Control Damper is a opposite bladed damper used in duct, wall and ceiling applications for air volume and pressure control.
- ☞ Thanks to the aerofil blade structure, the effect on the total static pressure of the system is low. In addition, the sound levels are also reduced in this way.
- ☞ Damper blade adjustment can be manually selected with lever or actuator.

PRODUCT TYPE AND MATERIAL

- ☞ VDM.ALM.AK: The frame and blades are made of aluminum material.
- ☞ VDM.GAL.AK: Its frame is made of galvanized material and its blades are made of aluminum.
- ☞ VDM.GAL.GK: Its frame and blades are manufactured from galvanized material.
- ☞ Galvanized steel shaft.
- ☞ PVC gear drive mechanism.

VDM.ALM.AK



VDM.GAL.AK



VDM.GAL.GK



SURFACE COATING

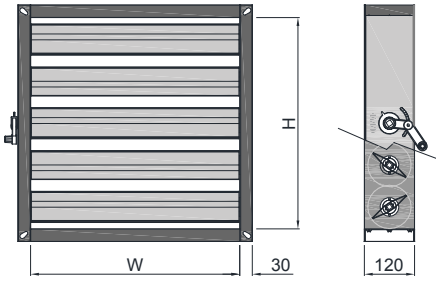
- ☞ It is unpainted as standard.
- ☞ Optional [VDM.ALM.AK]
 - Electrostatic powder paint in RAL color codes

INSTALLATION OPTIONS

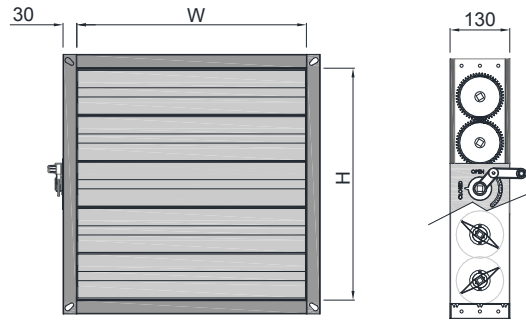
- ☞ Duct Installation
- ☞ Supply
- ☞ Return
- ☞ Air Transfer

STANDARD SIZES

VDM.ALM.AK



VDM.GAL.AK



VDM.GAL.GK

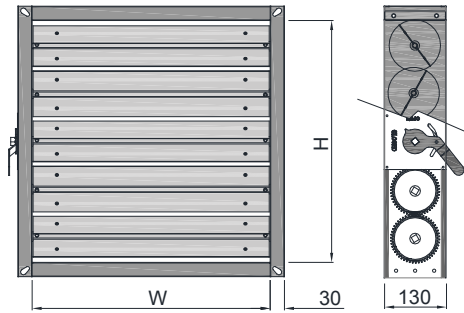


Table 1. Standard Sizes

Standard Sizes		H (Height) (mm)													
		100	200	300	400	500	700	800	900	1000	1100	1200	1300	1400	1500
W (Width) (mm)	100	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	200	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	300	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	400	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	500	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	600	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	700	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	800	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	900	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1000	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1100	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1200	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1300	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1400	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1500	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	1750	✓	✓	✓	✓	✓	✓	✓	✓	✓					
2000	✓	✓	✓	✓	✓	✓	✓	✓	✓						
2250	✓	✓	✓	✓	✓	✓	✓								
2500	✓	✓	✓	✓	✓	✓	✓								

Note: When the stainless blade is selected, the W [Width] dimension can be maximum 700 mm.

PERFORMANCE DATA

Table 2. Performance Data

Air Velocity [m/s]	Damper Position									
	Open		%25 closed		%50 closed		%75 closed		%100 closed	
	Total Pressure Loss [Pa]	Sound Power Level [dB]	Total Pressure Loss [Pa]	Sound Power Level [dB]	Total Pressure Loss [Pa]	Sound Power Level [dB]	Total Pressure Loss [Pa]	Sound Power Level [dB]	Total Pressure Loss [Pa]	Sound Power Level [dB]
1	<1	11	1	16	8	35	87	58	986	>90
2	1	27	3	32	31	51	348	74	>2000	>90
4	3	43	11	48	122	67	1390	>90	>2000	>90
6	7	52	24	57	276	76	>2000	>90	>2000	>90
8	13	59	43	64	490	83	>2000	>90	>2000	>90
10	21	81	67	69	766	88	>2000	>90	>2000	>90
12	31	90	97	73	1104	>90	>2000	>90	>2000	>90

Notes: As the damper blades are closed, the shut-off effect occurs due to the high pressure that will occur. In order to achieve an air velocity of more than 1 m/s at more than 75% closed blade positions, very high static pressurization must be applied to the duct.

Table 3. Damper Closed Position Sound Power Level

In-Duct Static Pressure [Pa]	Flow Field [WxH] [m ²]													
	0,01	0,04	0,09	0,16	0,25	0,42	0,56	0,72	0,9	1,1	1,32	1,56	1,82	2,1
	Sound Power Level [dB]													
100	38	42	45	48	50	52	53	54	55	56	57	58	59	59
200	43	49	52	55	57	60	61	63	64	65	66	67	68	69
400	50	56	61	64	66	69	71	72	74	75	76	77	78	79
600	55	61	66	69	72	75	77	79	80	81	83	84	85	86
800	58	65	70	73	76	80	82	83	85	86	88	89	>90	>90
1000	61	68	73	77	80	83	85	87	89	>90	>90	>90	>90	>90
1250	63	71	77	80	84	87	90	>90	>90	>90	>90	>90	>90	>90
1500	66	74	80	84	87	>90	>90	>90	>90	>90	>90	>90	>90	>90
1750	68	77	82	86	90	>90	>90	>90	>90	>90	>90	>90	>90	>90
2000	70	79	84	89	>90	>90	>90	>90	>90	>90	>90	>90	>90	>90

Table 4. Flow Field Table

Flow Field [m ²]	H (Height) [mm]														
	100	200	300	400	500	700	800	900	1000	1100	1200	1300	1400	1500	
W (Width) [mm]	100	0,01	0,02	0,03	0,04	0,05	0,07	0,08	0,09	0,10	0,11	0,12	0,13	0,14	0,15
	200	0,02	0,04	0,06	0,08	0,10	0,14	0,16	0,18	0,20	0,22	0,24	0,26	0,28	0,30
	300	0,03	0,06	0,09	0,12	0,15	0,21	0,24	0,27	0,30	0,33	0,36	0,39	0,42	0,45
	400	0,04	0,08	0,12	0,16	0,20	0,28	0,32	0,36	0,40	0,44	0,48	0,52	0,56	0,60
	500	0,05	0,10	0,15	0,20	0,25	0,35	0,40	0,45	0,50	0,55	0,60	0,65	0,70	0,75
	600	0,06	0,12	0,18	0,24	0,30	0,42	0,48	0,54	0,60	0,66	0,72	0,78	0,84	0,90
	700	0,07	0,14	0,21	0,28	0,35	0,49	0,56	0,63	0,70	0,77	0,84	0,91	0,98	1,05
	800	0,08	0,16	0,24	0,32	0,40	0,56	0,64	0,72	0,80	0,88	0,96	1,04	1,12	1,20
	900	0,09	0,18	0,27	0,36	0,45	0,63	0,72	0,81	0,90	0,99	1,08	1,17	1,26	1,35
	1000	0,10	0,20	0,30	0,40	0,50	0,70	0,80	0,90	1,00	1,10	1,20	1,30	1,40	1,50
	1100	0,11	0,22	0,33	0,44	0,55	0,77	0,88	0,99	1,10	1,21	1,32	1,43	1,54	1,65
	1200	0,12	0,24	0,36	0,48	0,60	0,84	0,96	1,08	1,20	1,32	1,44	1,56	1,68	1,80
	1300	0,13	0,26	0,39	0,52	0,65	0,91	1,04	1,17	1,30	1,43	1,56	1,69	1,82	1,95
	1400	0,14	0,28	0,42	0,56	0,70	0,98	1,12	1,26	1,40	1,54	1,68	1,82	1,96	2,10
	1500	0,15	0,30	0,45	0,60	0,75	1,05	1,20	1,35	1,50	1,65	1,80	1,95	2,10	
	1750	0,18	0,35	0,53	0,70	0,88	1,23	1,40	1,58	1,75					
2000	0,20	0,40	0,60	0,80	1,00	1,40	1,60	1,80	2,00						
2250	0,23	0,45	0,68	0,90	1,13	1,58	1,80								
2500	0,25	0,50	0,75	1,00	1,25	1,75	2,00								

ACTUATORS

The VDM is adjusted as standard with the hand lever. An optional actuator can be used instead of the adjustment lever. Servo motors have on off, proportional, fast reaction and spring return control options.

Table 5. Actuator Table

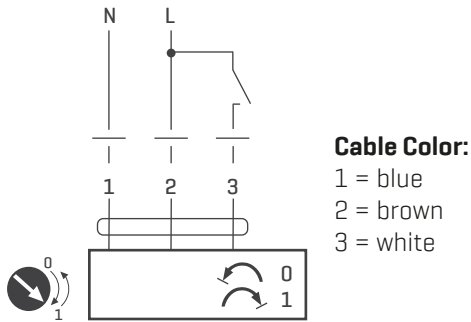
	Order code	Name	Control	Voltage	Torque	Switch Option
Open Close Actuators	S66	LM230A	1 wired control (On Off) 2 wired control (3-point)	100 – 240 V AC	5Nm	-
	S59	LM24A	1 wired control (On Off) 2 wired control (3-point)	24 V AC/DC	5Nm	-
	S44	LM230A	1 wired control (On Off) 2 wired control (3-point)	100 – 240 V AC	5Nm	S2A
	S20	LM24A	1 wired control (On Off) 2 wired control (3-point)	24 V AC/DC	5Nm	S2A
	N01	NM230A	1 wired control (On Off) 2 wired control (3-point)	100 – 240 V AC	10Nm	-
	S36	NM24A	1 wired control (On Off) 2 wired control (3-point)	24 V AC/DC	10Nm	-
	S43	NM230A	1 wired control (On Off) 2 wired control (3-point)	100 – 240 V AC	10Nm	S2A
	S21	NM24A	1 wired control (On Off) 2 wired control (3-point)	24 V AC/DC	10Nm	S2A
	S08	SM230A	1 wired control (On Off) 2 wired control (3-point)	100 – 240 V AC	20Nm	-
	S04	SM24A	1 wired control (On Off) 2 wired control (3-point)	24 V AC/DC	20Nm	-
	S09	SM230A	1 wired control (On Off) 2 wired control (3-point)	100 – 240 V AC	20Nm	S2A
	S10	SM24A	1 wired control (On Off) 2 wired control (3-point)	24 V AC/DC	20Nm	S2A
Quick Response Open Close Actuator	S45	SMQ24A	1 wired control (On Off)	24 V AC/DC	16Nm	-
Open Close Actuator With Spring Return	S65	NF24A	Voltage On Off	24 V AC/DC	10Nm	-
Proportional Actuators	S61	LM24A-SR	2 – 10 V DC	24 V AC/DC	5Nm	-
	S36	NM24A-SR	2 – 10 V DC	24 V AC/DC	10Nm	-
	S11	SM24A-SR	2 – 10 V DC	24 V AC/DC	20Nm	-
Proportional Actuator With Spring Return	S96	NF24A-SR	2 – 10 V DC	24 V AC/DC	10Nm	-

Table 6. Actuator Torque Selection Table

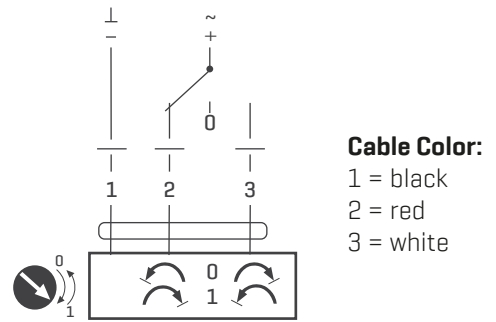
Actuator Torque selection	H (Height) [mm]														
	100	200	300	400	500	700	800	900	1000	1100	1200	1300	1400	1500	
W (Width) [mm]	100	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm
	200	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm
	300	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm
	400	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm
	500	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm
	600	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	10 Nm	10 Nm	10 Nm
	700	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	10 Nm	10 Nm	10 Nm	10 Nm
	800	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	10 Nm	10 Nm	10 Nm	10 Nm	10 Nm	10 Nm
	900	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	10 Nm	10 Nm	10 Nm	10 Nm	10 Nm	10 Nm	10 Nm
	1000	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	10 Nm	10 Nm	10 Nm	10 Nm	10 Nm	10 Nm	10 Nm	10 Nm
	1100	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	10 Nm	10 Nm	10 Nm	10 Nm	10 Nm	10 Nm	10 Nm	10 Nm
	1200	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	10 Nm	10 Nm	10 Nm	10 Nm	10 Nm	10 Nm	10 Nm	10 Nm	10 Nm
	1300	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	10 Nm	10 Nm	10 Nm	10 Nm	10 Nm	10 Nm	10 Nm	20 Nm	20 Nm
	1400	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	10 Nm	10 Nm	10 Nm	10 Nm	10 Nm	10 Nm	20 Nm	20 Nm	20 Nm
	1500	5 Nm	5 Nm	5 Nm	5 Nm	5 Nm	10 Nm	10 Nm	10 Nm	10 Nm	10 Nm	10 Nm	20 Nm	20 Nm	
	1750	5 Nm	5 Nm	5 Nm	5 Nm	10 Nm	10 Nm	10 Nm	10 Nm	10 Nm					
2000	5 Nm	5 Nm	5 Nm	10 Nm	10 Nm	10 Nm	10 Nm	10 Nm	20 Nm						
2250	5 Nm	5 Nm	5 Nm	10 Nm	10 Nm	10 Nm	10 Nm								
2500	5 Nm	5 Nm	5 Nm	10 Nm	10 Nm	10 Nm	20 Nm								

ACTUATOR WIRING DIAGRAMS

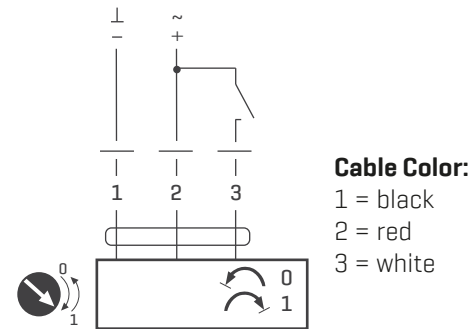
1 wire control AC 230V [On Off]



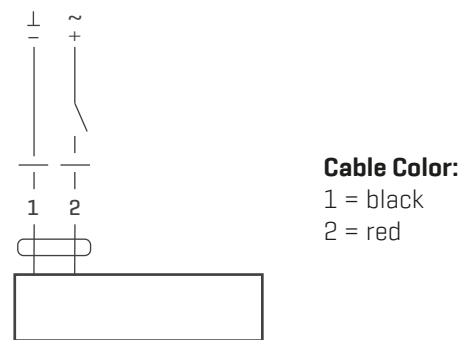
2 wire control AC/DC 24V [3 Points]



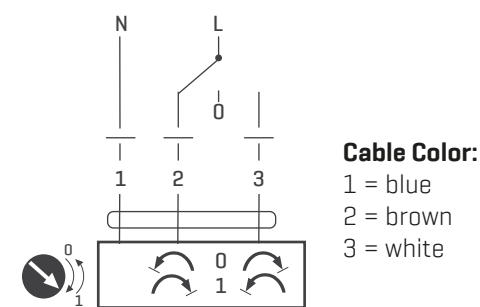
1 wire control AC/DC 24V [On Off]



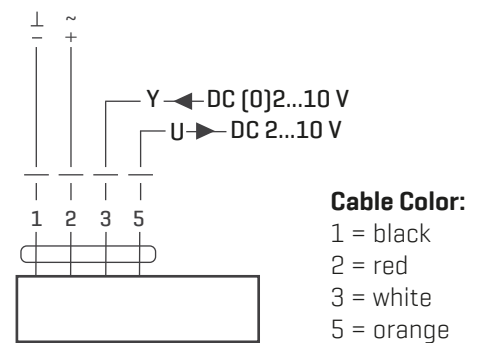
Voltage On Off AC/DC 24 V



2 wire control AC 230V [3 Points]



2-10 V DC Proportional [AC/DC 24 V]



PRODUCT SELECTION

Example: A prismatic air control damper will be mount to a duct with an air flow of 500 m³/h. The blade control will be on and off with a 24 V AC/DC servomotor. It is desired that the pressure loss should be less than 15 Pa and the sound power level should be less than 50 dB when the damper is in open and closed positions. When the blade is in the closed position, the static pressure that will occur in the channel will be 100 Pa. Make the product selection.

Solution: In order to keep the sound power level less than 50 dB when the static pressure inside the duct is 100Pa and the damper is in the closed position, the damper dimensions are controlled from the Damper Closed Position Sound Level Table[Table 3]. According to the table, values less than 50 dB at 100 Pa in-duct static pressure are between 0.01 m² and 0.25 m².

The technical characteristics of the damper in the open position are calculated with the help of performance data. The performance values in the table are found with the air velocity information. The following formula is used for the air velocity:

$$\text{Velocity} = \text{Flow Rate} / \text{Flow Area}$$

The values of 0.01 m² and 0.25 m² are used for the flow area, and 500 m³/h is used for the flow rate.

Accordingly, the velocity values that can be selected are between 0.56 m/s and 13.88 m/s. Using these values, a selection is made from Table 2. According to the table, the air flow rate between 0.56 m/s and 4 m/s complies with the performance criteria. For example, 2 m/s can be selected. According to the table, when the air flow rate is 2 m/s when the damper is in the fully open position, the pressure loss is 1 Pa and the sound power level is 27 dB.

To determine the product sizes, the flow area at 2 m/s air flow rate is calculated and the Flow Area Table [Table 4] is used.

$$\text{Flow Area} = \text{Flow Rate} / \text{Velocity}$$

According to the formula, the flow area is 0.0694 m². W[Width] x H[Height] dimensions are selected from the table as 1000 mm x 700 mm.

Servomotor selection: First, the required torque for the damper is calculated, then the appropriate actuator is selected. Actuator Torque Selection According to the table, a damper actuator with a torque of 1000 mm x 700 mm and a torque of 5 Nm should be selected. Actuator selection is made with the Actuator Table. According to the table, the suitable servomotor is Belimo LM24A.

A	Frame Material	
	ALM	Aluminum
	GAL	Galvanized
B	Blade Material	
	AK	Aluminum Blade
	GK	Galvanized Blade
C	Mechanism	
	MEK	Mechanism Manual Control
	MBU	Suitable for Motor Connection, Without Motor
	S66	LM230A
	S59	LM24A
	S44	LM230A
	S20	LM24A
	N01	NM230A
	S36	NM24A
	S43	NM230A
	S21	NM24A
	S08	SM230A
	S04	SM24A
	S09	SM230A
	S10	SM24A
D	Width (W) [mm]	
	0000	Standard Sizes
E	Height (H) [mm]	
	0000	Standard Sizes
F	Paint	
	00	Unpainted
	S1	Standard Painted - RAL 9010
	S2	Standard Painted - RAL 9016
	XX	Special Painted

Sample Coding: VDM.GAL.AK.MEK.30.0800.0600.00

NOTES





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OLZ

Slot Diffuser With Plastic Blades [Large Type]

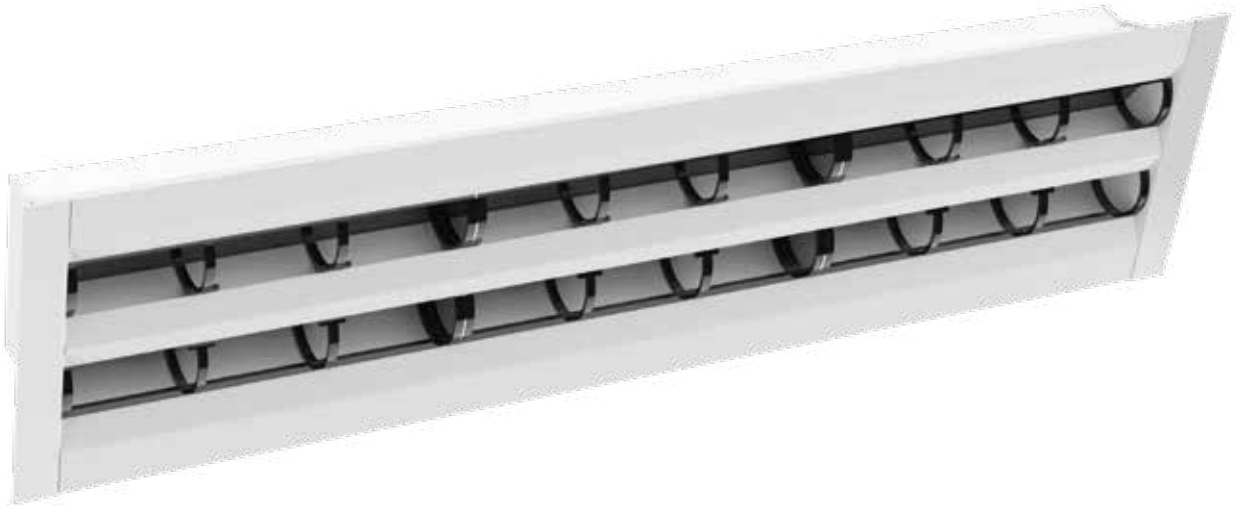
Venues Breathe with DOGU HVAC Systems!

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.



- ☞ OLZ - Slot Diffuser With Plastic Blades [Large Type] is both decorative thanks to its cylindrical, moving blades and modular structure and is ideal for meeting comfort parameters in difficult climatic spaces.
- ☞ The blade and slot internal structure has been aerodynamically optimized and has a compact structure. It provides energy saving thanks to its low pressure loss and acoustic comfort with low sound level thanks to its wide blade structure.
- ☞ They are used in feed or return in ceiling and wall applications. Use for horizontal shot from the ceiling suitable. It creates effective throw geometry in cooling applications with the Coanda effect.
- ☞ It is used in spaces between 2-4 m high.



MATERIAL

- ☞ Aluminum 6063 extrusion profile production
- ☞ ABS plastic blades that provide air direction inside the case.

SURFACE COATING

- ☞ RAL 9010 or RAL 9016 electrostatic powder paint as standard
- ☞ Optional
 - Different RAL color codes
 - Unpainted manufacturing
 - Matt anodised aluminum

MOUNTING OPTIONS

- ☛ Mounting Bracket

PRODUCT SELECTION

STANDARD DIMENSIONS

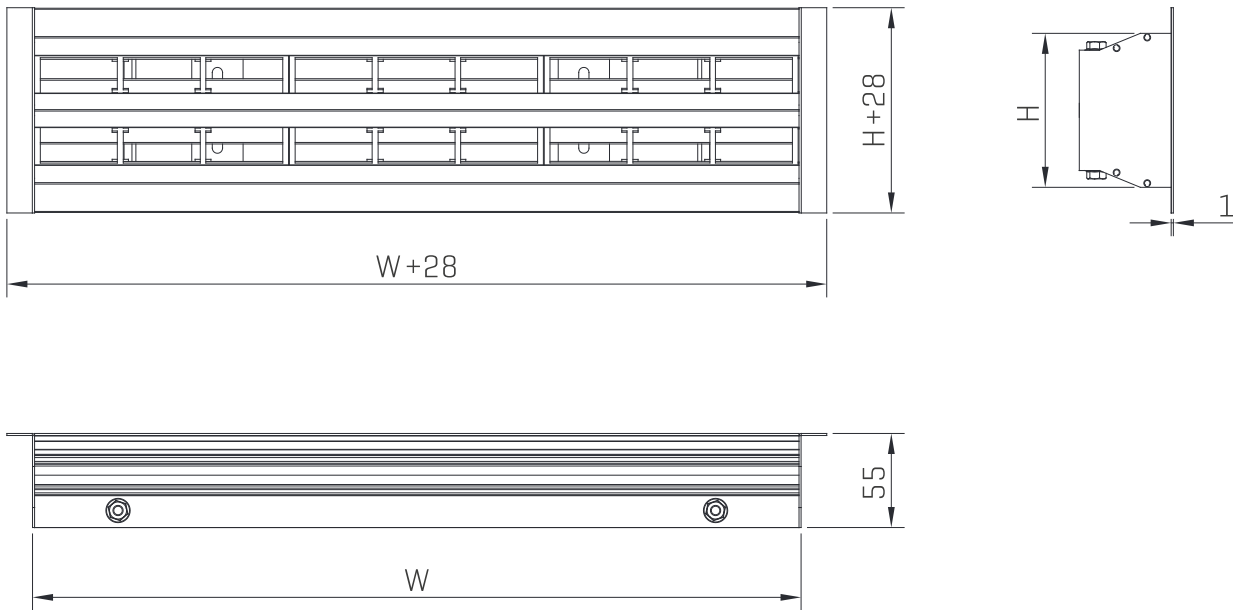


Table 1. Standard Sizes Table

Standard Sizes		H (Height) [mm]			
		1 Slot	2 Slots	3 Slots	4 Slots
		50	92	133	175
W (Width) [mm]	155	✓	✓	✓	✓
	300	✓	✓	✓	✓
	450	✓	✓	✓	✓
	600	✓	✓	✓	✓
	750	✓	✓	✓	✓
	900	✓	✓	✓	✓
	1050	✓	✓	✓	✓
	1200	✓	✓	✓	✓
	1345	✓	✓	✓	✓
	1495	✓	✓	✓	✓
	1645	✓	✓	✓	✓
	1800	✓	✓	✓	✓
1940	✓	✓	✓	✓	

PERFORMANCE DATA

EFFECTIVE AREA TABLE

Table 2. Effective Area Table

Effective Area [mm ²]		H (Height) [mm]			
		1 Slot	2 Slots	3 Slots	4 Slots
		50	92	133	175
W (Width) [mm]	155	0.0018	0.0029	0.0041	0.0052
	300	0.0031	0.0053	0.0075	0.0098
	450	0.0044	0.0078	0.0111	0.0145
	600	0.0058	0.0103	0.0147	0.0193
	750	0.0071	0.0128	0.0183	0.0240
	900	0.0085	0.0153	0.0219	0.0287
	1050	0.0098	0.0178	0.0255	0.0334
	1200	0.0112	0.0202	0.0291	0.0382
	1345	0.0125	0.0226	0.0326	0.0427
	1495	0.0138	0.0251	0.0362	0.0475
	1645	0.0152	0.0276	0.0397	0.0522
	1800	0.0166	0.0302	0.0435	0.0571
1940	0.0178	0.0325	0.0468	0.0615	

SUPPLY AIR DATA

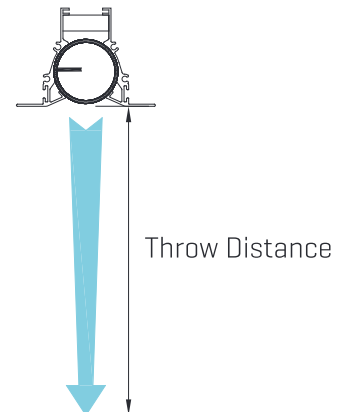
Table 3. Supply Air Data Table

Flow Rate (m³/h)		Effective Velocity (m/s)															
		0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	6.0	7.0	8.0	9.0	10.0	
50	Effective Area [m²]	0.0278	0.0139	0.0093	0.0069	0.0056	0.0046	0.0040									
	Pressure Drop [Pa]	2	3	5	6	7	8	9									
	Throw Distance [m]	1	1	2	2	2	3	3									
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	<15									
100	Effective Area [m²]	0.056	0.028	0.0185	0.0139	0.0111	0.0093	0.0079	0.0069	0.0062	0.0056	0.0046	0.0040				
	Pressure Drop [Pa]	3	5	7	9	11	13	14	16	18	19	22	25				
	Throw Distance [m]	1	1	2	2	2	3	3	4	4	4	5	6				
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	16	18	19	20	23	25				
200	Effective Area [m²]		0.056	0.037	0.0278	0.0222	0.0185	0.0159	0.0139	0.0123	0.0111	0.0093	0.0079	0.0069	0.0062	0.0056	
	Pressure Drop [Pa]		8	11	14	17	20	23	25	28	30	35	39	44	48	52	
	Throw Distance [m]		1	2	2	2	3	3	4	4	4	5	6	6	7	8	
	Sound Power Level [dB(A)]		<15	<15	16	19	22	24	25	27	28	31	33	34	36	37	
300	Effective Area [m²]			0.0556	0.0417	0.0333	0.0278	0.0238	0.0208	0.0185	0.0167	0.0139	0.0119	0.0104	0.0093	0.0083	
	Pressure Drop [Pa]			15	19	22	26	29	32	36	39	45	51	57	62	68	
	Throw Distance [m]			2	2	2	3	3	4	4	4	5	6	6	7	8	
	Sound Power Level [dB(A)]			17	21	24	26	28	30	31	33	35	37	39	41	42	
400	Effective Area [m²]				0.0556	0.0444	0.0370	0.0317	0.0278	0.0247	0.0222	0.0185	0.0159	0.0139	0.0123	0.0111	
	Pressure Drop [Pa]				22	27	31	35	39	43	47	54	61	68	75	81	
	Throw Distance [m]				2	2	3	3	4	4	4	5	6	6	7	8	
	Sound Power Level [dB(A)]				24	27	29	31	33	35	36	38	40	42	44	45	
500	Effective Area [m²]					0.0556	0.0463	0.0397	0.0347	0.0309	0.0278	0.0231	0.0198	0.0174	0.0154	0.0139	
	Pressure Drop [Pa]					31	36	40	45	50	54	62	71	78	86	94	
	Throw Distance [m]					2	3	3	4	4	4	5	6	6	7	8	
	Sound Power Level [dB(A)]					30	32	34	36	37	39	41	43	45	46	48	
600	Effective Area [m²]						0.0556	0.0476	0.0417	0.0370	0.0333	0.0278	0.0238	0.0208	0.0185	0.0167	
	Pressure Drop [Pa]						40	45	51	56	61	70	79	88	97	105	
	Throw Distance [m]						3	3	4	4	4	5	6	6	7	8	
	Sound Power Level [dB(A)]						34	36	38	39	41	43	45	47	48	50	
700	Effective Area [m²]							0.0556	0.0486	0.0432	0.0389	0.0324	0.0278	0.0243	0.0216	0.0194	
	Pressure Drop [Pa]							50	56	61	67	77	87	97	107	116	
	Throw Distance [m]							3	4	4	4	5	6	6	7	8	
	Sound Power Level [dB(A)]							38	40	41	42	45	47	49	50	51	
800	Effective Area [m²]								0.0635	0.0556	0.0494	0.0444	0.0370	0.0317	0.0278	0.0247	0.0222
	Pressure Drop [Pa]								55	61	67	73	84	95	106	117	127
	Throw Distance [m]								3	4	4	4	5	6	6	7	8
	Sound Power Level [dB(A)]								39	41	43	44	46	48	50	52	53
900	Effective Area [m²]									0.0625	0.0556	0.0500	0.0417	0.0357	0.0313	0.0278	0.0250
	Pressure Drop [Pa]									66	72	78	91	103	114	126	137
	Throw Distance [m]									4	4	4	5	6	6	7	8
	Sound Power Level [dB(A)]									42	44	45	48	50	51	53	54
1000	Effective Area [m²]										0.0617	0.0556	0.0463	0.0397	0.0347	0.0309	0.0278
	Pressure Drop [Pa]										77	84	97	110	122	134	146
	Throw Distance [m]										4	4	5	6	6	7	8
	Sound Power Level [dB(A)]										45	46	49	51	53	54	55
1250	Effective Area [m²]												0.0579	0.0496	0.0434		
	Pressure Drop [Pa]												112	127	141		
	Throw Distance [m]												5	6	6		
	Sound Power Level [dB(A)]												51	53	55		
1500	Effective Area [m²]													0.0595			
	Pressure Drop [Pa]													142			
	Throw Distance [m]													6			
	Sound Power Level [dB(A)]													55			

Quick Selection: Safe Selection Design Upper Limit High Pressure Drop

Note: Data is obtained with blades in a straight position. If the throw is adjusted horizontally, the pressure drop and sound power level data in the table have acceptable variability.

Throw distance: The vertical distance of the air in the comfort zone leaving the air distribution equipment at a speed of 0.25 m/s.



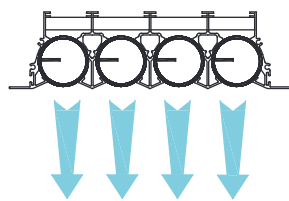
THROW DISTANCE CORRECTION TABLE

Table 4. Throw Distance Correction Table

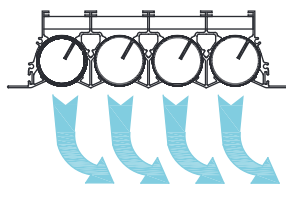
Heating Mode [ΔT]	4	6	8	10	12
Throw Distance Multiplier	1.07	1.02	1	0.90	0.83
Cooling Mode [ΔT]	4	6	8	10	12
Throw Distance Multiplier	1.31	1.36	1.42	1.48	1.54

AIR FLOW DIRECTION

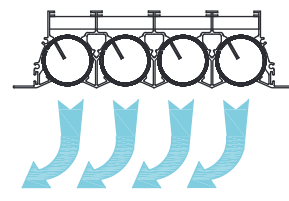
Below are sample application examples for air throw and air collector wing position.



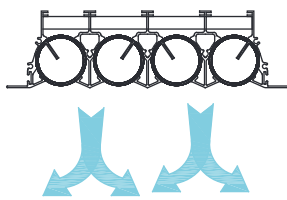
Blades in Straight Position



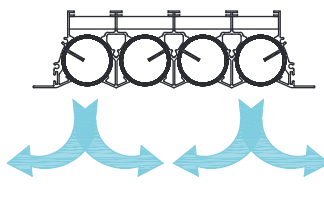
Blades in Right Position



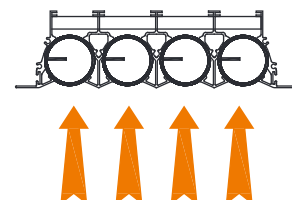
Blades in Left Position



Multi-Directional Distributor 30°



Multi-Directional Distributor 45°



Return Air

Note: OLZ - Slot Diffuser With Plastic Blades [Large Type] is suitable for use in variable flow rate systems and the air throw directing characteristic remains constant between 100% and 25% flow rate.

COVER OPTIONS

If specified in the order, the slot diffuser can be produced in the following ways, with a single cover or without covers on both sides. If the cover option is not specified in the order, standard cover production is made.

STANDARD CAP



SINGLE CAP

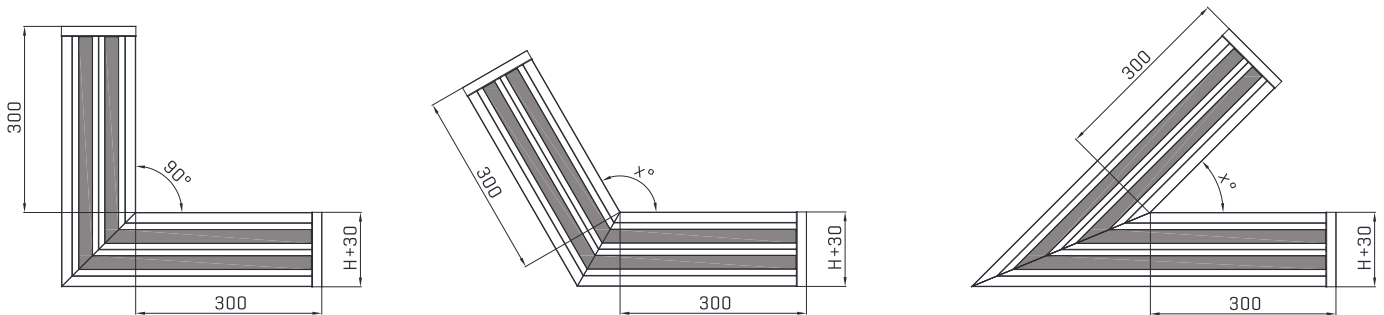


WITHOUT CAP



CORNER JOINING

In order to ensure the continuity of OLZ assembly in wall-to-wall applications, a stylish appearance is provided by the corner joining system that allows different angles of transitions.

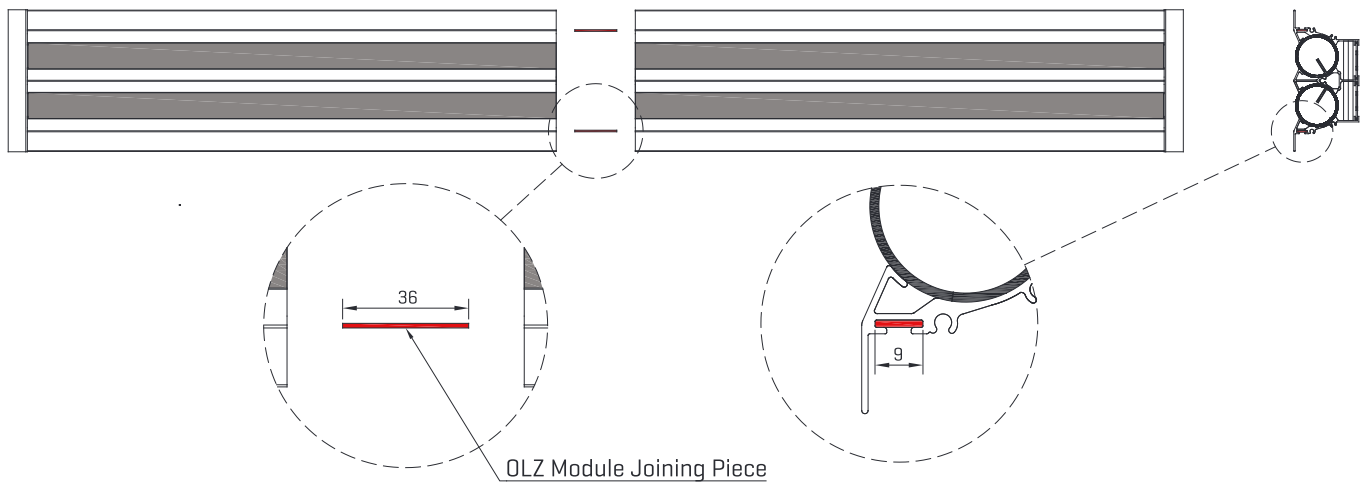


Standard corner joint length is 300 mm.

x: Corner piece angle. The standard corner joint is right angle [90 °]. The desired angle dimensions must be specified in the order. Corner piece angle is minimum 45°.

MODULE ASSEMBLY

When the slot length [W] given in orders for OLZ - Slot Diffuser With Plastic Blades [Large Type] is over 2300 mm, the slot profiles are assembled with the module joining piece. In this way, the slot diffuser is seen in one piece as well as preserving its strength.

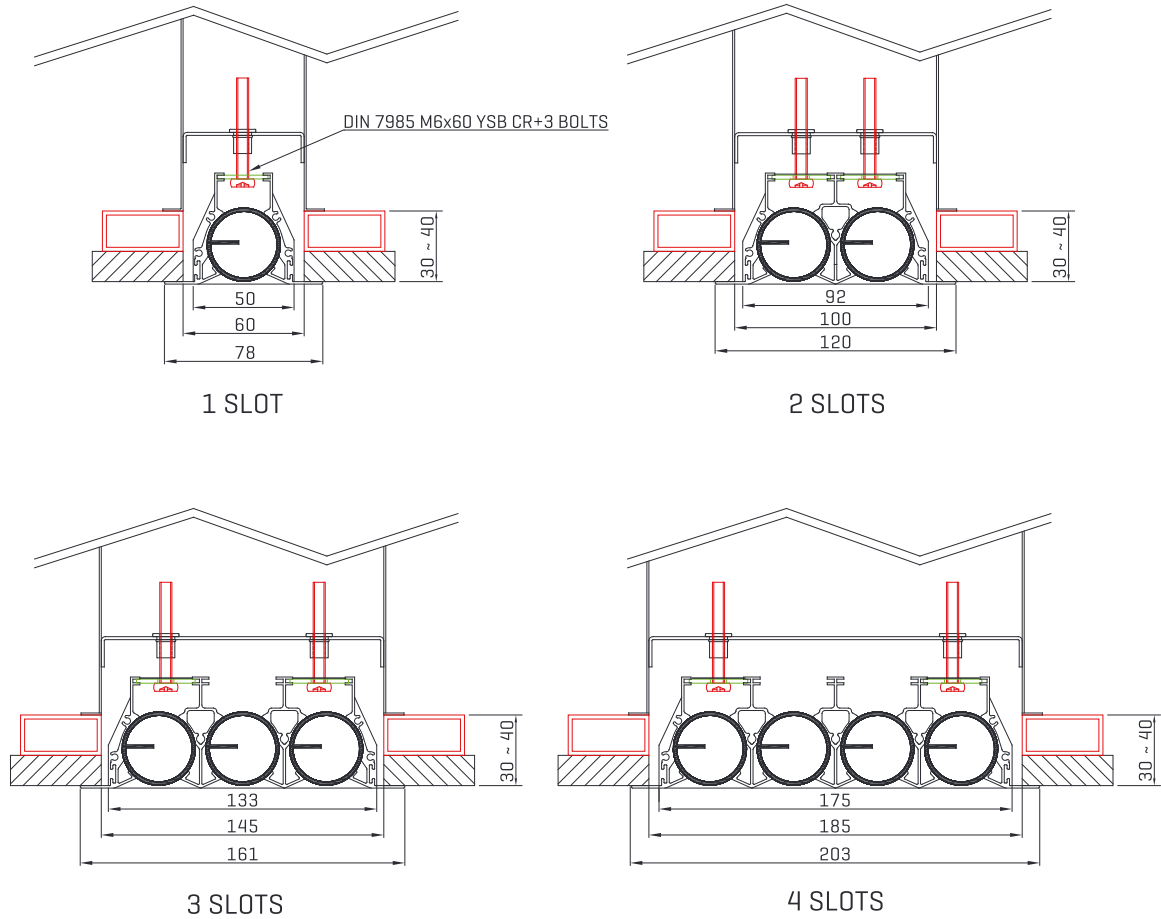


Number of Modules=Round Up [Order Size/2300]

ASSEMBLY

MOUNTING BRACKET

Bracket assembly is made as standard. For each slot module, there are 2 mounting plates on OLZ and 2 mounting plates [bracket] on the box. Bolt is screwed into the mounting plate on OLZ, a nut is screwed into the mounting plate and the assembly is completed by screwing the bolt with a screw driver.



BOX DIMENSIONS

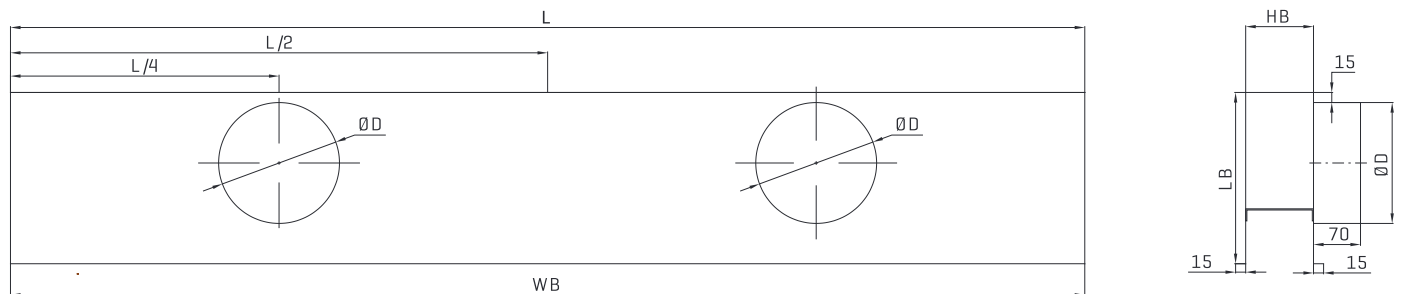


Table 5. Box Size Table

Number of Slots	Box Size Table									
	Property	Slot Length [mm]								
		400	600	800	1000	1200	1400	1600	1800	2000
1	Box Neck (ØD) [mm]	Ø100 - 1 Piece	Ø100 - 1 Piece	Ø100 - 1 Piece	Ø100 - 1 Piece	Ø150 - 1 Piece	Ø150 - 1 Piece	Ø150 - 2 Pieces	Ø150 - 2 Pieces	Ø200 - 2 Pieces
	Box Height (LB) [mm]	175	175	225	225	225	275	275	275	275
	Box 1st Size (WB) [mm]	410	610	810	1010	1210	1410	1610	1810	2010
	Box 2nd Size (HB) [mm]	60	60	60	60	60	60	60	60	60
2	Box Neck (ØD) [mm]	Ø100 - 1 Piece	Ø100 - 1 Piece	Ø150 - 1 Piece	Ø150 - 1 Piece	Ø150 - 1 Piece	Ø200 - 1 Piece	Ø200 - 2 Pieces	Ø200 - 2 Pieces	Ø200 - 2 Pieces
	Box Height (LB) [mm]	175	175	225	225	275	275	275	325	325
	Box 1st Size (WB) [mm]	410	610	810	1010	1210	1410	1610	1810	2010
	Box 2nd Size (HB) [mm]	100	100	100	100	100	100	100	100	100
3	Box Neck (ØD) [mm]	Ø100 - 1 Piece	Ø100 - 1 Piece	Ø150 - 1 Piece	Ø150 - 1 Piece	Ø200 - 1 Piece	Ø200 - 1 Piece	Ø200 - 2 Pieces	Ø250 - 2 Pieces	Ø250 - 2 Pieces
	Box Height (LB) [mm]	175	225	225	275	275	275	325	325	325
	Box 1st Size (WB) [mm]	410	610	810	1010	1210	1410	1610	1810	2010
	Box 2nd Size (HB) [mm]	145	145	145	145	145	145	145	145	145
4	Box Neck (ØD) [mm]	Ø100 - 1 Piece	Ø150 - 1 Piece	Ø150 - 1 Piece	Ø200 - 1 Piece	Ø200 - 1 Piece	Ø200 - 1 Piece	Ø250 - 2 Pieces	Ø250 - 2 Pieces	Ø250 - 2 Pieces
	Box Height (LB) [mm]	175	225	225	275	275	275	325	325	325
	Box 1st Size (WB) [mm]	410	610	810	1010	1210	1410	1610	1810	2010
	Box 2nd Size (HB) [mm]	185	185	185	185	185	185	185	185	185

PRODUCT SELECTION

Example: The air flow distributed in the space is determined as 400 m³/h and the temperature difference is -8K. 3 meter slot diffuser will be used in supply application. Make your product selection.

Solution: From the supply data table (Table 3), the effective areas corresponding to the appropriate pressure loss and flow rate values are selected. The method to be used for the desired lengths of performance data is made by calculating the number of modules. The result is reached by correcting the data found for 1 module.

Number of modules for 3 meters of slot diffuser: Round up $(3000/2000)=2$ modules.

1 module length=3000/2 (Module)=1500 mm (Length to be used in calculation)

Required flow rate for 1 module=400/2 (Module) 200 m³/h (Flow Rate Used in Calculation)

From the effective area table (Table 2), the effective areas of the 1500 mm wide slot diffusers are selected according to the number of slots. Accordingly, the effective area values are approximately 0.0139 m² (1 slot), 0.0252 m² (2 slot), 0.0363 m² (3 slot) and 0.0476 m² (4 slot) according to the number of slots.

Using the effective area value obtained from the supply data table (Table 3) and the required flow rate for 1 module, the appropriate effective area is determined. Performance data:

1 slot

Pressure Drop: 25 Pa

Throw Distance: 3.5 m

Sound Power Level: 25.3 dB(A)

2 slots

Pressure Drop: 15.5 Pa

Throw Distance: 2.1 m

Sound Power Level: 17.5 dB(A)

3 slots

Pressure Drop: 11.6 Pa

Throw Distance: 1.5 m

Sound Power Level: <15 dB(A)

4 slots

Pressure Drop: 9.32 Pa

Throw Distance: 1.2 m

Sound Power Level: <15 dB(A)

Throw Distance Correction Table

In the 2-module slot diffuser selection, the throw distance was found to be 1.9 m. For cooling mode -8 K, refer to the Throw Distance Correction Chart (Table 4). The multiplier value is 1.42.

Corrected throw distance=2.1 m x 1.42=2.98 m

PRODUCT ORDER CODE

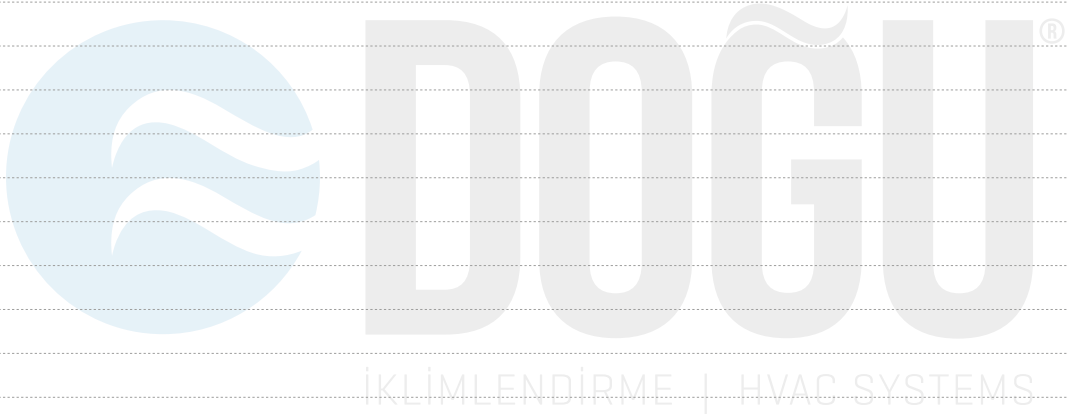
You can place your orders according to the following coding format.

OLZ.ALM.KP.<A>..<C>

A	Slot Width [W] [mm]	
	0000	Standard dimensions
B	Vertical Size [H] [mm] & Number of Slots	
	050-01	50 mm - 1 Slot
	092-02	92 mm - 2 Slots
	133-03	133 mm - 3 Slots
	175-04	175 mm - 4 Slots
C	Paint	
	00	Unpainted
	S1	Standard Painted - RAL 9010
	S2	Standard Painted - RAL 9016
	XX	Special Painted
	EK	Matt Anodized Coating

Sample Coding; OLZ.ALM.KP.01000.133-03.S1

NOTES





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FOUR DKS

Air Handling Unit



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 6 major groups as Air Handling Units, Rooftop Units, Heat/Energy Recovery Units, Air Purifiers, Air Distribution & Management Products and Kitchen Ventilation Equipments 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 2 factories, in total area of 32.000 sqm in which 17.500 sqm indoor space that enables DOGU HVAC manufactures 180 various type of products. Additionally, DOGU HVAC has a powerful sales network with 4 sales offices located in İstanbul, Ankara, Antalya and Adana 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 55 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 TSEK, CE and GOST-R quality certifications.



FOUR SEASONS Air Handling Units are manufactured in 28 different sections. Volume flow rate in units for cooling and ventilation is 900-133.000 m³ / h and 900-177.000 m³ / h only for heating units.



FOUR SEASON Air Handling Units are modular and have double-walled panels. It can be produced by using panels of 50 mm or 60 mm thickness with rock wool, glass wool or polyurethane insulation, depending on demand and application. The outer surfaces are painted sheet metal in standard RAL 9002 color, and the inner surfaces can be galvanized, painted or stainless steel according to the request and application. It is easy to clean with its smooth inner surface and dust accumulation is prevented.

FOUR SEASON air handling units form a strong structure with specially designed aluminum profiles with electrostatic furnace painted and plastic corner fasteners. EPDM-based seals are used to ensure impermeability.

Filter selections are made taking into account the needs of the environment and the process in which the unit operates. With special designs, leaks that may occur during air flow are prevented, and high efficiency is achieved in coils and filters.

Optionally, plate, rotor or coil type heat recovery units are used for energy efficiency, which is of great importance today.

The fan-motor group is selected in the most efficient way, taking into account the air flow and total static pressure. Fans are selected according to the intended use and desired design criteria, with forward curved dense blades, backward inclined sparse blades, airfoil or plug types. Fans with approved performance tests are used. The motors are in IP55 class as standard and comply with CE norms.

Dampers used in Air Handling Units are manufactured using aluminum profiles, aluminum blades and plastic-based gears. The gears are out of the air stream. It provides sealing between specially shaped plastic gaskets and damper blades.

AIR HANDLING UNITS SELECTION PROGRAM

The technical report containing the selection, sizing and performance data sheet of **FOUR SEASONS** brand air handling units can be created easily with **FOUR DKS** air handling unit selection program.

Thanks to the air handling unit selection program: According to the desired air flow rate, you can see the air velocities in different unit sections and on the coil surface and determine the most suitable cross section. You can create the unit you want by bringing the elements you have determined side by side. For every element you can specify the accessories. In the selection of each element, you can see the brand model alternatives together with their price rates, you can choose the most suitable option in terms of parameters such as efficiency and price. You can determine how many parts the unit will consist of and the maximum cell size. You can see the dimensions and weights of the parts that make up the unit. You can see the technical report of the unit you choose, including its price, its sized picture and the necessary information.

Model	Air Handling Unit Internal Section		Heating / Cooling / Ventilation		Heating / Ventilation
	W (mm)	x H (mm)	Flow Rate m ³ /h		Flow Rate m ³ /h Maximum
			Minimum	Maximum	
DKS-S 062 - 046	620	x 465	926	1852	2469
DKS-S 062 - 062	620	x 620	1296	2592	3456
DKS-S 093 - 062	930	x 620	2160	4321	5761
DKS-S 124 - 062	1240	x 620	3024	6049	8065
DKS-S 093 - 093	930	x 930	3395	6789	9053
DKS-S 124 - 093	1240	x 930	4753	9505	12674
DKS-S 155 - 093	1550	x 930	6110	12221	16295
DKS-S 124 - 124	1240	x 1240	6481	12962	17282
DKS-S 155 - 124	1550	x 1240	8332	16665	22220
DKS-S 186 - 124	1860	x 1240	10184	20368	27158
DKS-S 155 - 155	1550	x 1550	10554	21109	28145
DKS-S 186 - 155	1860	x 1550	12900	25800	34400
DKS-S 217 - 155	2170	x 1550	15245	30491	40654
DKS-S 186 - 186	1860	x 1860	15610	31221	41628
DKS-S 217 - 186	2170	x 1860	18449	36897	49196
DKS-S 248 - 186	2480	x 1860	21287	42574	56765
DKS-S 217 - 217	2170	x 2170	21671	43341	57789
DKS-S 248 - 217	2480	x 2170	25005	50009	66679
DKS-S 279 - 217	2790	x 2480	28339	56677	75570
DKS-S 310 - 217	3100	x 2480	31673	63345	84460
DKS-S 248 - 248	2480	x 2480	27775	55550	74066
DKS-S 279 - 248	2790	x 2480	31478	62956	83942
DKS-S 310 - 248	3100	x 2480	35182	70363	93817
DKS-S 341 - 248	3410	x 2480	38885	77770	103693
DKS-S 403 - 248	4030	x 2480	44440	88880	118506
DKS-S 465 - 248	4650	x 2480	51846	103693	138257
DKS-S 527 - 248	5270	x 2480	59253	118506	158008
DKS-S 589 - 248	5890	x 2480	66660	133320	177759

CASSETTE STRUCTURE

Special extrusion aluminum profiles, intermediate profiles and panels are used in the Four Seasons framed Air Handling Unit. Aluminum profiles are electrostatic powder painted, resistant to corrosion. Profiles are combined with each other specially designed plastic corners.

Panels are produced in standard sizes, with double walls and rock wool, glass wool or polyurethane are used as insulation material between them. Panel thickness is 50 mm or 60 mm. The outer sheet of the panels is painted as standard in RAL 9002 color, coated with protective polyfilm, and the inner surfaces are made of galvanized, stainless or painted sheet. Sheet thickness is in the range of 0.8-1.2 mm. Panels are removable from outside of the air handling unit. The internal surfaces of the unit are designed to be completely smooth. Panels are fastened directly to the profiles with special self-drilling screws. EPDM-based sealing gaskets are used between panels and profiles. Intermediate profiles are used between the panels. The intermediate profiles are also filled with insulation material.

Leak-proof sealed service doors are installed at required places on the power plant. Service doors can also be manufactured with sight glass on request or according to the purpose of application [hygienic, etc.].

Air handling unit base can be in one piece or in pieces on the basis of cells, depending on the size of the unit. Air handling units are placed on a 141 mm base at low pressures and 200 mm at high pressures. There are lifting holes in the base for easy transportation.

In outdoor units, the unit is protected from external weather conditions by a specially designed roof.

Air Handling Unit can be shipped in modular or disassembled form and assembled on site in order to provide ease of transportation. It can be connected to each other with special connection elements in cell assembly. Special EPDM gasket is used to seal the joint interface.

ACCESSORIES

In Four Seasons Air Handling Units, optional lighting, sight glass, mano-meter, flexible connection in the throw and suction nozzles, siphon, maintenance switch, damper motor and rain protection are used.



FILTERS

The entire cross section of Four Seasons Air Handling Units is used as a filter transition area in accordance with international standards. The filters are cassette type and can be easily attached and detached. Air leaks are prevented with suitable designs. There are maintenance and replacement service doors for filter cells. Optionally, manometer, illumination and sight glass are used.

Considering the importance of indoor air quality in air handling units, filters of different types and efficiency are used. Generally, filter types are panel filter, bag filter, metal filter, active carbon filter, compact filter, hepa filter.

Panel filters are used as pre-filters. The filter material is synthetic or metallic. Metal filters have the feature of holding oil. The filter classes we use are; for synthetic material: G2, G3, G4, for metallic material: G2, G3.

Bag filters are used for high efficiency air filtration. Their dust holding capacity is high. They should be used in conjunction with a pre-filter to increase their life. Bag lengths vary as 305 mm, 508 mm, 635 mm according to air flow. The filter classes we use are G4, F5, F6, F7, F8.

Compact filters are high efficiency filters. They must be used in conjunction with a pre-filter. Since their depth is 292 mm, they occupy less space in the air handling unit. Due to the filter structure, it is possible to distribute the air evenly over the entire filter surface. The filter classes we use are F6, F7, F8, F9.

Hepa filters are used for hygienic environments. Their efficiency is very high. These filters are installed after the fan and must be used with a pre-filter. The filter classes we use are H10, H12, H13, H14.

Activated carbon filters are used to absorb malodorous gas or vapor molecules from the air (such as exhaust fumes, rubber odor, alcohol, hydrocarbon, chlorine, and odors from other chemical production processes). An alternative model is available to absorb odors from other industrial processes such as hydrogen sulfide, sulfur dioxide, and they must be used with a pre-filter to increase their life.



ASPIRATOR-MIXTURE-VENTILATOR CELLS

DAMPERS

Damper sections are sized in accordance with the air velocity. Dampers with opposed blades in aerofoil structure are used as standard. The material of the damper frame and blades is aluminum. Air leakage has been minimized by using gaskets on the wing edges. Dampers are manufactured in accordance with manual or servo motor control.

Optional servo motor, rain protection and flexible connection can be attached.

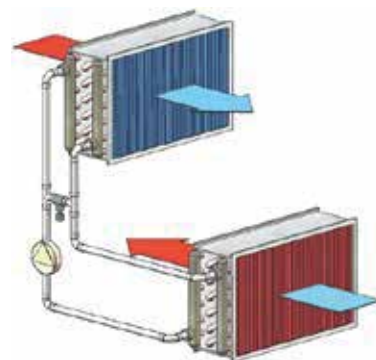
Damper dimensions are standard according to the type of plant and are designed to pass 100% air flow rate.



HEAT RECOVERY SYSTEM

Today, energy efficiency is of great importance. For this reason, the use of heat recovery units has started to be preferred in air handling units. Serpentine, plate and rotor heat recovery elements are used in Four Seasons Air Handling Units.

Generally, efficiency varies between 30-50% in serpentine type heat recovery units, 40-60% in plate type, and 60-80% in rotor type.



SERPENTINE HEAT RECOVERY

With double coil heat recovery, heat transfer between fresh air and exhaust air is realized by the fluid circulating in the coils in a closed circuit. Heat transfer is carried out from air to water - from water to air. There is no mixing of fresh air and exhaust air. Ethylene glycol is used in areas with risk of freezing. There is a need for a circulation pump and balance tank in the system. A condensation pan is used on the exhaust side.

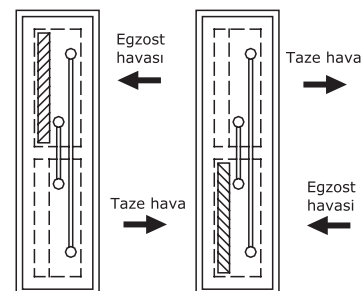


PLATE HEAT RECOVERY

Cross flow plate type heat recovery elements allow heat transfer between fresh air and exhaust air without moving parts. It is possible to provide full sealing even in high pressure differences. It can operate between -30°C and 90°C . Plates are made of aluminum, epoxy-coated aluminum or stainless steel. They are manufactured with by-pass dampers to prevent freezing at low temperatures. In the exhaust part, a condensation pan is installed against condensation that may occur.



PLATE HEAT RECOVERY

They have a compact structure and high thermal performance. Heat transfer is performed with the wavy sheet-like aluminum plates placed inside the rotor. Rotor rotation is provided by a belt-pulley driven electric motor.

It can generally be grouped into 3 types:

1-Condensing heat wheels:

In standard comfort ventilation, it is a low cost solution that provides heat recovery by condensing and draining the water vapor in the air.

2-Dehumidifying heat wheels:

It transfers moisture with its special surface at appropriate temperature ranges in standard comfort ventilation applications.

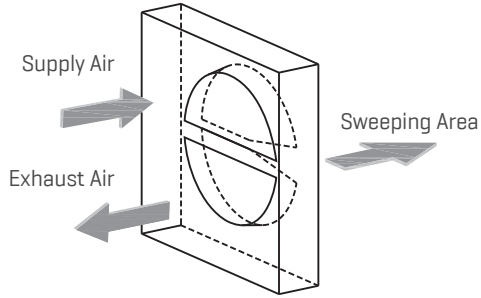
3-Enthalpic heat wheels:

It is preferred in climatic conditions with high temperature and humidity. It transfers higher amounts of moisture thanks to the filling surfaces coated with desiccant materials. With its pre-cooling and dehumidification feature, it reduces the energy spent for cooling. Therefore, as chillers are used in smaller capacities, it provides significant energy savings.

The filling diameter is between 250-5000 mm. It takes up less space due to its compact structure. The temperature efficiency of the heat wheels has been optimized for a rotational velocity of 12 rpm per minute. It is increased according to the application situation. If capacity control is required according to variable climate conditions, velocity control can be done with a frequency converter. Capacity control request must be notified in the order. There is no risk of freezing.

DETERMINATION OF THE FAN POSITION IN AIR HANDLING UNITS WITH ROTARY TYPE HEAT RECOVERY SYSTEM

While determining the fan rotor positions on the heat wheel, attention should be paid to the sweeping zone that occurs. Allowable contamination-leakage amount in heat wheel according to EN308 and ARI 1060 is maximum 3%. Leakage is below 0.5% on a correctly configured, pressurized and manufactured heat wheel with a standard sweeping chamber. Sweep zone angle according to fan positions and pressure difference is given in the table.



AIR HANDLING UNITS SELECTION PROGRAM

Fan Position	$\Delta P < 200 \text{ Pa}$	$\Delta P 200 \sim 500 \text{ Pa}$	$\Delta P 500 \sim 800 \text{ Pa}$	$800 \text{ Pa} < \Delta P$
	Sweep Zone Not Necessary	Sweep Zone Not Necessary	2.5°	Sweep Zone Not Necessary
	Sweep Zone Not Necessary	Sweep Zone Not Necessary	2.5°	Sweep Zone Not Necessary
	Sweep Zone Not Necessary	Sweep Zone Not Necessary	2.5°	Sweep Zone Not Necessary
	Not Recommended			

Note:
 $\Delta P = P1 - P3$ [Pressure difference between supply air and return air]

HEAT RECOVERY SYSTEM

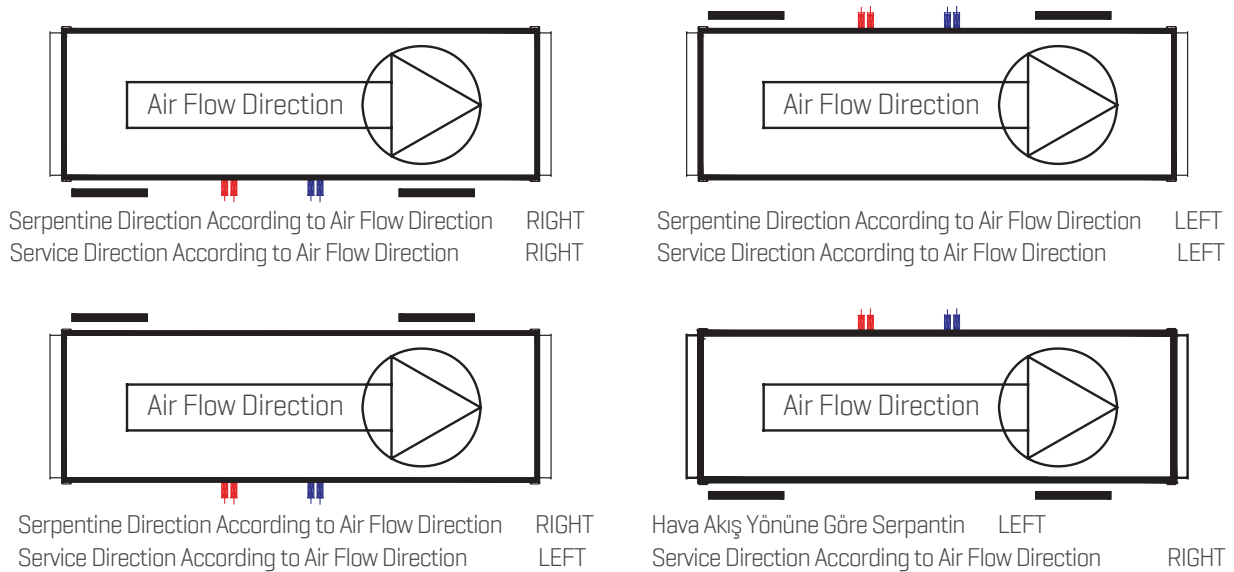
Electric heater is used optionally in Four Seasons Air Handling Units. It is used at the entrance of the power plant in areas with high risk of freezing. It is also used at the exit of the power plant in sensitive systems that require instant heating. The electric heater frame is optionally manufactured from galvanized or stainless steel. Its elements are stainless material. Protection class is IP43. It can be made gradually or proportionally. It has CE certificate. As standard, there are automatic reset limit thermostats and manual reset safety thermostats in the heaters. If the heater is over 30 kW, it is recommended to run the air handling unit's fan for another 2-3 minutes after the power is cut off. If there is an electric heater in the air handling unit, precautions must be taken to deactivate the electric heater in cases where the fan does not operate or operates at very low speeds [less than 1.5 m/s].



HEATING AND COOLING SERPENTINES

Heating and cooling processes are carried out with coils. Serpentine pipes can be copper or steel, blades can be aluminum, copper, steel, epoxy coated aluminum or epoxy coated copper. Direct expansion coils are manufactured as copper tube-aluminum fins and collectors are copper. Serpentine frame is made of galvanized steel plates. Test pressure is 20 bar. Pipe inlet-outlet openings in hot and cold water coils are threaded; In superheated and steam coils, pipe inlet-outlet openings are flanged. It is designed to be easily taken out for maintenance. Air is only allowed to pass through the serpentine surface with special by-pass plates. Air and water are designed as counter flow in order to provide high efficiency. In hot and cold water coils, the water inlet is from the bottom and the water outlet is from the top. In the cooling coils, thanks to the condensation pan that is embedded in the panel, the surface area of the coil is used efficiently. The condensation pan is made of stainless steel with double slope. A separator is used to keep the condensed water in the air after the cooling coil.

Serpentine and Service Directions



HUMIDIFIER

The desired humidity rate in the location is provided by humidifiers. Steam type, filled type, isothermal gas burning and atomizer humidification units are used in Four Seasons Air Handling Units.



STEAM HUMIDIFIER

It generates steam from water with electrical energy. It is microprocessor controlled. The steam taken from the humidifier unit is humidified with the help of steam distribution pipes in the air handling unit. There are many models in the range of 1.5-130 kg/h that operate with On-Off or proportional control.

FILLER TYPE HUMIDIFIERS

It is evaporative humidification in which the air is passed over the wet filling. The filling is wetted by the circulation pump system. The efficiency of the humidifiers used is 65% -85% -95%. A separator is placed in the humidifier section at air velocities above 3.5 m/s.

ISOTHERMIC GAS BURNING HUMIDIFIERS

Isothermal gas-burning humidifiers can produce isothermal steam by burning gas thanks to their compact structure. It can burn natural gas (G20 or G25), propane (G30) or butane (G31) without changing parts during assembly. Isothermal steam humidifiers are installed outside the unit and the generated steam is directed into the air handling unit through steam distribution pipes.



ATOMIZER HUMIDIFIERS

They are devices that produce high amount of steam by consuming very low energy. There are models ranging from 100 to 600 kg/h. These devices, which operate proportionally, have the ability to be connected to more than one air handling unit. It works with demineralized water. It sprays and pulverizes the water at a pressure of up to 75 bar, thus allowing it to mix with air completely. It consumes approximately 4 watts of energy for each liter / hour humidification. The system complies with DIN 1946 hygiene standards. This type of humidifier is also used for adiabatic cooling. Equipments:

- A frequency controlled pump
- Control unit
- Distribution pipes
- Automatic column valves
- Drain valves
- Stainless steel sprayers
- Drop holder

SILENCERS

The noise level, which is of great importance in ventilation systems, is reduced to an acceptable sound level in the room with the help of silencers. The sound absorption coefficient of the silencers varies according to the silencer size used. The silencer cell consists of couettes in which rock wool is placed in galvanized or stainless sheet metal. Silencer elements are designed not to be deformed at 20m / s air speed. 6 different silencer lengths are offered in Four Seasons Air Handling Units. Sound absorption capacities are given in the following tables according to the silencer sizes.

SILENCER LENGTH (mm)	SOUND ABSORPTION CAPACITY (dB)							
	63 hz	125 hz	250 hz	500 hz	1000 hz	2000 hz	4000 hz	8000 hz
600	5	9	15	16	16	11	8	8
900	6	12	21	22	23	16	11	11
1200	7	15	27	28	29	20	12	12
1500	9	19	33	34	36	25	17	17
1800	10	22	39	40	42	29	20	20
2100	11	25	45	46	48	33	23	23

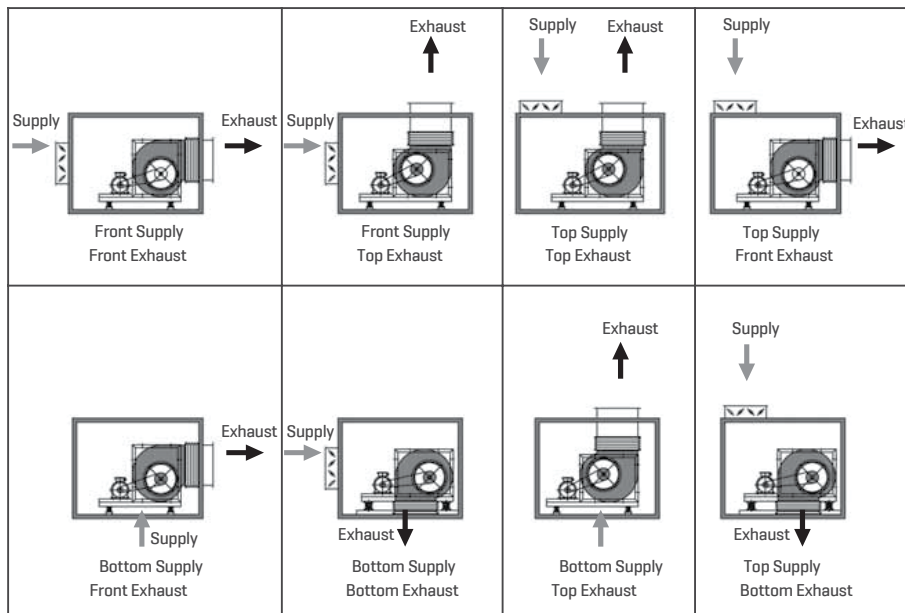
FANS AND MOTORS

Various fan types are presented in accordance with the air flow rate and total pressure drop in each section. Static and dynamically balanced fans in accordance with international standards can be forward curved, backward inclined or airfoil blades, depending on the purpose of use and customer demand. Fan motor group is selected considering high efficiency, low noise level and minimum energy consumption, depending on the air flow and total static pressure. In order to prevent vibration, the fan-motor group is connected to the device with spring insulators.

In our units, bushed, fixed diameter pulleys are used as standard. It is possible to use variable diameter pulleys optionally. SPZ, SPA, SPB and SPC belt types are available. The belt is tensioned by a special mechanism. There is a safety guarded service door in the fan cell for service and maintenance. In special cases, plug type fans are used and they are directly coupled to the motor. The motors are in IP55 protection class as standard and comply with CE norms. The motors are single-speed as standard and double-speed motors can be used optionally. A frequency converter for motor speed control is available as an accessory.





Fan Operating Modes



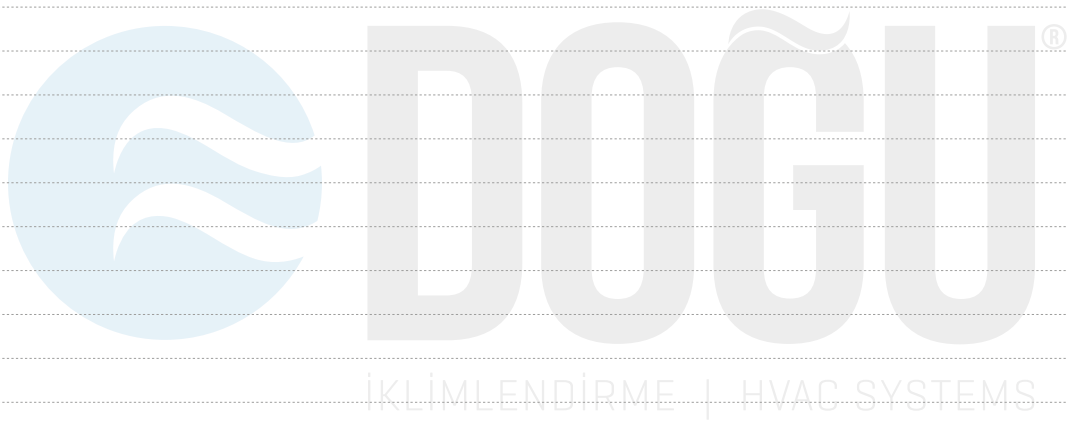
ATOMIZER HUMIDIFIERS

Diffusers are used to ensure a homogeneous distribution of air over these elements in case there are elements such as filters, serpentine, and silencers after the fan.

AIR HANDLING UNITS SELECTION PROGRAM

FUNCTION-EQUIPMENT	DEFINITION	STANDARD - ST OPTIONAL - OP
Emergency stop button	Emergency stop button that stops the system in an emergency	ST
External links are made terminal board.	Motor terminals are moved to an easily accessible panel outside the unit.	ST
AUTOMATIC CONTROL Electronic control panel Duct type temperature sensor Duct type humidity sensor Valve servomotors Damper servomotors Frequency Converters	Air temperature control at the desired point or points. Humidity control at the desired point or points. Control of two-way or three-way valves. Control of dampers. Air pressure control.	OP OP OP OP OP
MICROPROCESSOR CONTROL Microprocessor Duct type temperature sensor Duct type humidity sensor Differential pressure switches Valve servomotors Damper servomotors Frequency Converters  	<ul style="list-style-type: none"> - Air flow is controlled. Pressure control between two spaces can be made. Generating alarm information in case the desired flow cannot be achieved (blockage, malfunction, contamination). - Adjustable ventilator flow rate according to operating altitude and temperature. - Preheating, heating and cooling algorithms optionally input, output or according to preheating temperatures. Blowing temperature limit control can be made. - Detecting the pollution of all filters used separately and generating alarm information. - Efficient working conditions are obtained by controlling DX coils. - It is possible to see and change all parameters with the terminal on it. - All exchanges can be communicated as a network. - Operation and configuration parameters can be encrypted. - Audible and visual alarm information can be given. - Daily, weekly work-stop time can be adjusted. - Turkish and English options - The entire system can be connected to a central computer with additional hardware, managed and accessed over the internet. - When the unit configuration changes, a new configuration can be easily defined parametrically (adding humidification or dehumidification, valve and damper control changes, changing the fan control type, etc.) - Temperature control can be done parametrically, proportional, proportional + integral or proportional + integral + derivative. - Compensation can be made according to outdoor temperature and can be adjusted parametrically. - The control of the fans can be done parametrically, thermostatic, continuously, gradually or proportionally. - The way the fan motors start up (direct, star, triangle) is parametrically adjustable. - Each piece of equipment can be tested by running it individually. - All kinds of alarm information are kept in memory (Differential pressure switches, thermal, sensor, emergency stop, etc.). - It can be integrated into the building automation system with all known communication languages (Modbus, BACnet, Lon-ECHOLON, LAN TCP / IP, SNMP) with an additional hardware. 	OP

NOTES



NOTES





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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 6 major groups as Air Handling Units, Rooftop Units, Heat/Energy Recovery Units, Air Purifiers, Air Distribution & Management Products and Kitchen Ventilation Equipments 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 2 factories, in total area of 32.000 sqm in which 17.500 sqm indoor space that enables DOGU HVAC manufactures 180 various type of products. Additionally, DOGU HVAC has a powerful sales network with 4 sales offices located in İstanbul, Ankara, Antalya and Adana 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 55 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 45001 certifications. Air Handling Units have EUROVENT, TUV Hygiene [in accordance with DIN1946-4, VDI 6022-1, DIN EN 13053 standarts], have TSEK and CE quality 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 TSEK and CE quality certifications.



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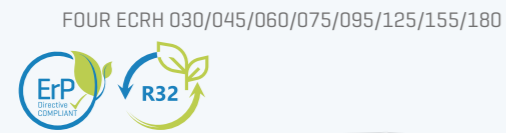
PRODUCTS

FOUR DKS AIR HANDLING UNIT



- Flow rate range of 2.000 – 100.000 m³/h
- Eurovent certified
- DIN 1946/4 & VDI 6022 hygiene certified
- Steel profile case with D1 - L1 - T3 - TB2
- Thermal bridgeless aluminum profile case with D1 - L1 - T2 - TB2
- Easy installation and commissioning
- Plug&Play
- Modbus, BACnet, LonWorks

FOUR ECRH ROOFTOP UNIT



- Flow rate range of 4.400 – 35.200 m³/h
- Compatible with ECODSIGN ERP 2021 Lot 21
- Operation with 0-100% fresh air
- High seasonal efficiency
- Eco-friendly R32 refrigerant gas.
- Independent dual circuit cooling
- EC plug fan and EC axial fan
- Double skin case [50 mm rock wool insulation]
- Optional rotary type heat exchanger
- Optional thermodynamic heat recovery
- Optional water, electric or natural gas heater
- Optional economizer
- Optional return fan
- Plug&Play
- Modbus, BACnet, LonWorks

FOUR POOL PACKAGE POOL DEHUMIDIFIER UNIT

FOUR POOL-CRF/FOUR POOL-00 30/45/60/80
/100/120/ 160/180/200/250



- Flow rate range of 3.000 – 25.000 m³/h
- Hydrophilic coated plate heat exchanger
- High efficiency AC plug fan
- Double skin case [50 mm rock wool insulation]
- Absolute humidity control
- Mechanical cooling
- Free cooling
- Optional EC plug fans
- Plug&Play
- Modbus, BACnet, LonWorks

FOUR HOME RESIDENTIAL HEAT RECOVERY UNIT

FOUR HOME 27/35/50/65/85



- Flow rate range of 270 – 850 m³/h
- Compliant with ERP 2018 directives
- A+ energy class
- Counterflow plastic heat recovery exchanger
- EC plug fan
- 19 mm rubber insulated case
- Low sound level
- Interchangeable service direction from right or left
- Switchable duct connection from top or front
- By-pass damper [%100]
- Optional CO₂ and humidity sensor
- Optional wireless control
- Optional ISO ePM1 filter
- Optional duct type electric heater
- Optional duct type DX/heating/cooling coil
- Plug&Play
- Modbus

FOUR HOME CEILING RESIDENTIAL HEAT RECOVERY UNIT [CEILING TYPE]

FOUR HOME CEILING 35/50



- Flow rate range of 350 – 500 m³/h
- Compliant with ERP 2018 directives
- A+ energy Class
- Counterflow plastic heat recovery exchanger
- EC plug fan
- 19 mm rubber insulated case
- Low sound level
- Interchangeable service direction from right or left
- By-pass damper [%100]
- Optional CO₂ and humidity sensor
- Optional wireless control
- Optional ISO ePM1 filter
- Optional duct type electric heater
- Optional duct type DX/heating/cooling coil
- Plug&Play
- Modbus

B-FRESH AIR PURIFIER

B-FRESH 05/08/12/20



- 4 different models between 550-2000 m³/h.
- 33.9 dB sound level at minimum speed thanks to 30 mm rock wool insulation.
- High efficiency low sound level EC fans.
- It can be used in areas up to 270 m² such as lobby, meeting room, office, gym, classroom, nursery, market, mosque, public building, hairdressers.
- Adjustable 5 level fan speed.
- Optional D99 dose ozone-free UV-C lamp.
- Plug&Play

GLC / GLD LAMINAR FLOW CEILING SYSTEM



- 100% leakproof guarantee
- AISI 304 quality stainless steel manufacturing
- 99.995% filter efficiency
- Complies with ISO EN 14644, DIN 1946/4, DIN 24194,
- DIN 25414, ÖNORM H6020, SWKI VA 105-01, HTM 03-01 hygiene standards.

GFP HEPA FILTER BOX



- 100% leakproof guarantee
- DKP sheet or AISI 304 quality stainless steel sheet manufacturing
- Inner surface resistant to disinfection processes.
- HEPA filter with MDF or aluminum frame
- Complies with VDI 6022, VDI 3803, EN 16798, ISO EN 14644, DIN 1946-4, DIN 24194, DIN 25414 hygiene standards.

VGF FIRE AND SMOKE DAMPER



- EI 120 [ve, ho i <-> a] S fire resistance according to EN 13501-3:2005+A1:2009 standard
- CE certificate according to EN 15650:2010 standard
- Easy installation
- Single module production between 200x200 mm and 1300x800 mm dimensions

FOUR RTER ROTARY ENERGY RECOVERY UNIT

FOUR RTER 010/018/025/035/050
/070/090/110/140/200



- Flow rate range of 1.000 – 20.000 m³/h
- Compliant with ERP 2018 directives
- Rotary energy recovery exchanger
- EC plug fan
- ISO ePM10 + ISO ePM1 filter for supply & exhaust
- Switchable duct connection from top or front
- Interchangeable service direction from right or left
- Low sound level
- Double skin case [50 mm rock wool insulation]
- Optional duct type attenuator and damper
- Optional duct type electric heater
- Optional duct type DX/heating/cooling coil
- Plug&Play
- Modbus, BACnet, LonWorks

FOUR FHR COUNTER FLOW HEAT RECOVERY UNIT

FOUR FHR 010/016/025/040/060/085/110/140/170



- Flow rate range of 1.000 – 17.000 m³/h
- Compliant with ERP 2018 directives
- Counterflow aluminum heat recovery exchanger
- EC plug fan
- Low sound level
- By-pass damper [%100]
- ISO ePM10 + ISO ePM1 filter for supply & exhaust
- Double skin case [50 mm rock wool insulation]
- Optional duct type attenuator and damper
- Optional duct type electric heater
- Optional duct type DX/heating/cooling coil
- Plug&Play
- Modbus, BACnet, LonWorks

FOUR FHR-T COUNTER FLOW HEAT RECOVERY UNIT [VERTICAL TYPE]



- Flow rate range of 1.000 – 7.000 m³/h
- Compliant with ERP 2018 directives
- Counterflow aluminum heat recovery exchanger
- Vertical[Top Outlet]
- EC plug fan
- Low sound level
- By-pass damper [%100]
- ISO ePM10 + ISO ePM1 filter for supply & exhaust
- Double skin case [50 mm rock wool insulation]
- Optional duct type attenuator and damper
- Optional duct type electric heater
- Optional duct type DX/heating/cooling coil
- Plug&Play
- Modbus, BACnet, LonWorks

FOUR CFHR COUNTER FLOW HEAT RECOVERY UNIT [CEILING TYPE]

FOUR CFHR/CFHR-S 05/07/10/12
/16/25/28/33/40



- Flow rate range of 500 – 4.000 m³/h
- Compliant with ERP 2018 directives
- Counterflow aluminum heat recovery exchanger [CFHR]
- Crossflow paper energy recovery exchanger [CFHR-S]
- EC plug fan
- Double skin case [30 mm rock wool insulation]
- Low sound level
- By-pass damper [%100]
- Optional CO₂ and humidity sensor
- Optional ISO ePM1 filter
- Optional duct type electric heater
- Optional duct type DX/heating/cooling coil
- Plug&Play
- Modbus

FOUR HPGK HEAT PUMP HEAT RECOVERY UNIT

FOUR HPGK 07/10/15/20/30/40



- Flow rate range of 700 – 4.000 m³/h
- Integrated heat pump system
- Cross flow heat exchanger
- EC / AC plug fan
- ISO Coarse filter
- Optional attenuator and damper
- Optional duct type electric heater
- Optional duct type DX/heating/cooling coil
- Plug&Play
- Modbus

FOUR KITCHEN ECOLOGY UNIT

FOUR KITCHEN 021/042/063/084
/105/126/147/168



- Flow rate range of 3.500 – 30.000 m³/h
- Compact design
- Optional stainless steel internal surface
- Cyclone metal filter, greasestop filter, electrostatic filter, activated carbon filter
- Optional V-LUV lamp
- Fan flow control according to filter pollution
- Plug&Play
- Modbus, BACnet, LonWorks

FOUR SMOKE SOOT & GREASE ABATEMENT SYSTEM

FOUR SMOKE 030/050/075/100



- Flow rate range of 3.000 – 10.000 m³/h
- Compact design
- AISI 304 quality stainless steel manufacturing
- Low water consumption
- Low energy consumption
- High efficiency filtration system
- Plug&Play
- Modbus

HWW MAKE-UP AIR HOOD WITH WATER WASH



- AISI 304 quality stainless steel manufacturing
- Up to 95% particle capture ability
- Easy maintenance thanks to the washing system
- 40% lower exhaust flow and operating cost
- Fast and accurate product selection with the selection program

ACA / ACB / ACD VARIABLE / CONSTANT AIR VOLUME UNITS



- Flow adjustment according to comfort needs
- High precision calibration in the VAV-CAV laboratory
- Compliance with VDI 6022, DIN 1946-4, VDI 3803, EN 16798-3 hygiene standards
- Optional acoustic insulation



GFP
Hepa Filter Box

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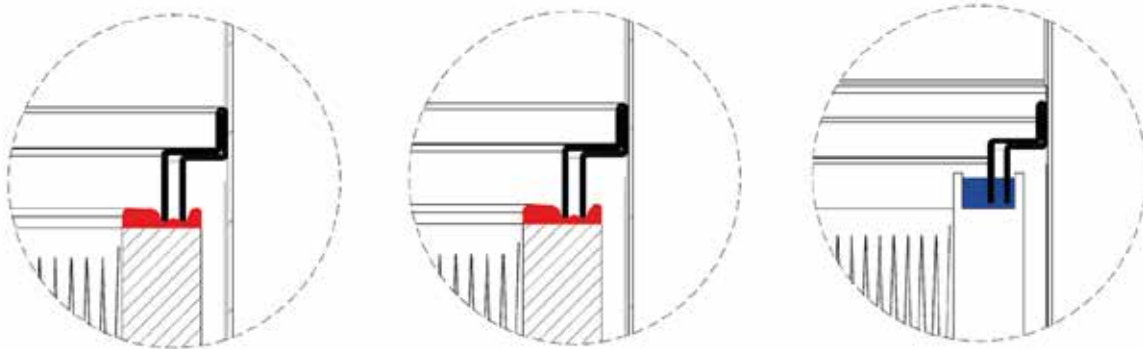
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- ☞ GFP - Hepa Filter Box is designed for sterile rooms, operating rooms and clean rooms (pharmaceutical, chemical, food industries).
- ☞ All Hepa filter boxes are tested according to DIN 1946/4 during production with 100% leakage guarantee.
- ☞ GFP fully responds to application requirements with its wide product range.
- ☞ GFP has differential pressure measuring tips to measure filter contamination.
- ☞ The inside of the box is resistant to disinfection.

MATERIAL

- ☞ Hepa filter box is produced from sheet steel or optional AISI 304 quality stainless sheet.
- ☞ All accessories are corrosion resistant.
- ☞ Flat profile type in hepa filter is compatible with both EPDM and Gel type seals.



Aluminium Filter Case with EPDM Sealing

MDF Filter Case with EPDM Sealing

Aluminium Filter Case filled with Gel

- ☞ MDF and Aluminum options are available for the frame of the Hepa filter. At the same time, the filter pile heights can be chosen 50 mm or 125 mm depending on the dimensions of the Hepa filter.

COLOR

- ☞ RAL 9010 or RAL 9016 Electrostatic powder paint
- ☞ Optional
 - Different RAL Codes

COLOR

- ☞ Center Support Installation
- ☞ Corner Screw System Installation

DIMENSIONS

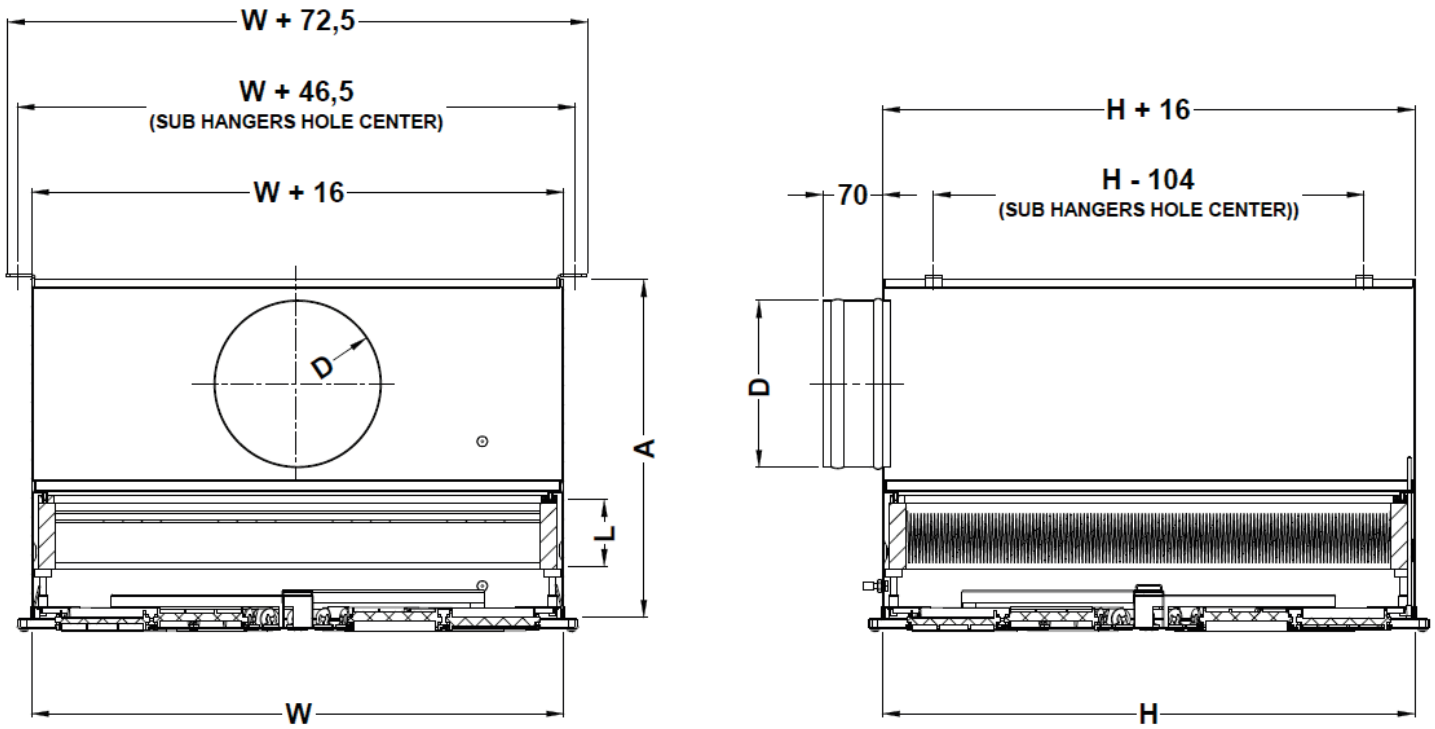


Table 1. Dimensions Table

Dimensions [W x H x Filter Height] [mm x mm x mm]	
305 x 305 x 78	305 x 305 x 149
305 x 610 x 78	305 x 610 x 149
457 x 457 x 78	457 x 457 x 149
457 x 610 x 78	457 x 610 x 149
535 x 535 x 78	535 x 535 x 149
575 x 575 x 78	575 x 575 x 149
610 x 610 x 78	610 x 610 x 149
762 x 762 x 78	762 x 762 x 149

When L [Filter height] is 78 mm, A [Box height] = D + 190.
 When L [Filter height] is 149 mm, A [Box height] = D + 270.

PERFORMANCE DATA

Table 2. Performance Data

Dimensions [mm x mm x mm]	Pleat Length [mm]	Flow Rate [m ³ /h]	Clean Filter Pressure Drop [Pa]		Dirty Filter Pressure Drop [Pa]		Recommended Flex Pipe Diameter [mm]
			H13	H14	H13	H14	
305 x 305 x 78	50	150	100	125	200	250	Ø125
305 x 610 x 78	50	300	100	125	200	250	Ø160
457 x 457 x 78	50	340	100	125	200	250	Ø160
457 x 610 x 78	50	450	100	125	200	250	Ø180
535 x 535 x 78	50	465	100	125	200	250	Ø180
575 x 575 x 78	50	535	100	125	200	250	Ø200
610 x 610 x 78	50	600	100	125	200	250	Ø200
762 x 762 x 78	50	940	100	125	200	250	Ø250
305 x 305 x 149	125	150	55	70	110	140	Ø125
305 x 610 x 149	125	300	55	70	110	140	Ø160
457 x 457 x 149	125	340	55	70	110	140	Ø160
457 x 610 x 149	125	450	55	70	110	140	Ø180
535 x 535 x 149	125	465	55	70	110	140	Ø180
575 x 575 x 149	125	535	55	70	110	140	Ø200
610 x 610 x 149	125	600	55	70	110	140	Ø200
762 x 762 x 149	125	940	55	70	110	140	Ø250

Note: The values in the table are valid when the filter face velocity is 0.45 m/s

AIR DISTRIBUTOR DATA

Table 3. Air Distributor Data

Hepa Filter Box Dimensions [mm x mm]	Air Distributor Equipment	Corresponding Equipment Size [mm x mm]	Maximum Flow [m ³ /h]	Pressure Drop [Pa]
305x305	OSB - Prismatic Swirl Diffuser	355x355	150	20
	OAK - Square Ceiling Diffuser	201x201		3
305x610	OSB - Prizmatik Swirl Difüzör	355x660	300	38
	OAP - Prismatic Ceiling Diffuser	201x506		4
457x457	OSB - Prizmatik Swirl Difüzör	507x507	340	14
	OAK - Square Ceiling Diffuser	353x353		2
457x610	OSB - Prizmatic Swirl Difüzör	507x660	450	25
	OAP - Prismatic Ceiling Diffuser	353x506		2
535x535	OSB - Prizmatic Swirl Difüzör	585x585	465	13
	OAK - Square Ceiling Diffuser	431x431		2
575x575	OSB - Prizmatic Swirl Difüzör	625x625	535	18
	OAK - Square Ceiling Diffuser	471x471		2
610x610	OSB - Prizmatic Swirl Difüzör	660x660	600	23
	OAK - Square Ceiling Diffuser	506x506		2
762x762	OSB - Prizmatic Swirl Difüzör	812x812	940	20
	OAK - Square Ceiling Diffuser	658x658		4

INSTALLATION

EXPLODED VIEW

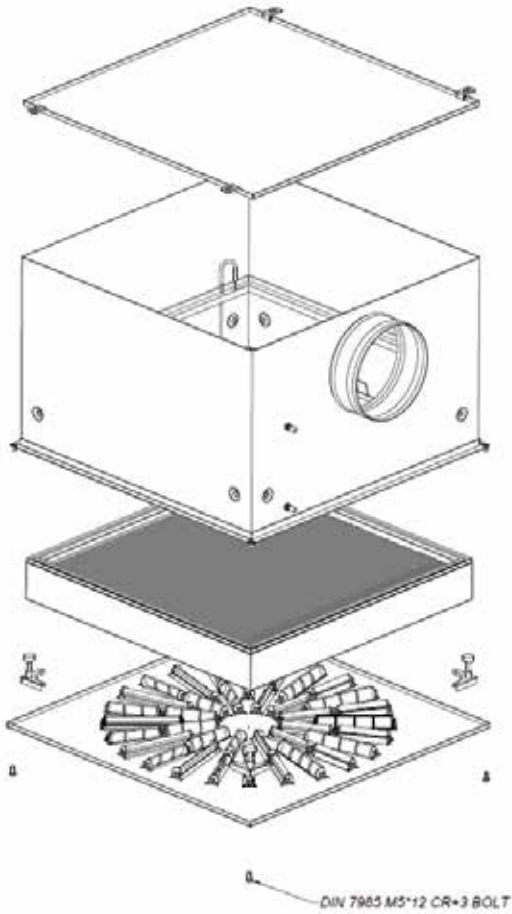


Figure 1. Corner Screw System Installation

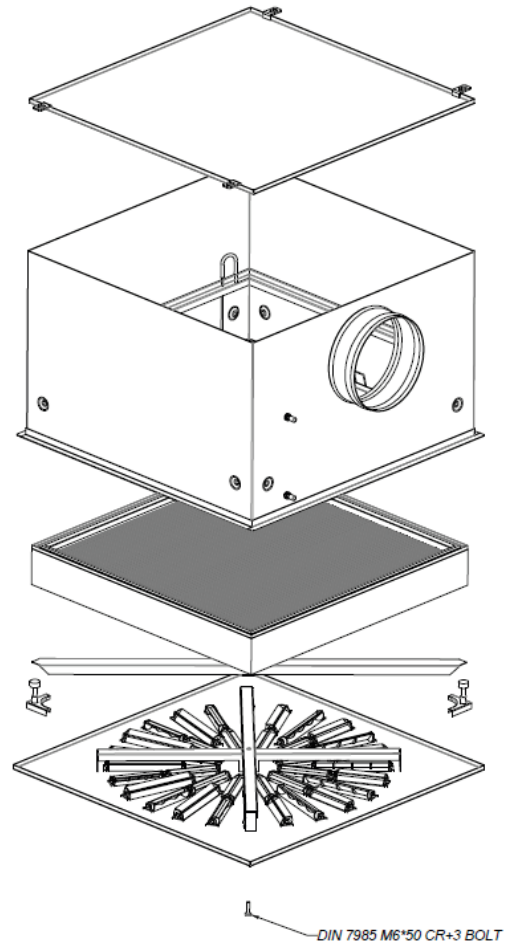
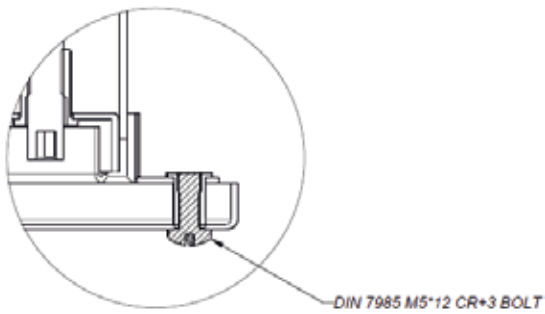
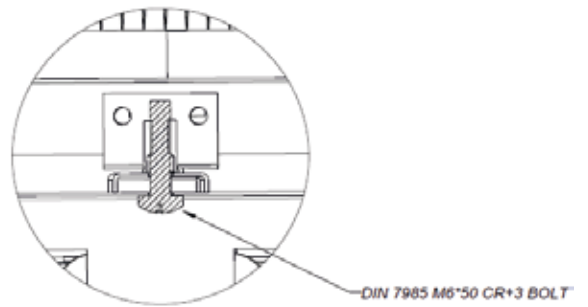


Figure 2. Center Support Installation

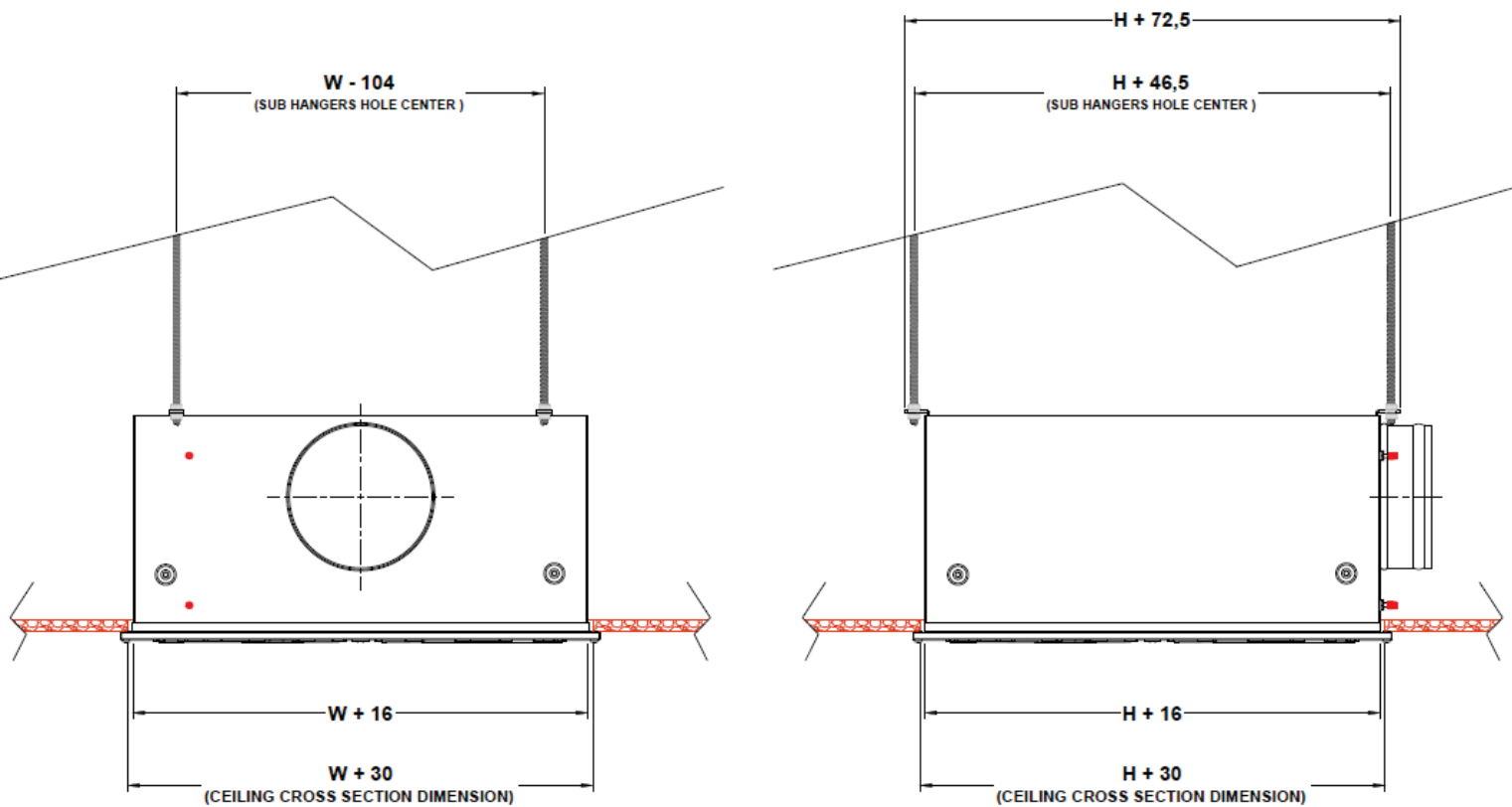
Corner Screw System Installation Detail



Center Support Installation Detail



HANGING LUGS INSTALLATION DETAIL



PRODUCT SELECTION

Example: Supply flow rate of Hepa filter is determined as 450 m³/h. H13 filter type with a pleat height of 50 mm will be selected. Swirl diffuser will be used as air distribution equipment.

Solution: From the performance data table [Table 3] for 450 m³/h flow rate, appropriate size:

457 x 610 x 78

Corresponding clean filter pressure loss is 100 Pa.

For the air distributor data to be used in the product, the air distributor table [Table 4] is referenced. For the swirl diffuser, there is a pressure loss of 20 Pa at 450 m³/h air flow.

Total pressure loss = Filter Pressure Loss + Air Distributor Pressure Loss

Total pressure loss = 100 Pa + 20 Pa = 120 Pa.

WALL BRACLET INSTALLATION DETAIL

FILTER ORDER CODE

Filter Type	Filter Frame	Filter Length [mm]	Dimensions [mm x mm]							
			305 x 305	305 x 610	457 x 457	457 x 610	535 x 535	575 x 575	610 x 610	762 x 762
H13	MDF	78	F01	F09	F02	F94	F03	F04	F05	F20
	EPDM Gasket	149	F07	F48	F06	F94	F08	F14	F17	F20
	Aluminum	78	F21	H11	F22	H13	F23	F43	F24	F89
	EPDM Gasket	149	H01	F46	H02	H17	F93	H03	F91	H19
	Aluminum	78	F27	H21	F28	H22	F29	F30	F31	H23
	Gel Gasket	149	H24	H25	H26	H27	H28	H29	H30	H31
H14	MDF	78	F60	F66	F61	H08	F62	F63	F64	F75
	EPDM Gasket	149	F68	H09	F69	H10	H04	F82	F65	F75
	Aluminum	78	F97	H12	F96	H14	F95	F18	F15	H15
	EPDM Gasket	149	H05	H16	H06	H18	F88	H07	F25	H20
	Aluminum	78	H32	H33	H34	H35	H36	H37	H38	H39
	Gel Gasket	149	H40	H41	H42	H43	H44	H45	H46	H47

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

GFD.<A>..<C>.<D>.<E>.<F>

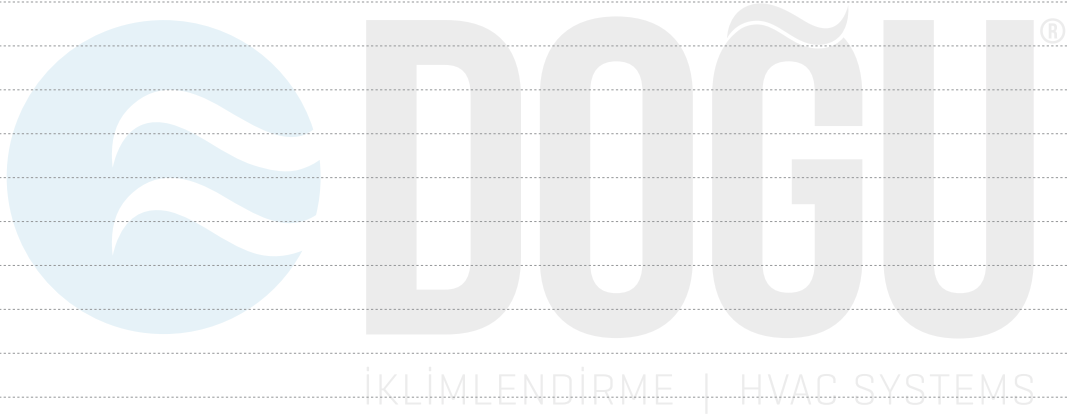
A	Raw Material Type	
	DKP	Painted DKP Sheet
	PAS	AISI 304 Quality Stainless Steel
B	Filter	
	F00	Without Filter
	XXX	You can check the Filter Order Code Table
C	Installation Option	
	GC	Bolted from Center
	KM	Bolted from Corners
D	Width (W) [mm]	
	0000	You can check the Standard Sizes Table
E	Height (W) [mm]	
	0000	You can check the Standard Sizes Table
F	Flex Diameter (Ø) [mm]	
	100 - 125 - 150 - 160 - 180 - 200 - 229 - 250 - 255 - 280 - 300 - 315 - 350 - 356	

Sample Coding; GFD.DKP.F03.KM.0535.0535.0078.180

NOTES



NOTES





We make the difference with
180 different types of products.



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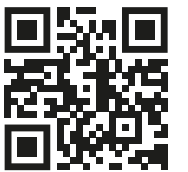
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FOUR ECRH
Rooftop Air Conditioner

Venues Breathe with DOGU HVAC Systems!

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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.



GENERAL SPECIFICATIONS

Roof type (ROOFTOP) package air conditioners, which operate either only cooling or reversible with the direct expansion refrigerant system providing the conditioning of the air indoor through ducts, which will meet the fresh air requirement needed and can perform all heating, cooling and ventilation processes in a compact unit. FOUR ECRH is designed for climates that need cooling only or reversible. Various capacity options available according to the size of the environment to be air-conditioned.

Main applications are business centers, airports, cinema and theatre halls, conference halls, industrial buildings, shopping malls, restaurants etc. Optimized heat recovery, fully automated system, economizer damper and free-cooling configurations available according to the needs of the place which will be conditioned efficiently with low energy consumption. Four ECRH ranges are fully automated with several options – options differ depending on the working scenarios-. Thanks to its Plug&Play feature and design, installation and commissioning time is short.



COMPONENTS

EC PLUG FANS

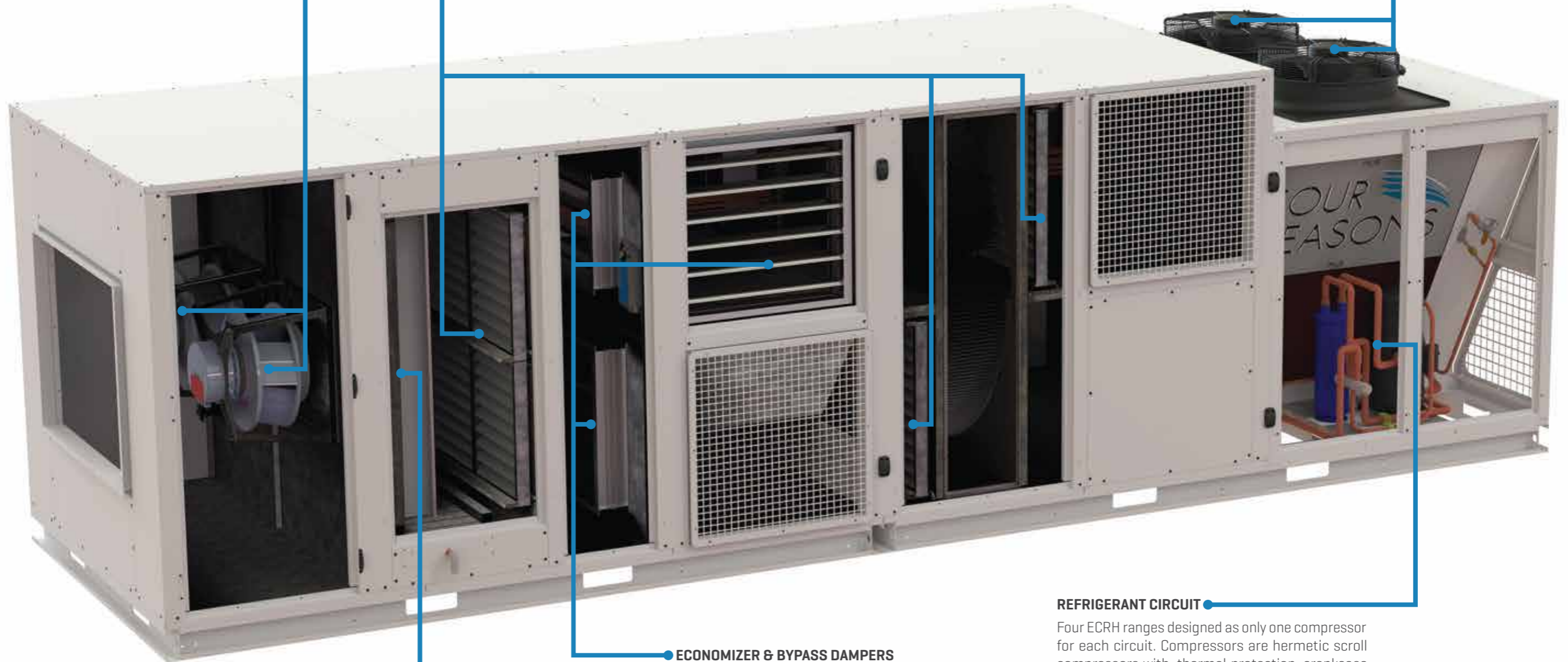
High efficient EC Plug Fans are used for supply side optionally. Economical AC plug fans might be used conditionally.

FILTERS

Easy clean and reusable filters. As standard EU ISO Course 55% (ISO 16890 – EN779 for G4). Filters are placed in front of the supply coil, at return air side and fresh air side of the rotary wheel. 2-stage filtration used as optionally with F class panel filters. Filters comply with EN779 and EN16890 standards. Filter impurities can be monitored from the control panel with the differential pressure switch.

EC AXIAL FANS

Four ECRH units are equipped with self-coupled electric motors with low consumption and suitable for outdoor conditions. EC axial fans with high efficiency and low energy consumption are used. In this way opportunity to control air flow provided without any additional electronic components according to weather conditions and operation capacity. Economical AC axial fans might be used conditionally.



INDOOR HEAT EXCHANGER COIL

Coils are made of copper pipes-aluminum fins. The design criteria of the coils are selected according to air and fluid side, pressure drop, air velocity, unit capacity, air flow rate and energy efficiency. In double circuit systems, custom made coils used. Optionally the fins might be coated with epoxy and hydrophilic. The drain pans of the coils are made of stainless steel and cleanable.

ECONOMIZER & BYPASS DAMPERS

Economizer is used to proportionally adjust the fresh air demand needed between 0-100% with a return fan. This adjustment is made automatically by control system with the sensors, located on the supply side in addition, it provides an opportunity of free cooling when outdoor and indoor conditions are suitable. Bypass damper, on the other hand, direct air mixture provided by stopping heat recovery where heat recovery is not possible (like mid seasons) between outdoor air and indoor air, direct air mixture can be made by stopping the heat recovery system with bypass damper.

REFRIGERANT CIRCUIT

Four ECRH ranges designed as only one compressor for each circuit. Compressors are hermetic scroll compressors with thermal protection, crankcase heater and compressors suitable for R410A as refrigerant fluid type. Thermostatic expansion valves used for each inlet of coil. And dryer, inspection glass, check valves, 4-way valve and accumulator used for each independent circuit. Safe operation of refrigeration cycle is ensured by low pressure and high-pressure sensors.

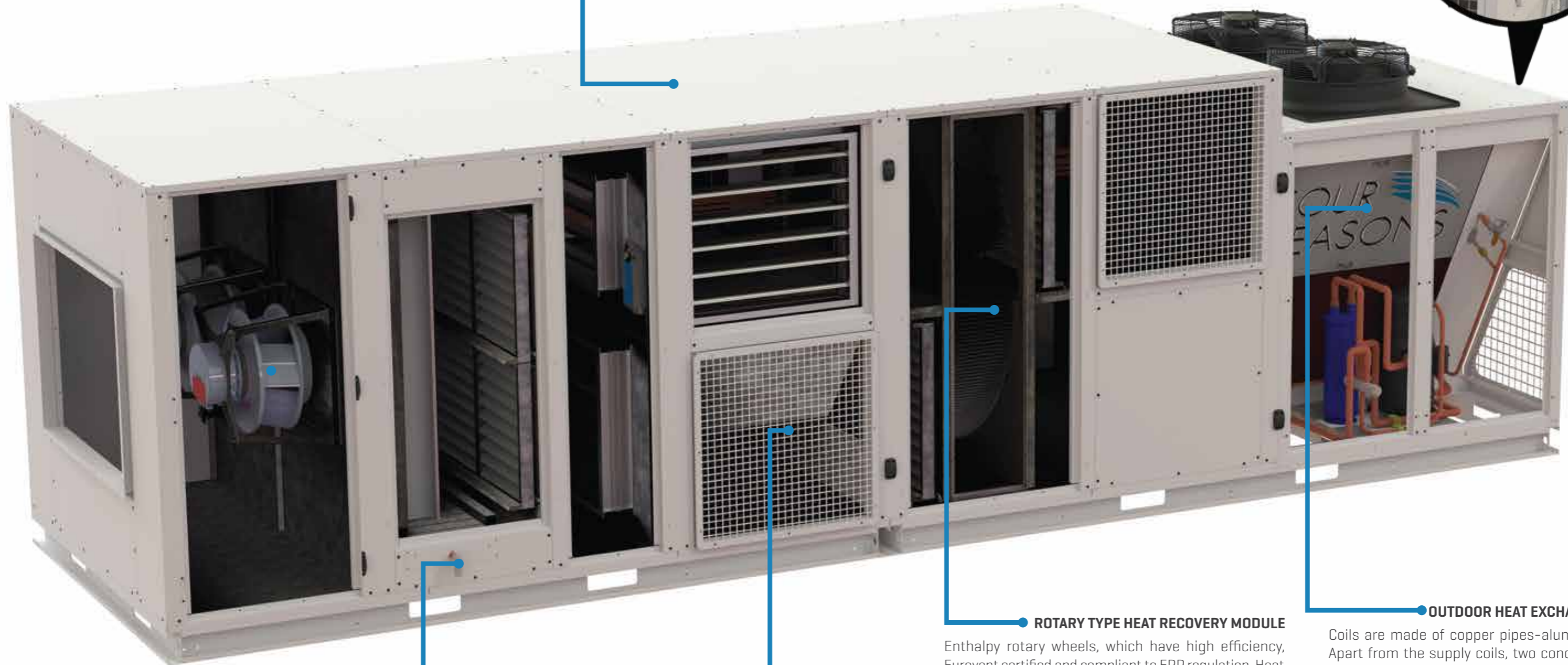


CASING

Double skin insulation with 50 mm rockwool, density 70 kg/m³, frameless structure and without roof curb. The inner surface of the Four ECRH ranges is made of aluzinc material which has resistance for corrosion and atmospheric oxidation. Outer surface is made of electro static powder coated galvanized steel. Condensation drain stainless steel condensation drain pans are used. Inspection doors are installed to base for easy maintenance and installation.

CONTROL PANEL

Standard Four ECRH ranges equipped with microprocessor based with indoor monitored control system. it is compatible with ModBus protocol to comply with the building automation systems. Besides, different compatible protocols such as, BACnet, LonWorks, BMS available. As a feature of the Plug&Play, Four ECRH ranges can operate without any external module. All system could work [cooling, heating, air conditioning included] at once and automatically. Properties such as [CO₂ sensors, smoke detector, differential pressure switch etc.] optionally available.



DRAIN PAN

The drain pan of evaporator is used to take out the condensation that will occur in the evaporator. It is made of stainless steel and cleanable.

RETURN FAN

EC Plug Fan as option for return air side. If the return fan is used, thermodynamic heat recovery feature is also added. Some of the air taken from the indoor environment is passed over the condenser coil with return fan. Thus, thermodynamic heat recovery is provided. In models with return fan, energy consumption is reduced while increasing the compressor efficiency with thermodynamic heat recovery.

ROTARY TYPE HEAT RECOVERY MODULE

Enthalpy rotary wheels, which have high efficiency, Eurovent certified and compliant to ERP regulation, Heat and moisture transfer are made between the fresh and exhaust air by means of rotary wheels. Optionally high efficient sorption or economical condensation rotary wheel. Filters on fresh and exhaust air sides used to prevent pollution in the Rotary wheel.

OUTDOOR HEAT EXCHANGER COIL

Coils are made of copper pipes-aluminum-fins. Apart from the supply coils, two condenser coils are used in couple independent circuits. The design criteria of the coils are selected according to air and fluid side, pressure drop, air velocity, unit capacity, air flow rate and energy efficiency... Optionally the fins might be coated with epoxy and hydrophilic.



FOUR ECRH - 030~180

- ⚙ High Energy Efficient Packaged Air Conditioners
- ⚙ Eco-Friendly R410A Refrigerant Gas
- ⚙ Operating with 100% Fresh Air
- ⚙ High Seasonal Efficiency
- ⚙ Thermodynamic Heat Recovery
- ⚙ 3 Stage [Asymmetric] Cooling
- ⚙ Independent Dual Circuit Cooling
- ⚙ Advanced Microprocessor Control
- ⚙ High Installation Flexibility and Easy Commissioning
- ⚙ Wide and Versatile Range [3 casings, 8 sizes]

3 Different Ranges: Bsc, Eco and Energy



Four ECRH – BSC: The heating and cooling for rooms ensured by BSC ranges, which operates with %100 return air, high efficiency and low energy consumption.



Four ECRH – ECO: Units with economizer dampers in fresh air inlet, return air and exhaust outlet. The economic operation of the unit is provided by adjusting the fresh air rate up to %30. This rate can be up to %100 according to the external weather conditions with free-cooling. Economizer dampers are controlled with the sensitive sensors on fresh and return air side.



Four ECRH – ENERGY: Units with economizer dampers and rotary type heat exchanger. Designed for areas, which requires high fresh air. With heat exchangers that have high efficiency and low pressure drop, sensible and latent heat transfer is made between exhaust and fresh air.

Model	Air Flow	Cooling & Heating Capacities	EER	COP	SEER	SCOP
ECRH-030	5500 m³/h	Cooling: 28.5 Heating: 28.7	3,19	3,77	3,31	2,99
ECRH-045	8000 m³/h	Cooling: 42.4 Heating: 42.7	3,44	3,99	3,62	3,15
ECRH-060	11000 m³/h	Cooling: 57.3 Heating: 57.6	3,29	3,58	3,55	3,14
ECRH-075	14000 m³/h	Cooling: 75.6 Heating: 74.8	3,43	3,65	3,58	3,22
ECRH-095	18000 m³/h	Cooling: 93 Heating: 91.4	3,41	3,61	3,66	3,15
ECRH-125	22000 m³/h	Cooling: 122.6 Heating: 123.2	3,23	3,84	3,49	3,06
ECRH-155	27000 m³/h	Cooling: 155.4 Heating: 158	3,24	3,61	3,42	3,24
ECRH-180	32000 m³/h	Cooling: 178 Heating: 175.5	3,27	3,61	3,48	3,14

TECHNICAL DATA

FOUR ECRH		030	045	060	075
FANS					
Indoor Fan Type				EC Plug Fan	
Outdoor Fan Type				EC Axial Fan	
Number of Outdoor Fan	pcs.	1	1	2	2
Min Air Flow	m ³ /h	4400	6400	8800	11200
Nominal Air Flow	m ³ /h	5500	8000	11000	14000
Max Air Flow	m ³ /h	6050	8800	12100	15400
Nominal ESP	Pa	200	200	200	200

NOMINAL THERMAL PERFORMANCES - COOLING MODE					
(1)Cooling Capacity	kW	28,5	42,4	57,3	75,6
(1)EER		3,19	3,44	3,29	3,43
(1)Total Installed Power	kW	15,63	18,77	28,39	32,92
Eurovent Energy Class		A	A	A	A

NOMINAL THERMAL PERFORMANCES - HEATING MODE					
(1)Heating Capacity	kW	28,7	42,7	57,6	74,8
(1)COP		3,77	3,99	3,58	3,65
Eurovent Energy Class		A	A	A	A

SEASONAL EFFICIENCIES					
(2)Seasonal Energy Efficiency Ratio(SEER)		3,31	3,62	3,55	3,58
(2)Seasonal Energy Efficiency $\eta_{s,c}$	%	129,58	141,85	138,95	144,4
(2)Seasonal Coefficient of Performance SCOP		2,99	3,15	3,14	3,22
(2)Seasonal Energy Efficiency $\eta_{s,h}$	%	116,62	122,91	122,26	125,6

COMPRESSOR					
Refrigerant Type				R410a	
Number of Compressor	pcs.	1	1	2	2
Compressor Type				Scroll	
Cooling Circuit	pcs.	1	1	2	2
Capacity Control		1	1	3	3
Total Compressor Power	kW	7,65	10,58	14,79	19,02
Current (Nominal)	A	14,8	18,62	27,52	34,31

OPTIONAL NATURAL GAS HEATER					
Capacity (Min-Max)	kW	7,6-34,85	12,4-65	12,4-65	16,4-82
Burner Pressure	Pa	90	120	120	120
Supply Voltage	V	230 V-50 Hz Monophase			
Power Input (Min-Max)	kW	0,011-0,074	0,015-0,097	0,015-0,097	0,02-0,123

OPTIONAL ELECTRIC HEATER					
Capacity ($\Delta T=10$ °C)	kW	20	30	40	50
Capacity ($\Delta T=20$ °C)	kW	40	60	80	100

OPTIONAL WATER HEATER					
Capacity	kW	82	117	135	210
Water Fluctuation	°C	80/60			

SOUND DATA					
Sound Level Power	dBA	75	76	78	80
Sound Pressure [1 m]	dBA	66	68	71	72
Sound Pressure [5 m]	dBA	52	54	57	57

NOTES:

[1] According to Eurovent conditions:

Cooling: · Outdoor temperature = 35°C DB · Entering coil temperature 27°C DB / 19°C WB

Heating: · Outdoor temperature = 7°C DB / 6°C WB · Indoor temperature = 20°C DB

[2] According to EN 14825

FOUR ECRH		095	125	155	180
FANS					
Indoor Fan Type		EC Plug Fan			
Outdoor Fan Type		EC Axial Fan			
Number of Outdoor Fan	pcs.	2	2	2	2
Min Air Flow	m ³ /h	14400	17600	21600	25600
Nominal Air Flow	m ³ /h	18000	22000	27000	32000
Max Air Flow	m ³ /h	19800	24200	29700	35200
Nominal ESP	Pa	200	200	200	200

NOMINAL THERMAL PERFORMANCES - COOLING MODE					
[1]Cooling Capacity	kW	93	122,6	155,4	178
[1]EER		3,41	3,23	3,24	3,27
[1]Total Installed Power	kW	38,37	54,76	65,19	71,27
Eurovent Energy Class		A	A	A	A

NOMINAL THERMAL PERFORMANCES - HEATING MODE					
[1]Heating Capacity	kW	91,4	123,2	158	175,5
[1]COP		3,61	3,84	3,61	3,61
Eurovent Energy Class		A	A	A	A

SEASONAL EFFICIENCIES					
[2]Seasonal Energy Efficiency Ratio(SEER)		3,66	3,49	3,42	3,48
[2]Seasonal Energy Efficiency $\eta_{s,c}$	%	143,43	136,48	133,61	136,14
[2]Seasonal Coefficient of Performance SCOP		3,15	3,06	3,24	3,14
[2]Seasonal Energy Efficiency $\eta_{s,h}$	%	122,95	119,37	126,64	122,68

COMPRESSOR					
Refrigerant Type		R410a			
Number of Compressor	pcs.	2	2	2	2
Compressor Type		Scroll			
Cooling Circuit	pcs.	2	2	2	2
Capacity Control		3	3	3	3
Total Compressor Power	kW	22,89	33,46	42,39	45,07
Current (Nominal)	A	41,26	59,15	73,45	79,03

OPTIONAL NATURAL GAS HEATER					
Capacity[Min-Max]	kW	21-100	12,4-130	16,4-164	21-200
Burner Pressure	Pa	120	120	120	120
Supply Voltage	V	230 V-50 Hz Monophase			
Power Input[Min-Max]	kW	0,02-0,130	0,015-0,194	0,02-0,246	0,02-0,26

OPTIONAL ELECTRIC HEATER					
Capacity ($\Delta T=10$ °C)	kW	65	80	100	120
Capacity ($\Delta T=20$ °C)	kW	130	165	190	230

OPTIONAL WATER HEATER					
Capacity	kW	258	318	405	465
Water Fluctuation	°C	80/60			

SOUND DATA					
Sound Level Power	dBA	79	81	81	84
Sound Pressure [1 m]	dBA	72	73	73	76
Sound Pressure [5 m]	dBA	58	59	60	62

NOTES:

[1] According to Eurovent conditions:

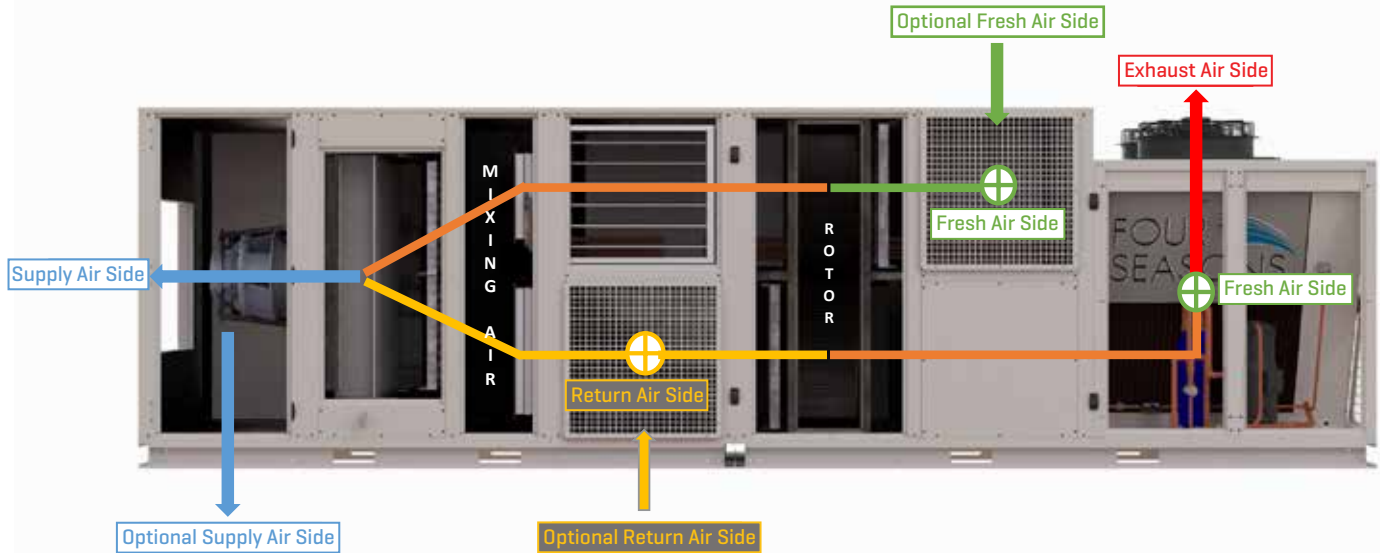
Cooling: · Outdoor temperature = 35°C DB · Entering coil temperature 27°C DB / 19°C WB

Heating: · Outdoor temperature = 7°C DB / 6°C WB · Indoor temperature = 20°C DB

[2] According to EN 14825

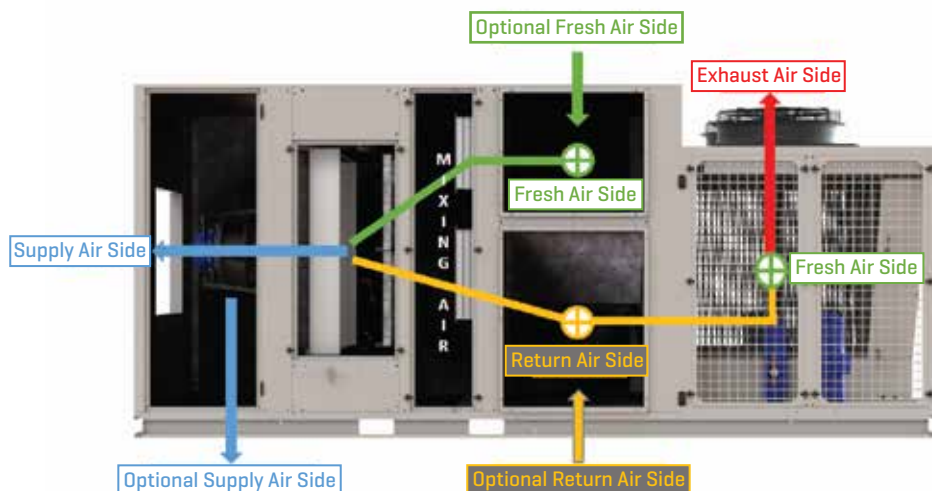
AIR CONFIGURATIONS

Four ECRH – Energy Series:



In ECRH ENERGY with heat recovery and economizer dampers, heat recovery and thermodynamics heat recovery are performed by the return fan. Some of the exhaust air is passed through the rotary type heat recovery unit according to the mixing ratio. Then, the heat transferred air is passed over the condenser coil directly. In this way, energy saving is achieved by thermodynamics heat recovery.

Four ECRH – ECO Series



In ECRH ECO with economizer dampers, thermodynamics heat recovery is performed by the return fan. Some of the exhaust air is mixed according to the mixing ratio. Then, the rest of the exhaust air is passed directly over the condenser coil.

AIR CONFIGURATIONS

Four ECRH – ECO Series:



Models	030	045	060	075	095	125	155	180
W	1300	1500	1900	2100	2100	2270	2600	2700
L	3770	3970	4570	4770	5250	5750	6350	6650
H	1605	1805	2005	2175	2425	2575	2785	3075

All dimensions are in mm.

Four ECRH – ENERGY Series



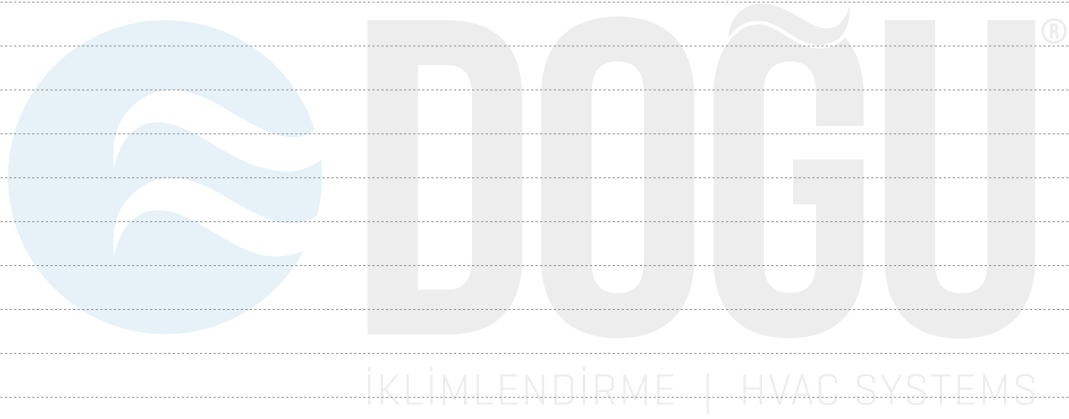
Models	030	045	060	075	095	125	155	180
W	1300	1500	1900	2100	2100	2270	2600	2700
L	5350	5650	6370	6570	7350	8010	8750	9170
H	1605	1805	2005	2175	2425	2575	2785	3075

All dimensions are in mm.

STANDARDS & OPTIONS	SERIES		
	BSC	ECO	ENERGY
Cooling Only	0	0	0
Reversible (Heating/Cooling)	S	S	S
EC plug fan for supply side	S	S	S
Plug fan for supply side	0	0	0
EC axial fan for condenser side	S	S	S
AC axial fan for condenser side	0	0	0
Roofcurb	0	0	0
Economizer	X	X	X
Bypass damper	X	X	X
Thermodynamics heat recovery	X	X	X
Rotary type heat exchanger	X	X	X
Return Fan for exhaust side	0	0	0
Operation with %100 return air	S	S	S
Operation with partial fresh air (up to %30)	X	X	X
Operation with %100 fresh air	X	X	X
Free-Cooling	X	X	X
Electronix expansion valve	0	0	0
Low and high electric heater	0	0	0
Natural gas heater	0	0	0
Hot Water Heater	0	0	0
ISO Course filter (G Class)	S	S	S
ePM1 filter (F Class)	0	0	0
ISO Course + ePM1 filters	0	0	0
Coil coating	0	0	0
Control with room temperature sensor	S	S	S
Differential pressure switch (Dirty filter alarm)	0	0	0
CO2 sensor	0	0	0
Enthalpy control	0	0	0
Smoke dedector and fire alarm	0	0	0
Fire alarm	0	0	0
Touch Panel	0	0	0
ModBus	S	S	S
Bacnet MSTP	0	0	0
LonWorks FTT	0	0	0

- S : Standard
- 0 : Options
- X : Not Available

NOTES





We make the difference with
140 different types of products.



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FOUR
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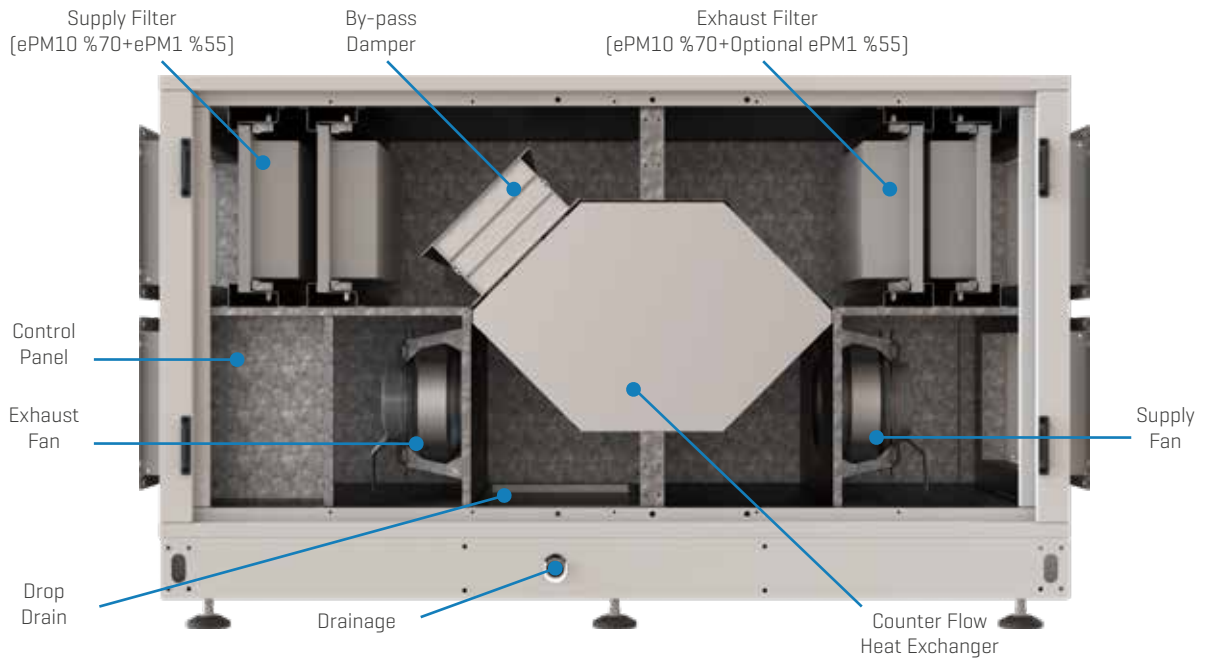
FOUR-FHR
Counter Flow Heat Recovery Unit

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FOUR-FHR

- High efficient EC fans with low sound level.
- Optional electrical heater or heating/cooling coil.
- 3 stage airflow speed control.
[All stages can be set between 0-100%]
- Double skin, 50 mm insulation.
- Hygienic Condensate Drip Tray.
- Plug & Play
- Bypass damper. [Night cooling, free cooling and anti-freeze protection of the heat exchanger]

Heat Exchanger

- High efficiency aluminium counter flow heat exchanger.
- Efficiency up to %94. [calculated for balanced air flows]
- Special application for the anti-freeze protection

Filters

- Large filtering area for energy efficiency and long service period. [up to 6 months]
- ePM10 %70 filters on both supply and extract air side, also for exhaust side optional ePM1 %55 Filter available.

Fans

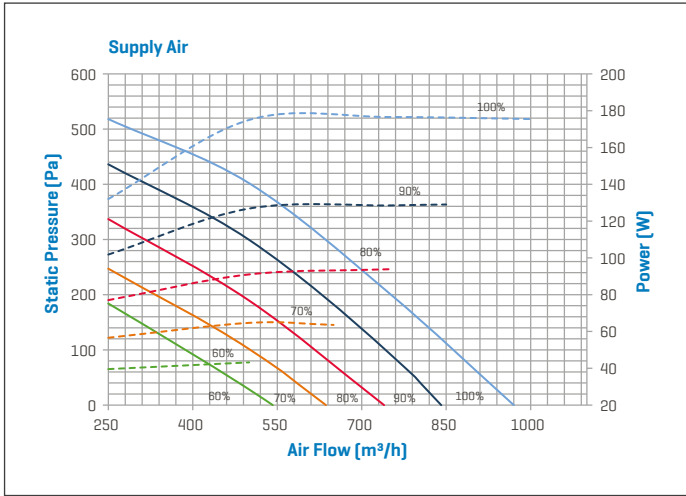
- For low power consumption and low sound level use of EC-plug fan preferred with in FHR series units. [EBM-Papst]
- 10 years exploitation time. [40.000 hours]

	SPI	SFP	SFP Class
	[W/m ³ /h]	[kW/m ³ /s]	EN 13142
FHR-010	0,23	1,22	SFP Class 3
FHR-016	0,33	2,25	SFP Class 5
FHR-025	0,20	2,04	SFP Class 5
FHR-040	0,32	2,38	SFP Class 5
FHR-060	0,32	2,22	SFP Class 5
FHR-085	0,36	2,31	SFP Class 5
FHR-110	0,34	2,38	SFP Class 5
FHR-140	0,36	2,42	SFP Class 5
FHR-170	0,47	2,94	SFP Class 5

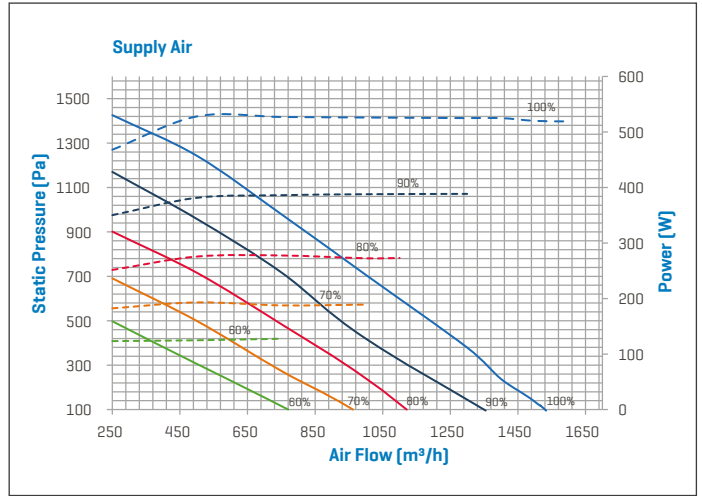
$$SPI = \frac{P_E [W]}{q_v \left[\frac{m^3}{h} \right]} \quad \text{[According to EN 13142]}$$

$$SFP = \frac{P_{sfm} + P_{efm} [kW]}{q_{max} \left[\frac{m^3}{s} \right]} \quad \text{[According to EN 13779]}$$

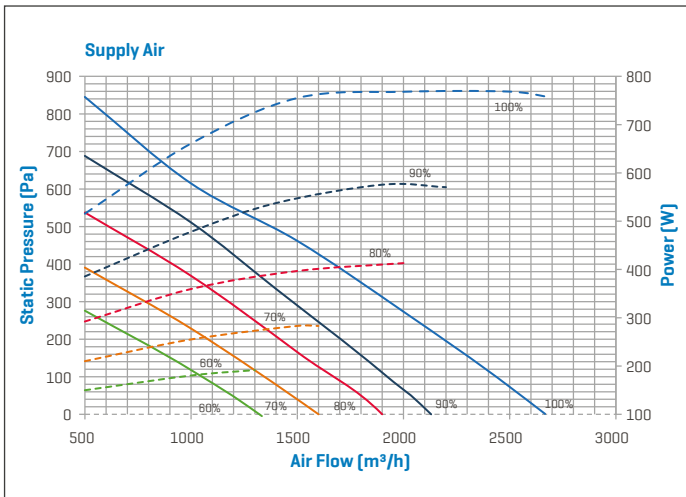
FHR-10



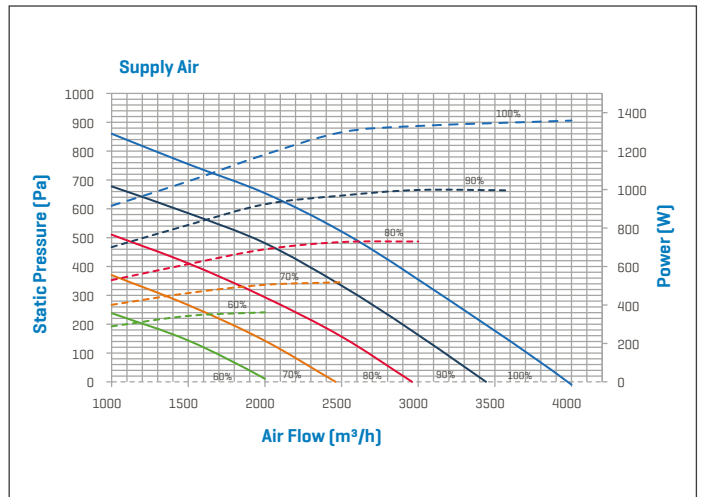
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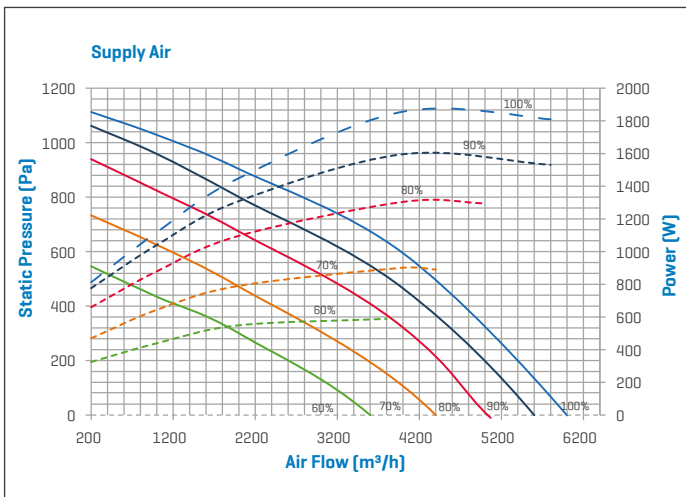
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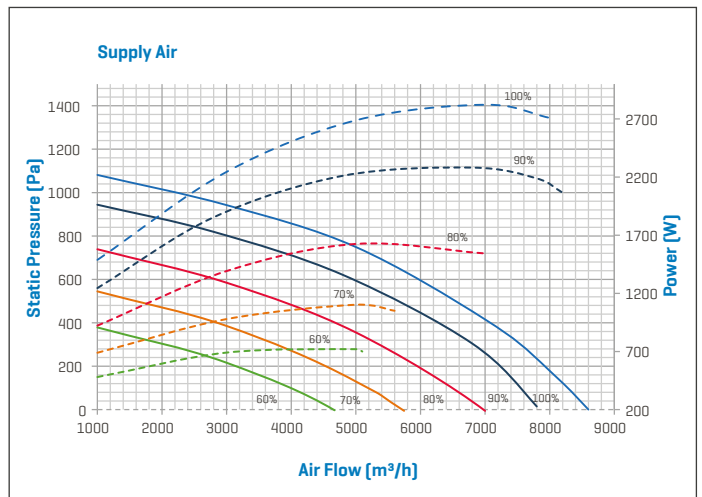
FHR-40



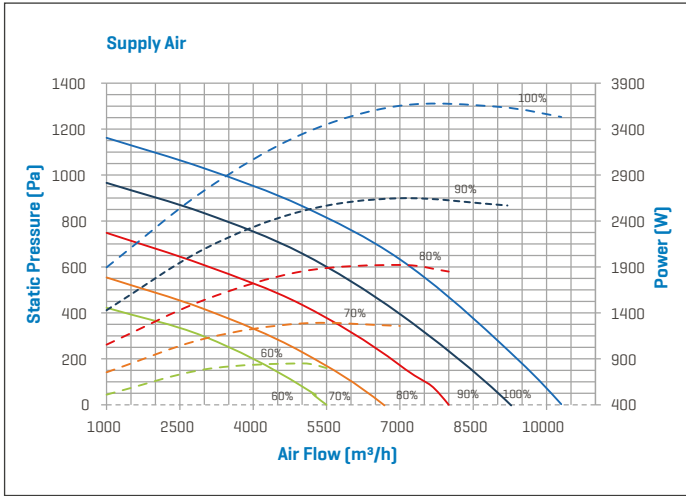
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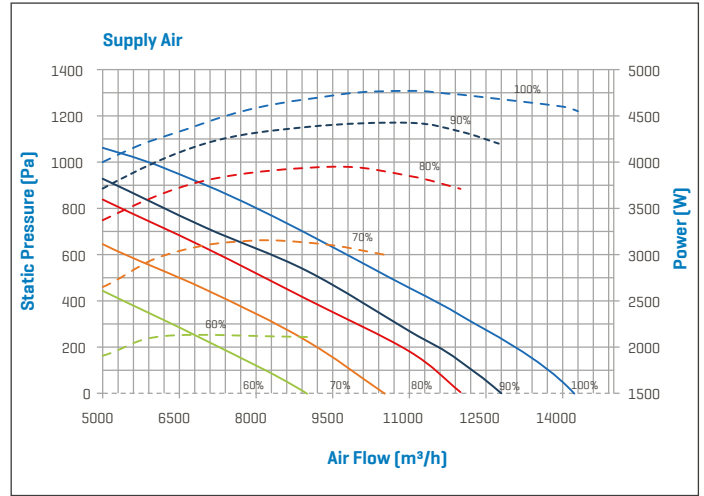
FHR-85



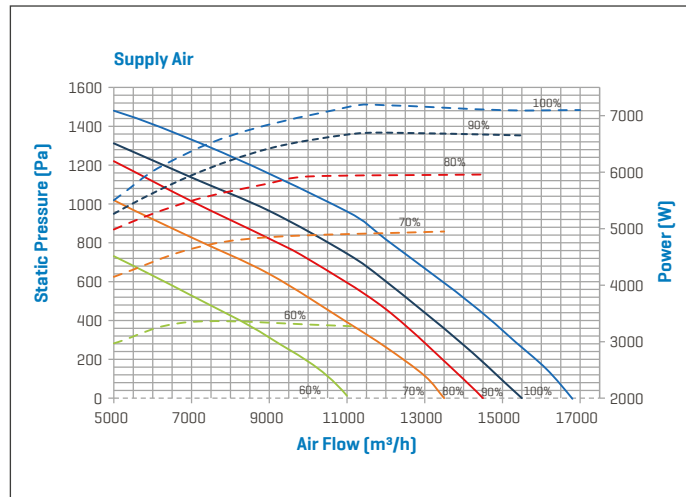
FHR-110



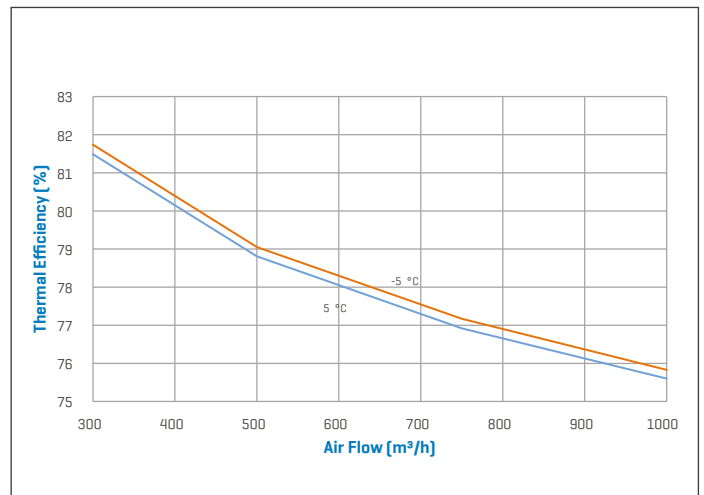
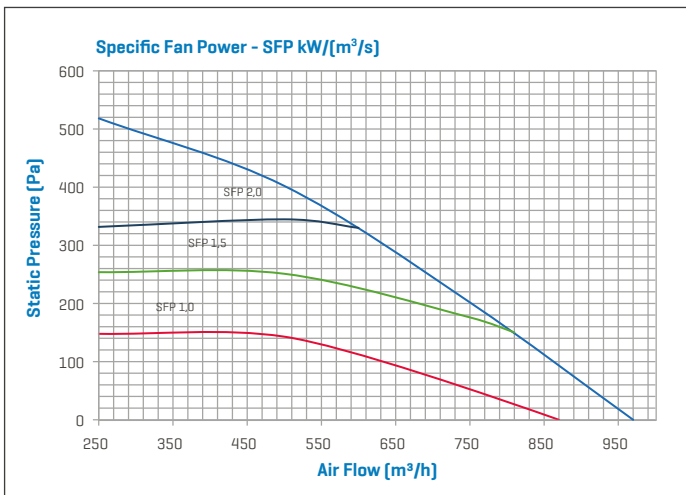
FHR-140



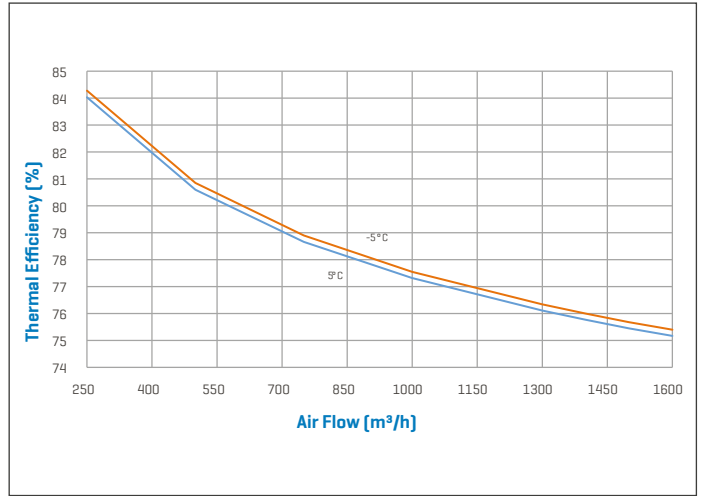
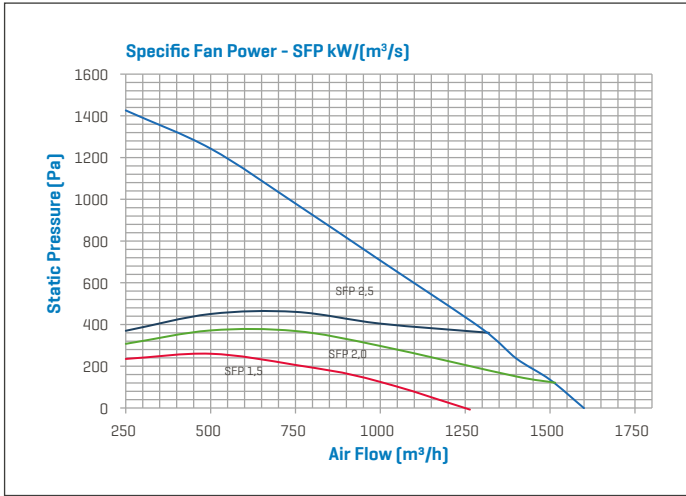
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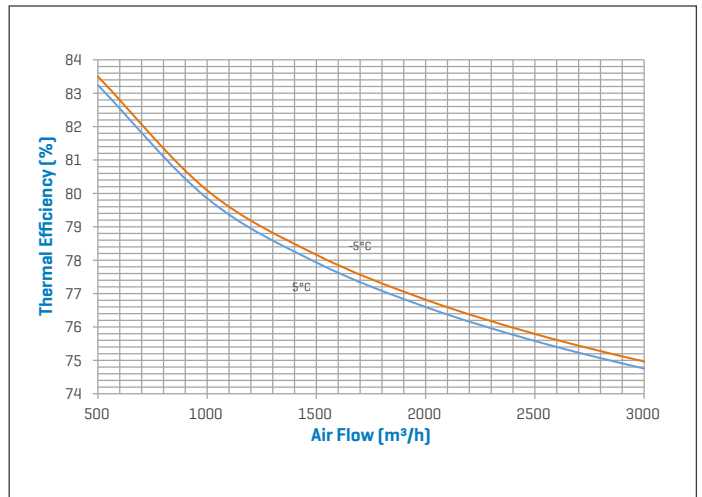
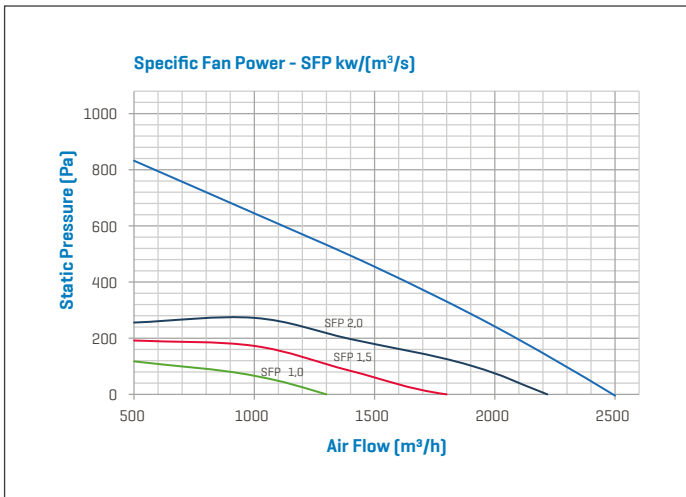
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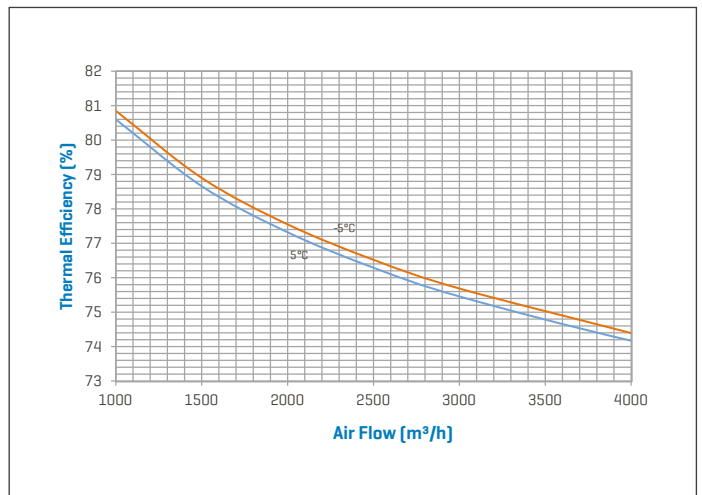
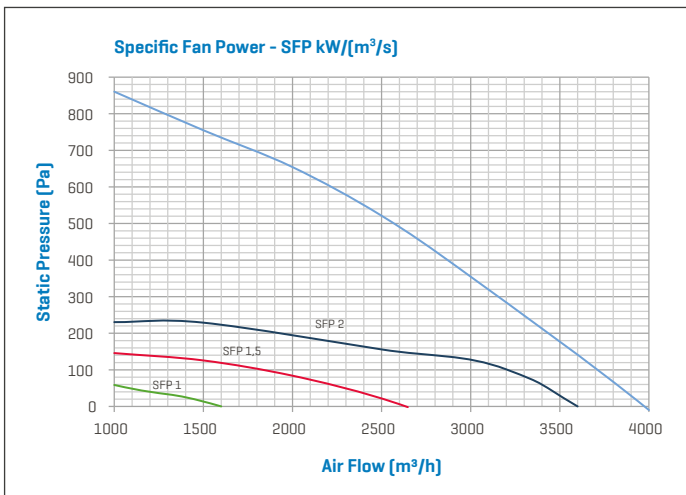
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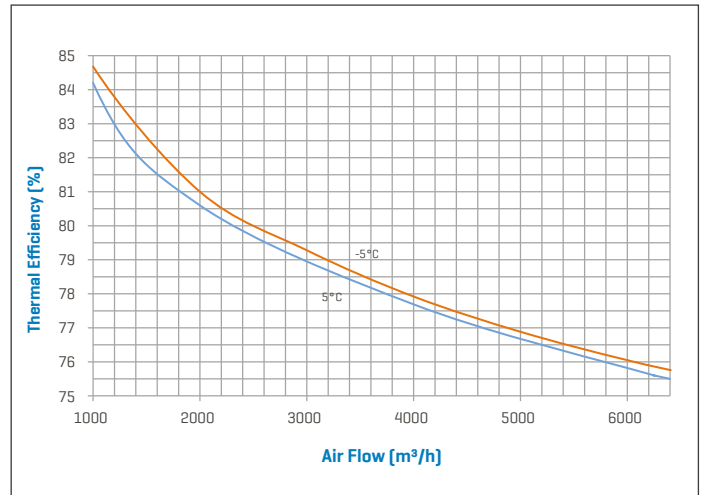
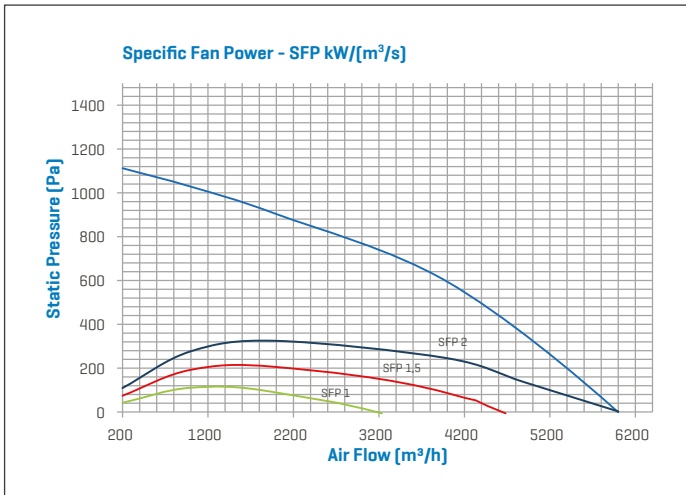
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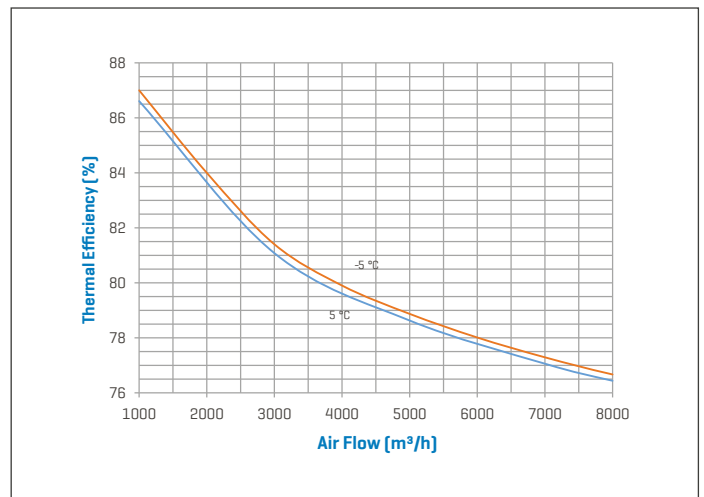
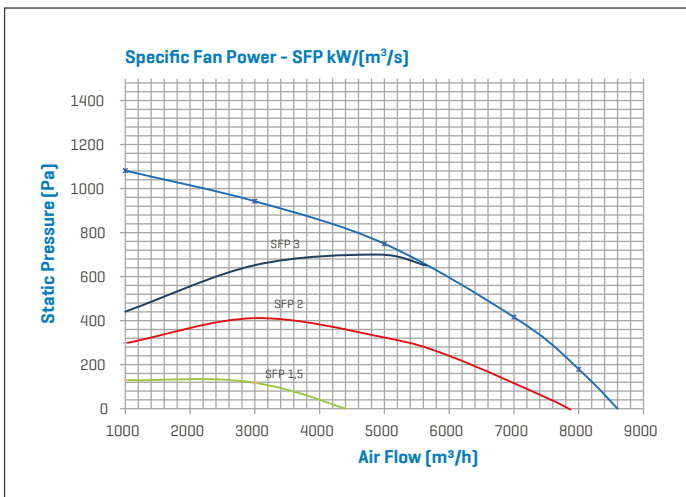
FHR-40



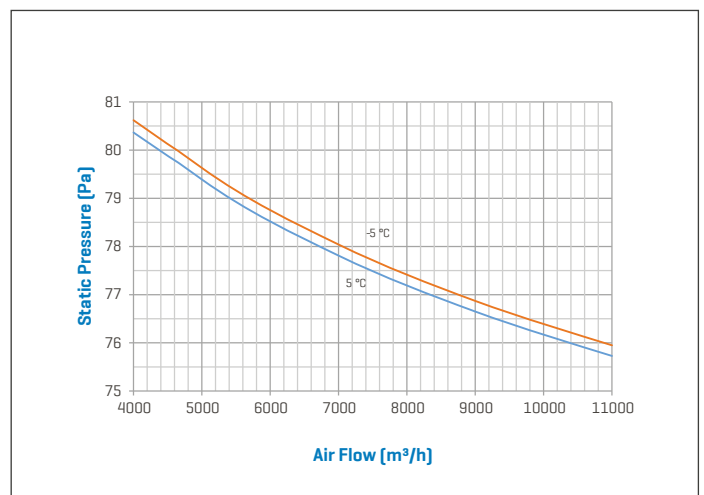
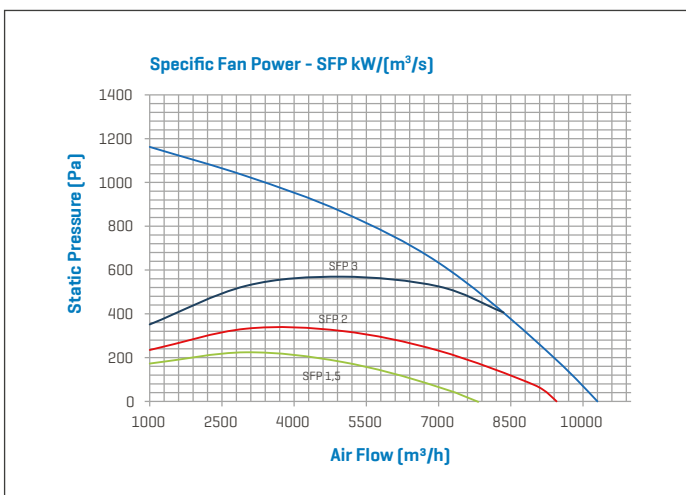
FHR-60



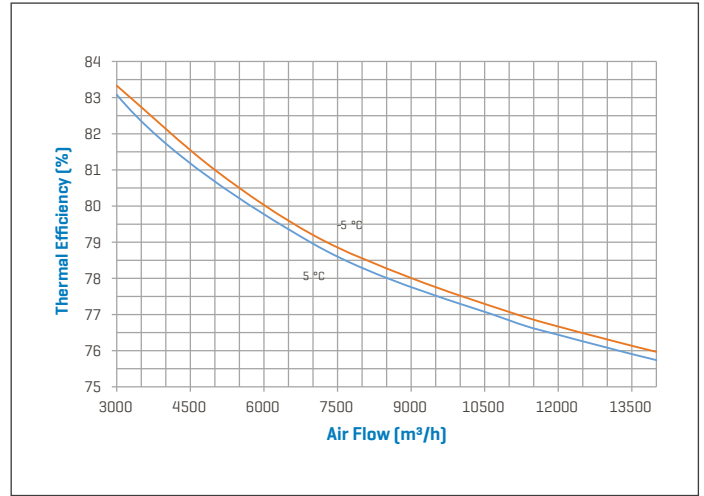
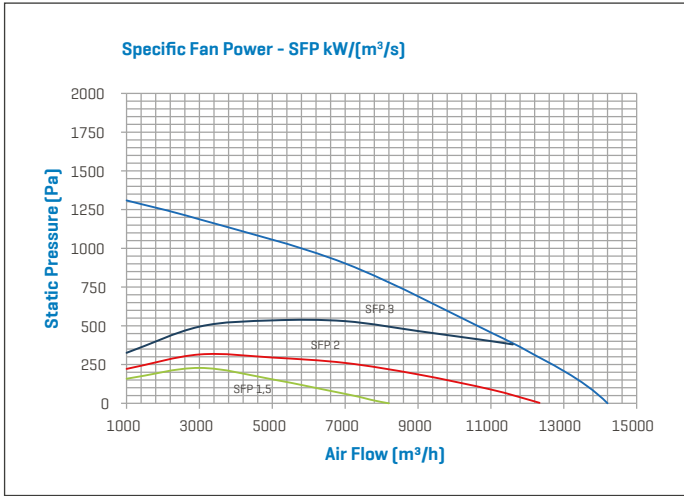
FHR-85



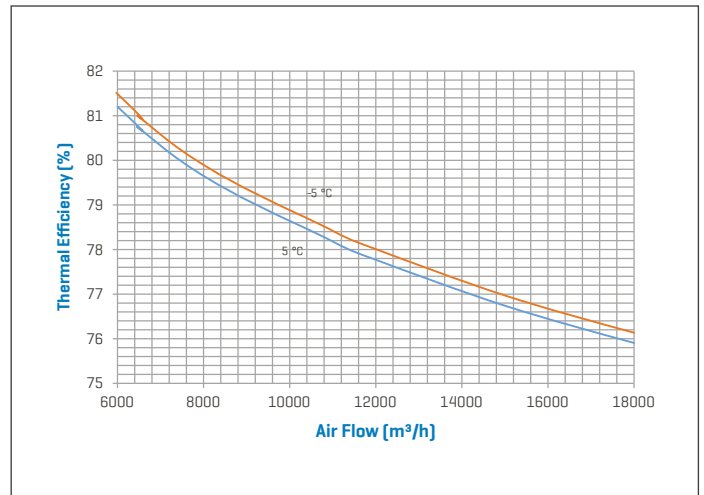
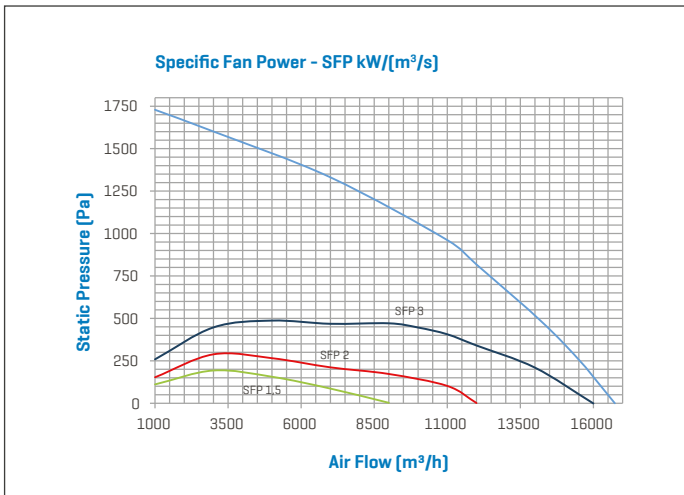
FHR-110



FHR-140

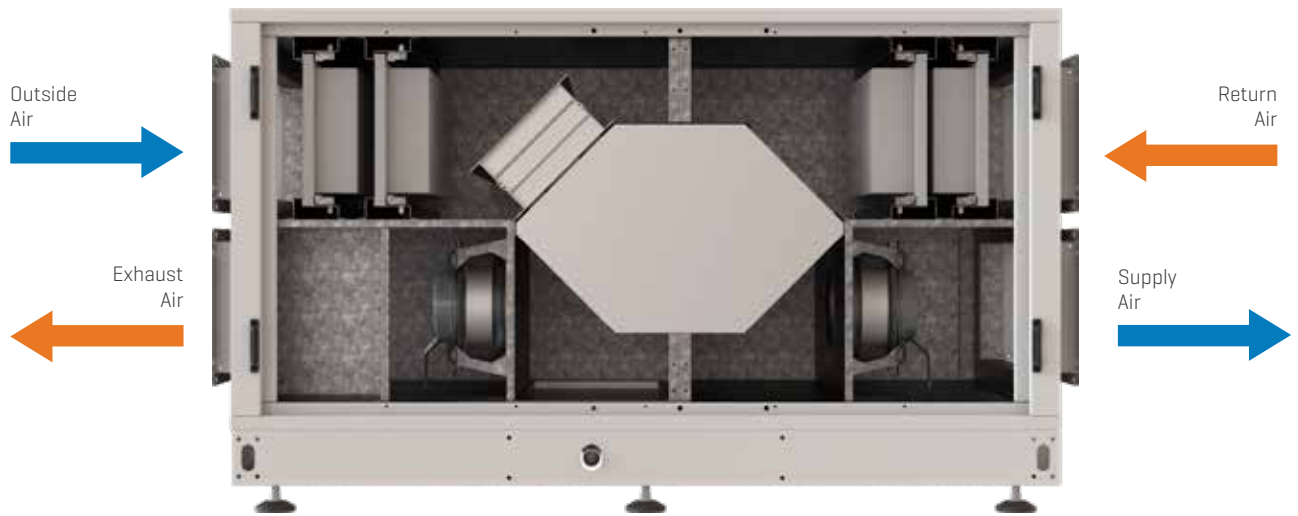


FHR-170

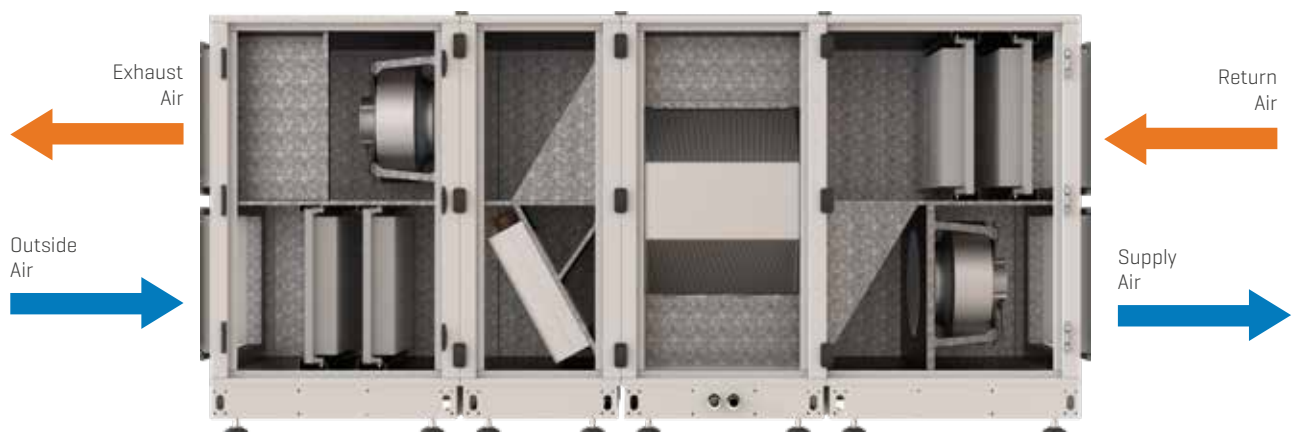


Air Flow Directions

FHR - 10/16/25



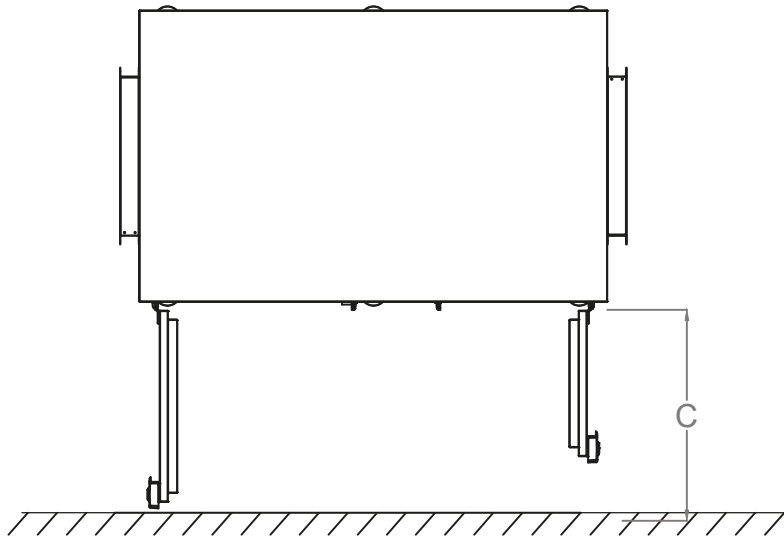
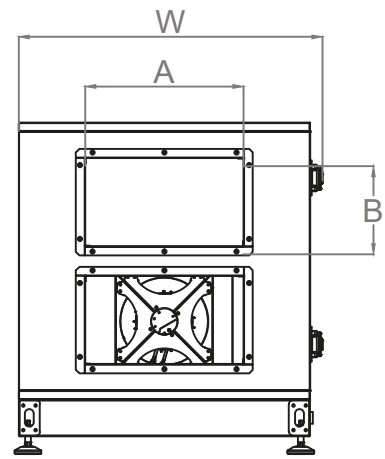
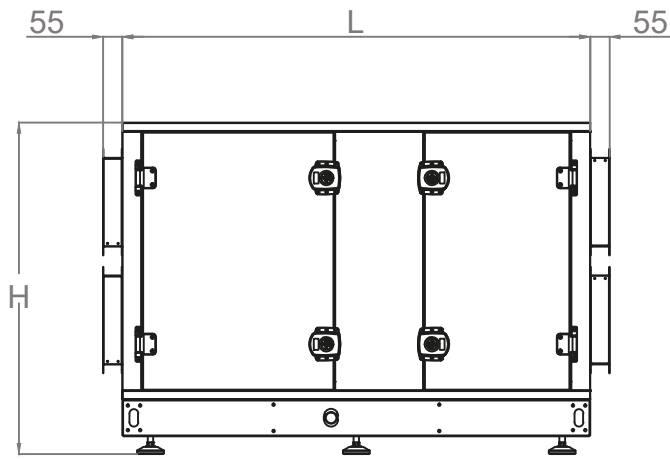
FHR - 40/60/85/110/140/170



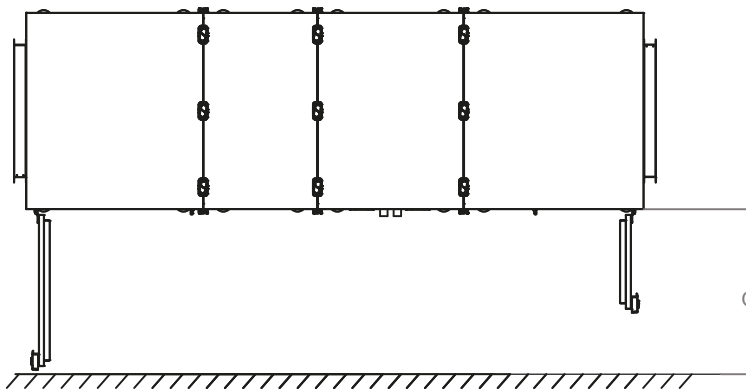
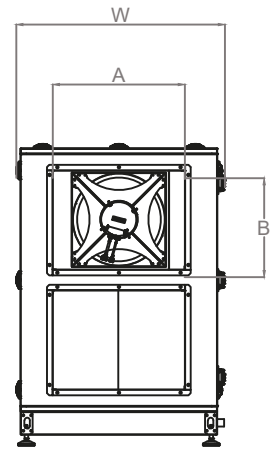
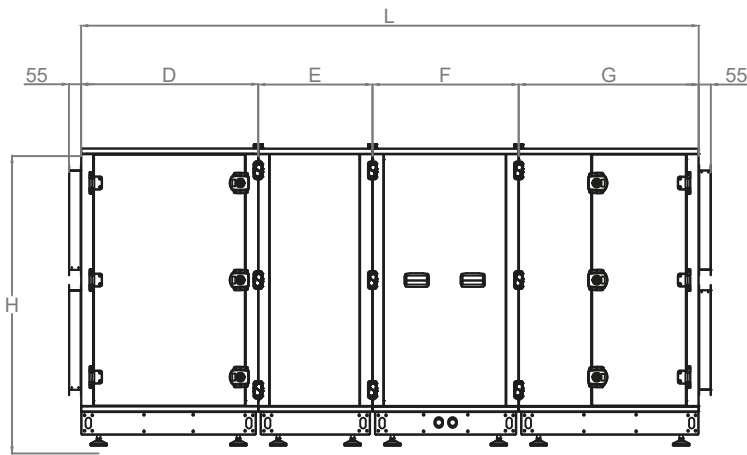
FANS		FHR-10	FHR-16	FHR-25	FHR-40	FHR-60	FHR-85	FHR-110	FHR-140	FHR-170*
SUPPLY FAN	Voltage [V]	230V-1	230V-1	230V-1	380-3	380-3	380-3	380-3	380-3	380-3
	RPM[1/min]	2510	3740	2100	2060	2180	2040	1910	1750	2680
	Power/current [W/A]	170W/1,4A	500W/2,2A	750W/3,3A	1320W/2,1A	1850W/2,9A	2730W/4,2A	3510W/5,4A	4700W/7,3A	3470W/5,3A
EXTRACT FAN	Voltage [V]	230V-1	230V-1	230V-1	380-3	380-3	380-3	380-3	380-3	380-3
	RPM[1/min]	2510	3740	2100	2060	2180	2040	1910	1750	2680
	Power/current [W/A]	170W/1,4A	500W/2,2A	750W/3,3A	1320W/2,1A	1850W/2,9A	2730W/4,2A	3510W/5,4A	4700W/7,3A	3470W/5,3A

*In FHR-170 units, two fans are used for supply and exhaust side.

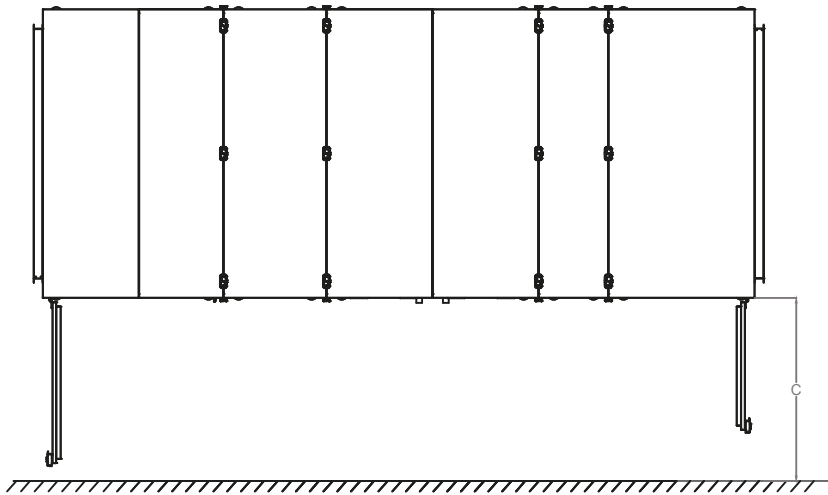
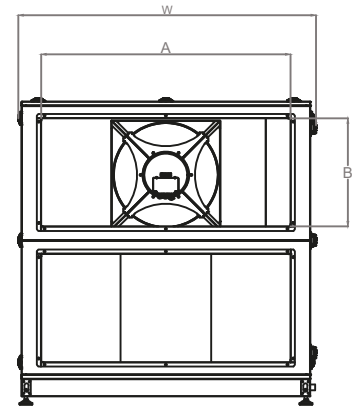
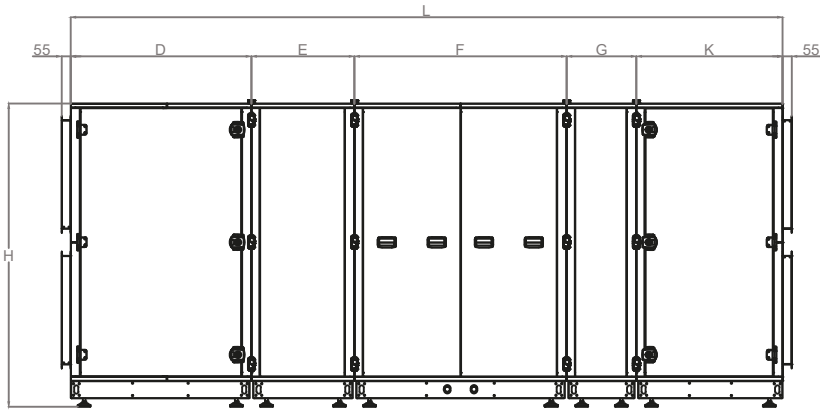
MODELS		FHR-10	FHR-16	FHR-25	FHR-40	FHR-60	FHR-85	FHR-110	FHR-140	FHR-170
Supply Filter	Class	ePM10 %70 + ePM1 %55								
Extract Filter	Class	ePM10 %70								
Insulation		50 mm								
Control System		Integrated								



MODEL	L	W	H	A	B	C	Weight [KG]
FHR-10	1330	865	945	450	250	650	300
FHR-16	1555	865	945	550	300	750	350
FHR-25	2060	865	1225	550	350	850	500



MODEL	L	W	H	A	B	C	D	E	F	G	Weight [KG]
FHR-40	2810	950	1355	600	450	750	805	518	664	818	750
FHR-60	3155	1230	1515	950	500	850	895	518	868	868	1250
FHR-85	3165	1790	1515	1200	500	1100	905	518	868	868	1950
FHR-110	3165	2075	1655	1450	600	1300	905	518	868	868	2520



MODEL	L	W	H	A	B	C	D	E	F	G	K	Weight [KG]
FHR-140	4280	1790	1825	1500	650	1100	1085	618	1275	418	878	3200
FHR-170	4885	1790	1955	1500	650	1100	885	818	1680	618	878	3950



Operation	Description	Availability
On / Off	Control panel or external start stop function is available.	Standard
Display	Digital control panel is available.	Standard
Display	Wireless controller is available as option.	Optional
Fan Speed Control	3 steps fan speed control of supply and exhaust fan is available.	Standard
Fan Speed Control	Constant air flow is available with pressure sensors.	Optional
Fan Speed Control	Airflow control based on the air quality sensor is available.	Optional
Bypass Damper Function	Free cooling is available, by controlling the indoor and outdoor air conditions.	Standard
ModBus	It controls all functions of unit via PC or central control system board.	Standard
Filter Function	There are 2 alternatives to control filters: Alternative 1: It records run time of the unit and when set time expires, control panel gives an alert for filter change. Alternative 2: Filter change time can be controlled with pressure switch mechanically. By this way, control panel gives an alert when filter needs to be changed.	Standard
Boost Function	It is used in order to increase fan speed: Alternative 1: Via boost button on the control panel. Alternative 2: Via dry contact or light power input (230V) on PCB board.	Standard
Safety	It automatically stops operating in case of interfering to the unit while it is working.	Standard
Fire Alarm Function	It will be active in case of fire.	Standard
Wireless Sensors	Upon request, wireless CO2, differential pressure, temperature and humidity sensors are available.	Optional
Heating Coil	Heating coil valves on the devices which include optional heating coil, are controlled by proportional valve motors with PID logic and sensitivity.	Optional
Frost Control	Optional heating coils also include frost thermostat to prevent coil freeze.	Optional



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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

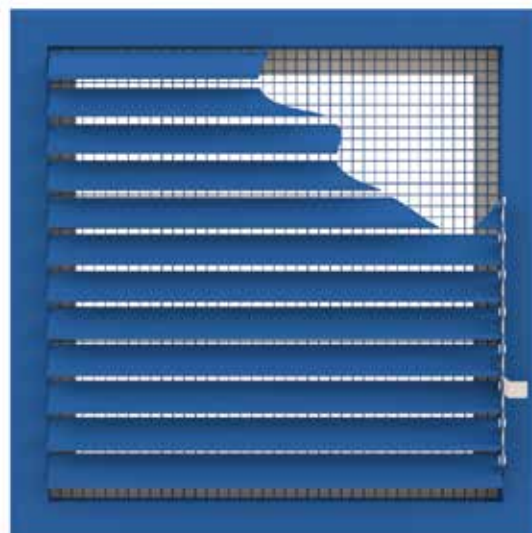
- ☞ RAL 9010 or RAL 9016 electrostatic powder paint as standard
- ☞ Optional
 - Different RAL color codes
 - Matt aluminum anodized finish for a matte and metallic look
 - Unpainted manufacturing

MOUNTING OPTIONS

- ☞ Screwed System
- ☞ Without Mounting Hole

ACCESORIES

- ☞ Optional
 - 2x2 wires



PRODUCT SELECTION

STANDARD DIMENSIONS

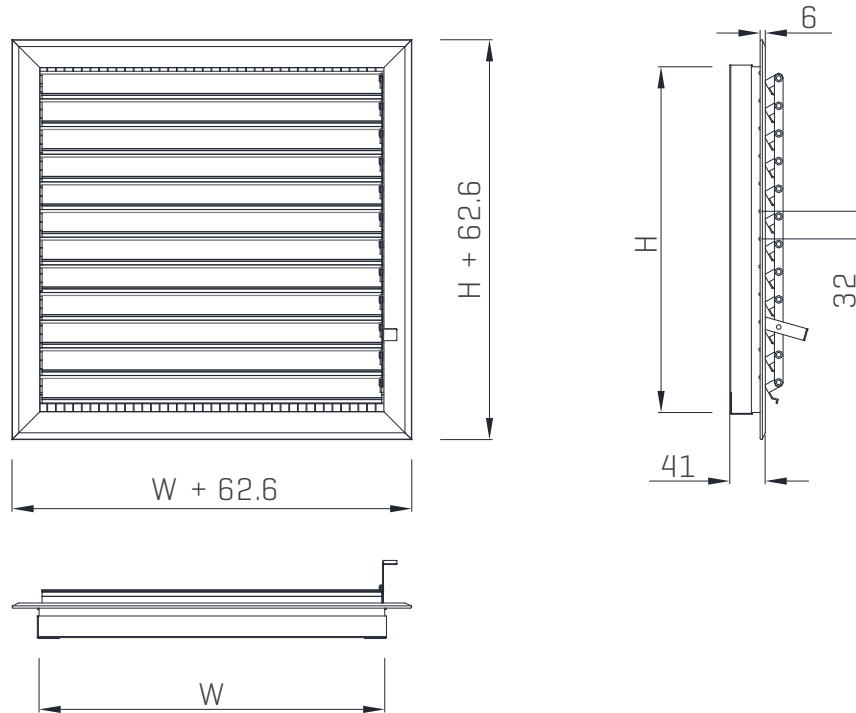
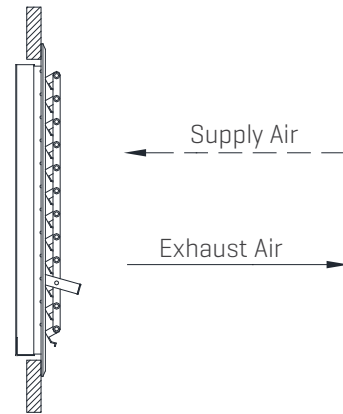


Table 1. Standard Dimensions

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	✓	✓	✓	✓	✓	✓	✓	✓	✓

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[m ²]	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

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	0.278	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

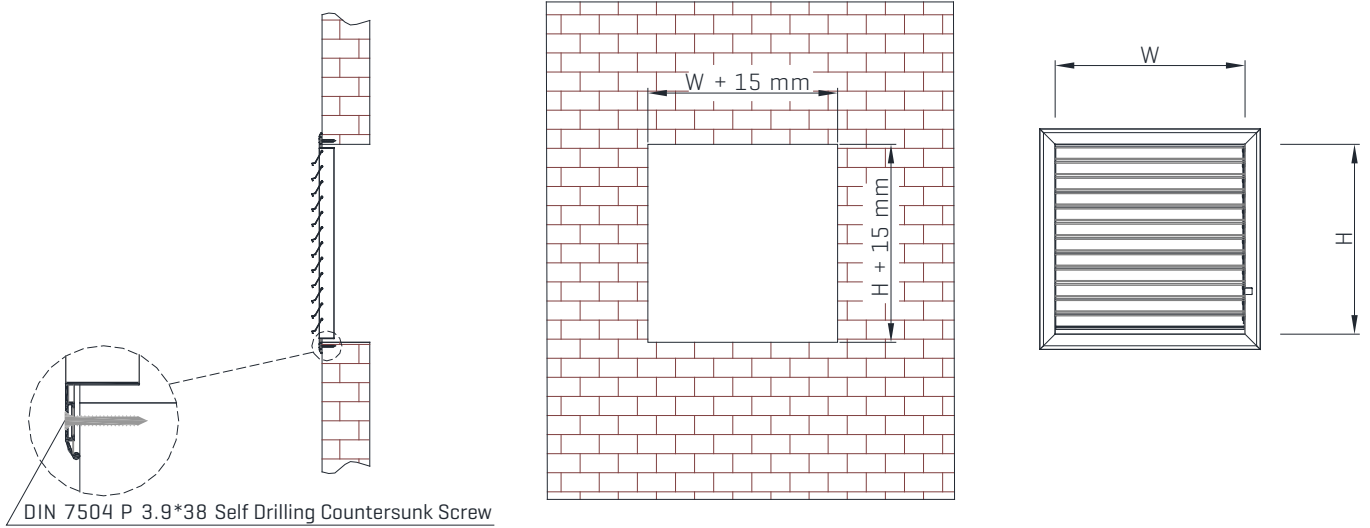
EXHAUST AIR DATA

Table 4. Exhaust Air Data

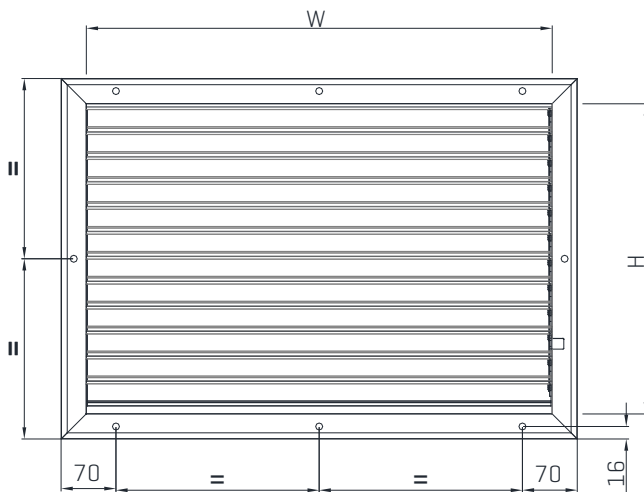
Flow Rate [m³/h]		Effective Speed [m/s]										
		0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	6.0
50	Effective Area [m²]	0.0278	0.0139	0.0093								
	Pressure Drop [Pa]	<1	3	6								
	Sound Power Level [dB(A)]	<15	<15	<15								
100	Effective Area [m²]	0.0556	0.278	0.019	0.014	0.011	0.009					
	Pressure 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
$W \leq 300$	1
$300 < W \leq 900$	2
$1000 < W \leq 1500$	3

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

SIZE PARAMETERS

In case of $W \leq 1500 - H \geq 900$, the louvers are produced as modules by dividing the H dimension.

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

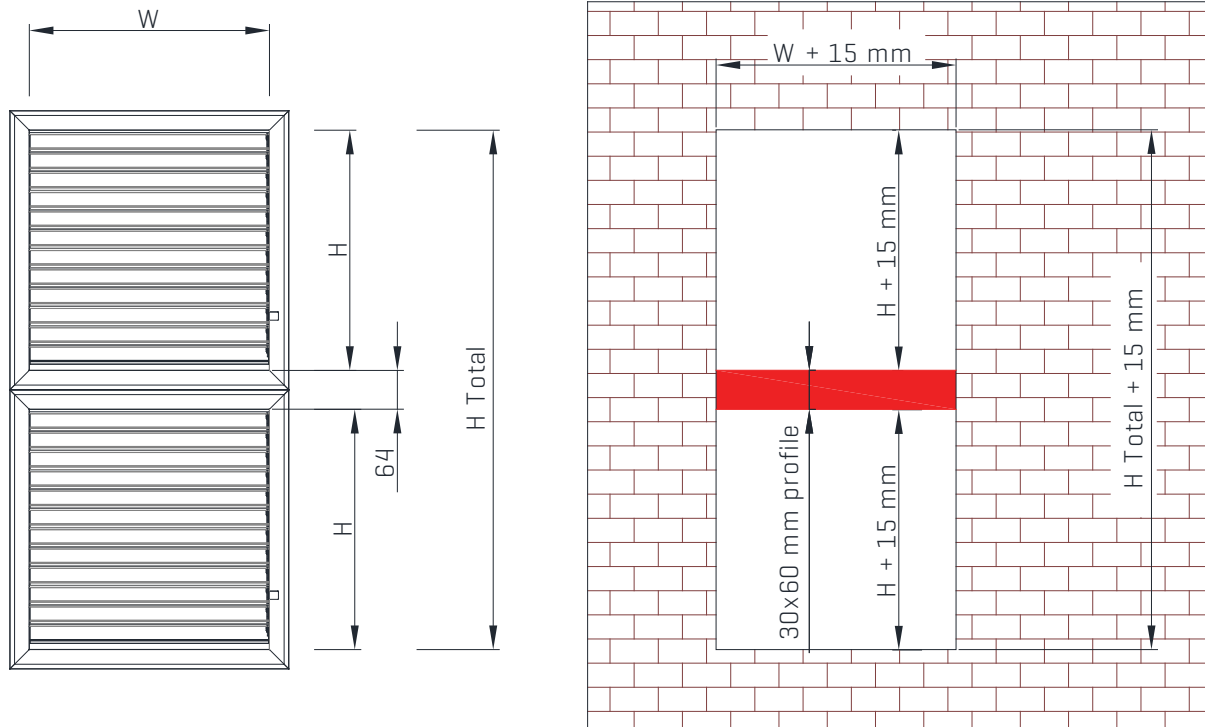


Figure 1

In the case of $W \geq 1200 - H \leq 900$, the louvers 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.

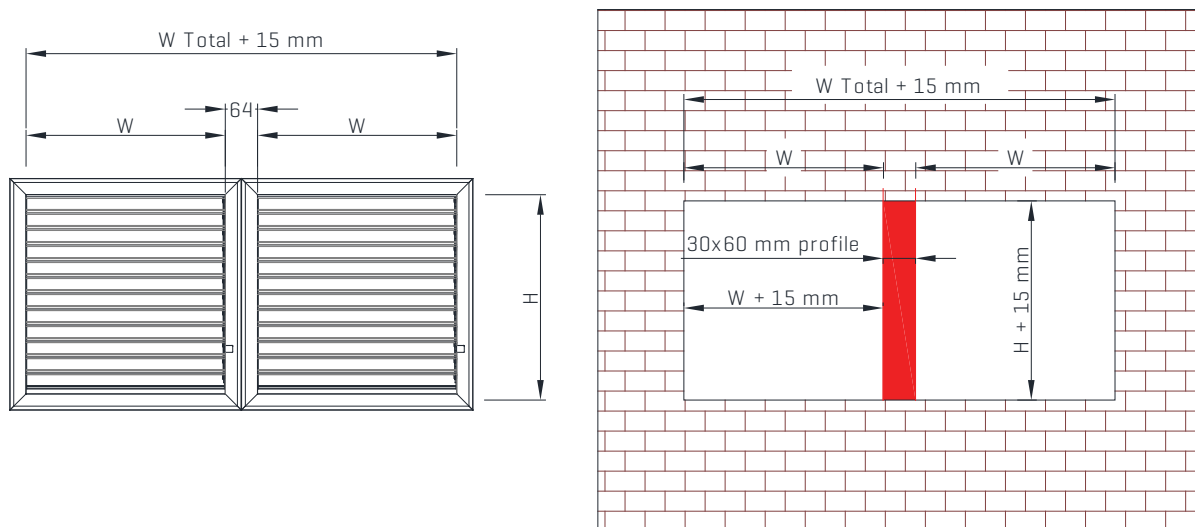


Figure 2

In case of $W \geq 2300$ - $H \geq 2100$, 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.

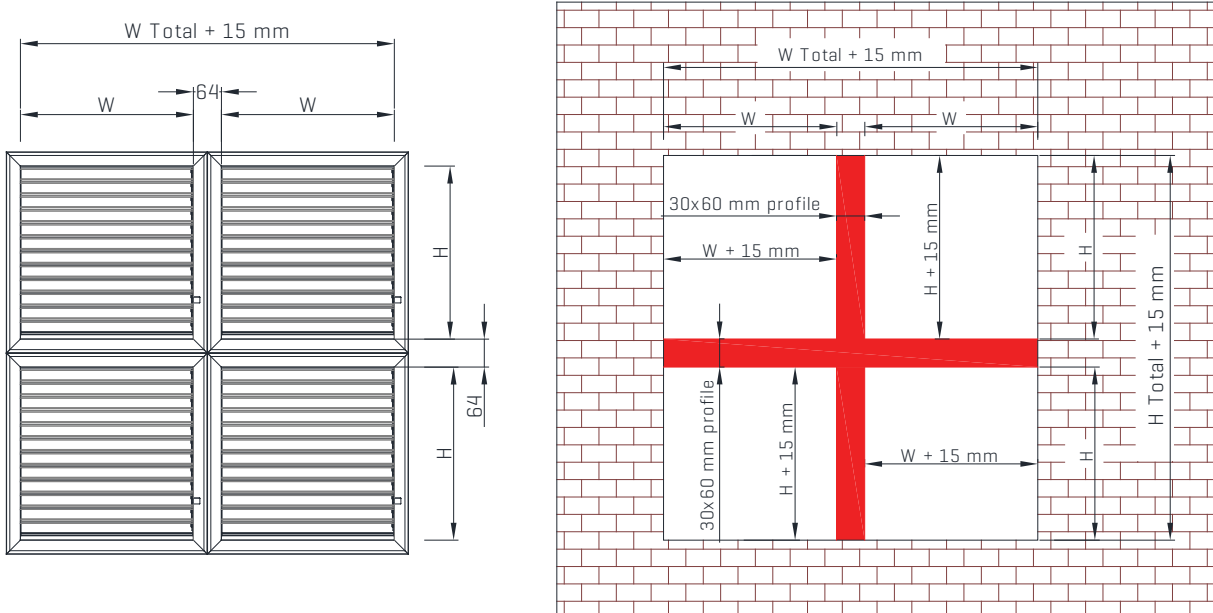


Figure 3

Module and Hole Size Calculation

$$W \text{ Total} = W \times n + [n-1] \times 64 \text{ mm}$$

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?

$$W \text{ Total} = 3600 \text{ mm}$$

$$3600 \text{ mm} = W \times n + [n-1] \times 64 \text{ mm}$$

$n=2$ [will be indicated in the offer]

$W =$ It is found as 1768 mm.

$$H \text{ Total} = 3000 \text{ mm}$$

$$3000 \text{ mm} = H \times n + [n-1] \times 64 \text{ mm}$$

$n=2$ [will be indicated in the offer]

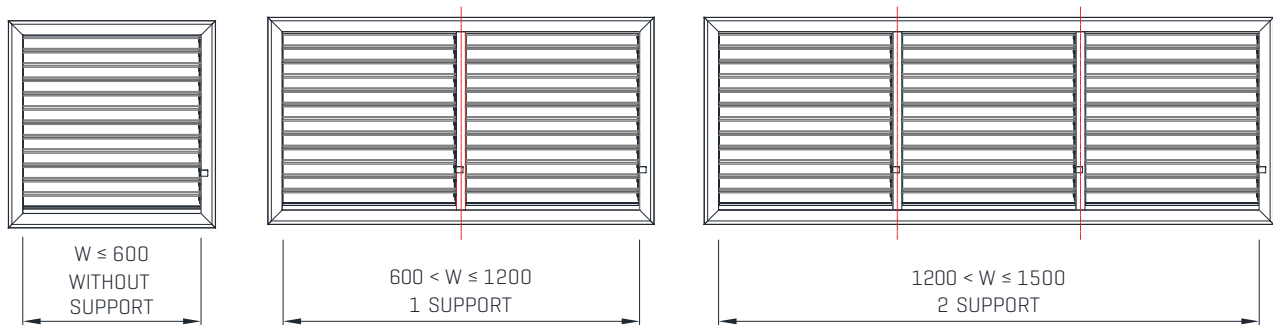
$H =$ It is found as 1468 mm.

$$1 \text{ Module Size} = 1768 \text{ mm} \times 1468 \text{ mm} [W \times H]$$

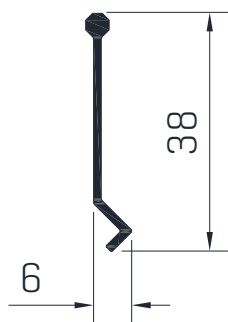
$$\text{Hole size} = 3615 \text{ mm} \times 3015 \text{ mm} [(W \text{ total} + 15 \text{ mm}) \times (H \text{ total} + 15 \text{ mm})]$$

SUPPORT COUNT PARAMETER

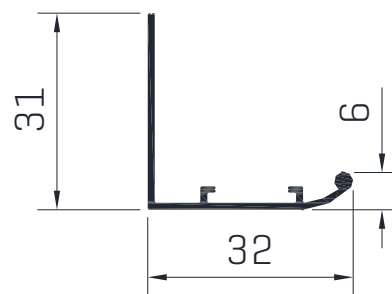
As the desired dimensions for a single module of the product increase, the product is produced with additional support and adjustment lever to increase strength.



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.

PRODUCT ORDER CODES

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

DPA.<A>..<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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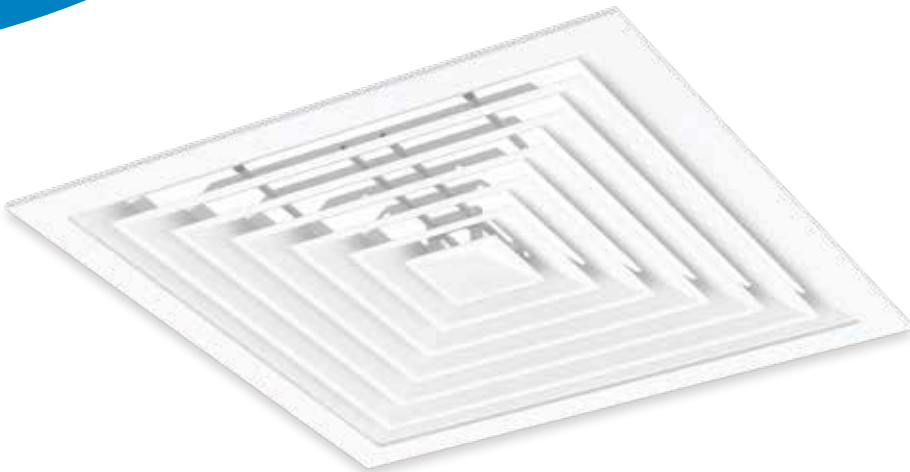
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OAK
Square Ceiling Diffuser

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 4 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 2 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 4 sales offices located in İstanbul, Ankara, Antalya and Adana 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 TSEK, CE and GOST-R quality certifications.



- ☞ OAK - Square Ceiling Diffuser is used in supply and return.
- ☞ It is preferred for its architectural design and functional features.
- ☞ It provides air throw in 4 directions or in the desired directions if specified in the order with low pressure drop.
- ☞ Installation and cleaning is done easily thanks to the plug-in system.
- ☞ It is used between 100 and 5000m³/h air flow rates depending on the product dimensions.
- ☞ It has a decorative structure compatible with ready-made aluminum suspended ceiling systems and metal ceiling systems.
- ☞ It can be produced as assembled with optional "Hepa Filter Box" provided that the dimensions are specified.
- ☞ It complies with TSE ISO EN 14644, DIN 1946/4, DIN 24194 and DIN 25414 hygiene standards.

MATERIAL

- ☞ Production with aluminum or galvanized option.

SURFACE COATING

- ☞ Electrostatic powder paint RAL 9010 or RAL 9016 as standard.
- ☞ Optional
 - Different RAL color codes
 - Unpainted production

INSTALLATION OPTIONS

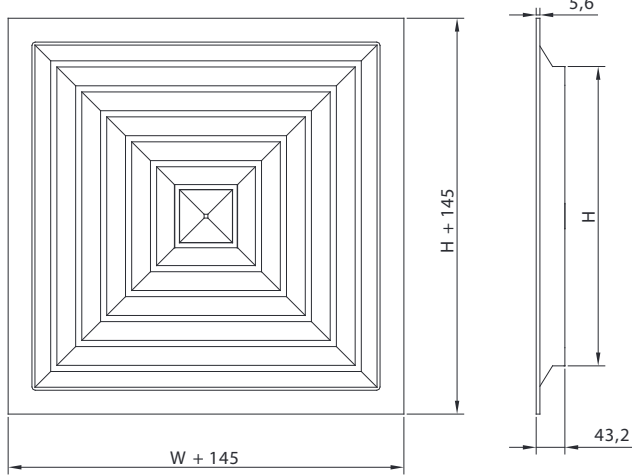
- ☞ Screwed
- ☞ Tile
- ☞ Clip-in
- ☞ Latched
- ☞ Corner Mounted
- ☞ Without Installation Holes

ACCESSORIES

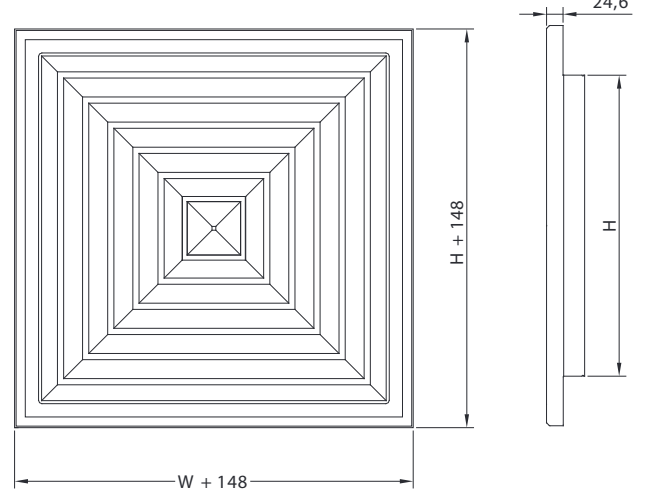
- ☞ Optional
 - ZKD - Opposite Blade Air Adjustment Damper
 - Fiber Filter
 - Reduction

STANDARD SIZES

OAK, OAG, OAB, OAL [STANDARD FRAME]



OAK [CLIP-IN PROFILE FRAME]



OAP [PROFILE FRAME]

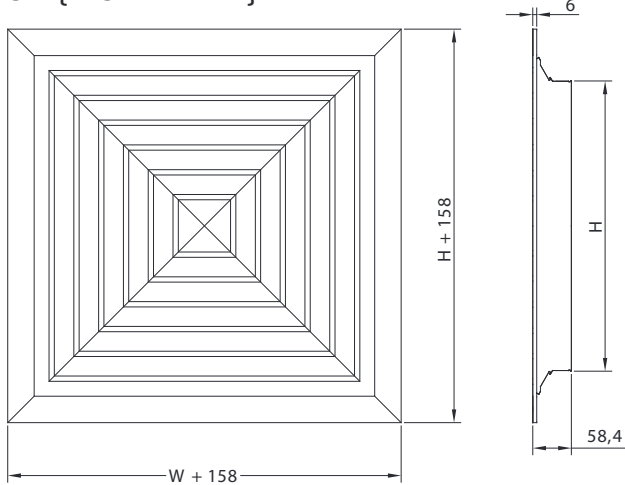


Table 1. Standard Sizes

Product Series	Standard Sizes [W x H] [mm]		Installation Type
OAK, OAG, OAB, OAL [Standard Frame]	150 x 150		Screwed, Latched
	225 x 225		
	300 x 300		Screwed, Latched, Tile
	450 x 450		
OAK, OAB [Clip-in Profile Frame]	452 x 452		Latched Installation
OAP [For HEPA Filter Boxes] [Profile Frame]	201 x 201		Corner Mounted
	353 x 353		
	431 x 431		
	471 x 471		
	506 x 506		
	658 x 658		
	201 x 506		
	353 x 506		
Non-Standard Dimensions [mm]			
Product Series	Width [W]	Height [H]	Installation Type
OAP [Profile Frame]	Minimum: 150 mm Maximum : 1050 mm	Minimum: 150 mm Maximum : 1050 mm	Screwed, Latched

MATERIAL OPTIONS

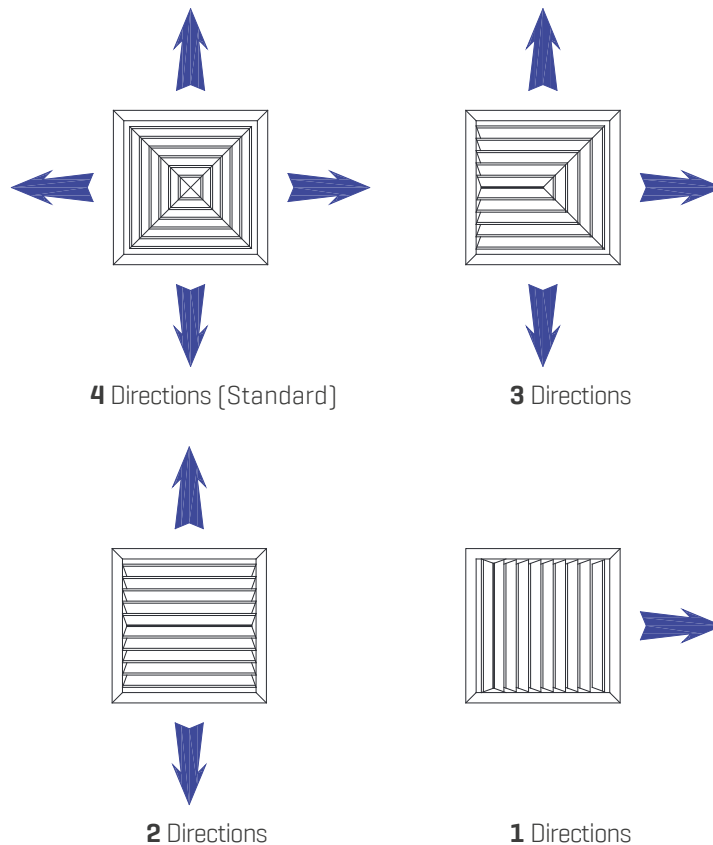


Table 2. Material Options

Product Code	Outer Frame	Inner Frame	Centre	Sizing
OAK	Aluminum	Aluminum	Galvanized	Square
OAB	Aluminum	Galvanized	Galvanized	Square
OAG	Galvanized	Galvanized	Galvanized	Square
OAL	Galvanized	Aluminum	Galvanized	Square
OAP	Aluminum	Aluminum	Aluminum	Rectangular

Note: The product is painted with RAL 9010 or RAL 9016 electrostatic powder paint as standard. If specified in the order, it can be painted with special RAL codes or selected unpainted.

AIR DISTRIBUTION DIRECTIONS



PERFORMANCE DATA

STANDARD SIZES

Table 3. Standard Sizes Performance Data

Product Sizes [mm x mm]	Outer Sizes [mm x mm]	Efektive Area [m ²]		Effective Velocity [m/s]							
				2	2.5	3	3.5	4	4.5	5	5.5
150 x 150	300 x 300	0.009	Air Flow Rate [m ³ /h]	63	79	95	110	126	142	158	173
			Throw Distance [m]	0.6	0.8	0.9	1.1	1.2	1.4	1.5	1.7
			Pressure Drop [Pa]	2	3	4	6	8	10	12	15
			Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	18	20
225 x 225	375 x 375	0.02	Air Flow Rate [m ³ /h]	142	177	213	248	284	319	355	390
			Throw Distance [m]	1.0	1.2	1.5	1.7	2.0	2.2	2.5	2.7
			Pressure Drop [Pa]	2	4	5	7	9	12	15	18
			Sound Power Level [dB(A)]	<15	<15	<15	<15	16	20	23	26
300 x 300	450 x 450	0.035	Air Flow Rate [m ³ /h]	252	315	378	441	504	567	630	693
			Throw Distance [m]	1.4	1.7	2.1	2.4	2.8	3.1	3.5	3.8
			Pressure Drop [Pa]	3	4	6	8	10	13	16	20
			Sound Power Level [dB(A)]	<15	<15	<15	16	20	23	27	30
375 x 375	525 x 525	0.055	Air Flow Rate [m ³ /h]	394	492	591	689	788	886	985	1083
			Throw Distance [m]	1.8	2.2	2.7	3.1	3.6	4.0	4.5	4.9
			Pressure Drop [Pa]	3	4	6	9	11	14	18	21
			Sound Power Level [dB(A)]	<15	<15	<15	19	23	26	30	32
450 x 450	600 x 600	0.079	Air Flow Rate [m ³ /h]	567	709	851	993	1135	1276	1418	1560
			Throw Distance [m]	2.2	2.7	3.3	3.8	4.4	5.0	5.5	6.1
			Pressure Drop [Pa]	3	5	7	9	12	15	19	23
			Sound Power Level [dB(A)]	<15	<15	16	21	25	29	32	35

- ⦿ The data were obtained when the temperature difference between the air distribution equipment and the room air was $\Delta T = 8$ K.
- ⦿ The throw distance is the distance between the point where the velocity of the supply air is at 0.25 m/s and the air distribution equipment.

VARIABLE SIZES

Effective Area Table

Table 4. Effective Area Table

Effective Area [m ²]		H (Height) [mm]									
		150	200	300	400	500	600	750	850	950	1050
W (Width) [mm]	150	0.009	0.012	0.018	0.023	0.029	0.035	0.044	0.050	0.055	0.061
	200	0.012	0.016	0.023	0.031	0.039	0.047	0.058	0.066	0.074	0.082
	300	0.018	0.023	0.035	0.047	0.058	0.070	0.088	0.099	0.111	0.123
	400	0.023	0.031	0.047	0.062	0.078	0.093	0.117	0.132	0.148	0.163
	500	0.029	0.039	0.058	0.078	0.097	0.117	0.146	0.165	0.185	0.204
	600	0.035	0.047	0.070	0.093	0.117	0.140	0.175	0.198	0.222	0.245
	750	0.044	0.058	0.088	0.117	0.146	0.175	0.219	0.248	0.277	0.306
	850	0.050	0.066	0.099	0.132	0.165	0.198	0.248	0.281	0.314	0.347
	950	0.055	0.074	0.111	0.148	0.185	0.222	0.277	0.314	0.351	0.388
	1050	0.061	0.082	0.123	0.163	0.204	0.245	0.306	0.347	0.388	0.429

Performance Data

Table 5. Variable Sizes Performance Data

Flow Rate [m³/h]	Effective Velocity [m/s]														
	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	6.0	7.0	8.0	9.0	10.0
50	Effective Area [m²]	0.0278	0.0139	0.009	0.007	0.006	0.005	0.004	0.004	0.003	0.003	0.002	0.002	0.002	0.001
	Pressure Drop [Pa]	<1	<1	1	2	3	4	5	7	8	10	14	18	23	35
	Throw Distance [m]	0	0	1	1	1	1	1	1	1	1	1	1	1	1
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	18	22	24
100	Effective Area [m²]	0.0556	0.0278	0.019	0.014	0.011	0.009	0.008	0.007	0.006	0.006	0.005	0.004	0.004	0.003
	Pressure Drop [Pa]	<1	<1	1	2	3	5	6	8	9	11	16	21	27	40
	Throw Distance [m]	0	1	1	1	1	1	1	1	1	1	1	1	1	2
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	19	23	26	29
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	0.008	0.007	0.006
	Pressure Drop [Pa]	<1	<1	1	2	4	5	7	9	11	13	18	24	31	38
	Throw Distance [m]	1	1	1	1	1	1	2	2	2	2	2	2	2	2
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	<15	<15	17	19	24	27	31	33
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	0.012	0.010	0.009
	Pressure Drop [Pa]	<1	<1	2	3	4	6	7	9	12	14	20	26	33	41
	Throw Distance [m]	1	1	1	2	2	2	2	2	2	2	3	3	3	3
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	<15	16	19	22	26	30	33	36
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	0.016	0.014	0.012
	Pressure Drop [Pa]	<1	<1	2	3	4	6	8	10	12	15	21	28	35	44
	Throw Distance [m]	1	1	2	2	2	2	2	2	3	3	3	3	3	4
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	<15	18	21	24	28	32	35	38
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	0.020	0.017	0.015
	Pressure Drop [Pa]	<1	<1	2	3	4	6	8	10	13	16	22	29	37	46
	Throw Distance [m]	1	2	2	2	2	2	3	3	3	3	4	4	4	4
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	16	20	23	25	30	33	37	39
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	0.024	0.021	0.019
	Pressure Drop [Pa]	<1	<1	2	3	5	6	8	11	13	16	22	30	38	47
	Throw Distance [m]	1	2	2	2	3	3	3	3	3	3	4	4	4	5
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	18	21	24	26	31	34	38	41
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	0.028	0.024	0.022
	Pressure Drop [Pa]	<1	<1	2	3	5	7	9	11	14	17	23	31	39	49
	Throw Distance [m]	1	2	2	2	3	3	3	3	4	4	4	5	5	5
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	19	22	25	27	32	35	39	42
800	Effective Area [m²]		0.222	0.148	0.111	0.089	0.074	0.064	0.056	0.049	0.0444	0.037	0.032	0.028	0.025
	Pressure Drop [Pa]		<1	2	3	5	7	9	11	14	17	24	32	40	50
	Throw Distance [m]		2	2	3	3	3	3	4	4	4	5	5	5	5
	Sound Power Level [dB(A)]		<15	<15	<15	<15	16	20	23	26	28	33	36	40	42
900	Effective Area [m²]		0.250	0.167	0.125	0.100	0.083	0.071	0.063	0.056	0.0500	0.042	0.036	0.031	0.028
	Pressure Drop [Pa]		<1	2	3	5	7	9	12	14	17	24	32	41	51
	Throw Distance [m]		2	3	3	3	3	4	4	4	4	5	5	5	6
	Sound Power Level [dB(A)]		<15	<15	<15	<15	17	20	24	26	29	33	37	40	43
1000	Effective Area [m²]		0.278	0.185	0.139	0.111	0.093	0.079	0.069	0.062	0.0556	0.046	0.040	0.035	0.031
	Pressure Drop [Pa]		<1	2	3	5	7	9	12	15	18	25	33	42	52
	Throw Distance [m]		2	3	3	3	4	4	4	4	4	5	5	6	6
	Sound Power Level [dB(A)]		<15	<15	<15	<15	17	21	24	27	30	34	38	41	44
1250	Effective Area [m²]		0.347	0.232	0.174	0.139	0.116	0.099	0.087	0.077	0.0694	0.058	0.050	0.043	0.039
	Pressure Drop [Pa]		<1	2	4	5	7	10	12	15	19	26	34	44	54
	Throw Distance [m]		3	3	3	4	4	4	5	5	5	6	6	7	7
	Sound Power Level [dB(A)]		<15	<15	<15	<15	19	22	26	28	31	35	39	42	45
1500	Effective Area [m²]		0.417	0.278	0.208	0.167	0.139	0.119	0.104	0.0926	0.0833	0.069	0.060	0.052	0.046
	Pressure Drop [Pa]		<1	2	4	5	8	10	13	16	19	27	36	45	56
	Throw Distance [m]		3	3	4	4	5	5	5	5	5	6	7	7	8
	Sound Power Level [dB(A)]		<15	<15	<15	15	20	24	27	30	32	37	40	44	46
1750	Effective Area [m²]			0.324	0.243	0.194	0.162	0.139	0.122	0.1080	0.0972	0.081	0.069	0.061	0.054
	Pressure Drop [Pa]			2	4	6	8	10	13	16	20	28	37	47	58
	Throw Distance [m]			4	4	5	5	5	6	6	6	7	7	8	9
	Sound Power Level [dB(A)]			<15	<15	16	21	25	28	31	33	38	41	45	47
2000	Effective Area [m²]			0.370	0.278	0.222	0.185	0.159	0.139	0.1235	0.1111	0.093	0.079	0.069	0.062
	Pressure Drop [Pa]			2	4	6	8	11	14	17	20	28	38	48	60
	Throw Distance [m]			4	5	5	5	6	6	6	7	7	8	8	9
	Sound Power Level [dB(A)]			<15	<15	17	22	25	29	32	34	38	42	45	48
2500	Effective Area [m²]				0.347	0.278	0.232	0.198	0.174	0.1543	0.1389	0.116	0.099	0.087	0.077
	Pressure Drop [Pa]				4	6	8	11	14	18	21	30	39	50	62
	Throw Distance [m]				5	6	6	7	7	7	8	9	9	10	10
	Sound Power Level [dB(A)]				<15	19	23	27	30	33	36	40	44	47	50
3000	Effective Area [m²]				0.417	0.333	0.278	0.238	0.2083	0.1852	0.1667	0.139	0.119	0.104	0.093
	Pressure Drop [Pa]				4	6	9	12	15	18	22	31	41	52	65
	Throw Distance [m]				6	6	7	7	8	8	9	9	10	11	11
	Sound Power Level [dB(A)]				<15	20	24	28	31	34	37	41	45	48	51
4000	Effective Area [m²]					0.370	0.318	0.278	0.2469	0.2222	0.185	0.159			
	Pressure Drop [Pa]					9	12	16	19	23	33	43			
	Throw Distance [m]					8	9	9	10	10	11	12			
	Sound Power Level [dB(A)]					26	30	33	36	39	43	47			
5000	Effective Area [m²]						0.397	0.3472	0.3086	0.2778					
	Pressure Drop [Pa]						13	16	20	24					
	Throw Distance [m]						10	10	11	12					
	Sound Power Level [dB(A)]						31	35	37	40					

Note: The data were obtained when the temperature difference between the air distribution equipment and the room air was $\Delta T = 8$ K.

THROW DISTANCE CORRECTION TABLE

Table 6. Throw Distance Correction Table

Heating Mode (ΔT)	4	6	8	10	12
Throw Distance Multiplier	1.07	1.02	1	0.90	0.83
Cooling Mode (ΔT)	4	6	8	10	12
Throw Distance Multiplier	1.31	1.36	1.42	1.48	1.54

DAMPER CORRECTION TABLE

Table 7. Damper Correction Table

Damper Position	Pressure Drop Multiplier	Sound Generation [dB(A)]
Open	1.1	+1
%25 Closed	1.14	+4
%50 Closed	2.48	+14
%75 Closed	5.11	+29

FILTER PRESSURE DROP TABLE

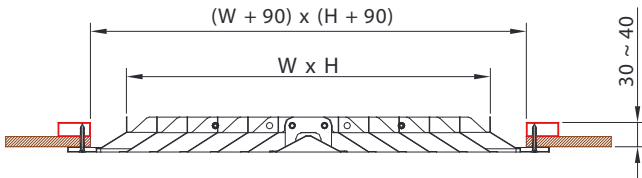
Table 8. Filter Pressure Drop Table

Pressure Drop [Pa]	Air Velocity [m/s]														
	0,5	1,0	1,5	2,0	2,5	3,0	3,5	4,0	4,5	5,0	6,0	7,0	8,0	9,0	10,0
Polyurethane Filter	1	3	5	8	11	15	19	24	29	35	48	63	81	100	121
Fiber Filter	15	28	40	51	62	73	84	94	105	115	135	155	174	193	212

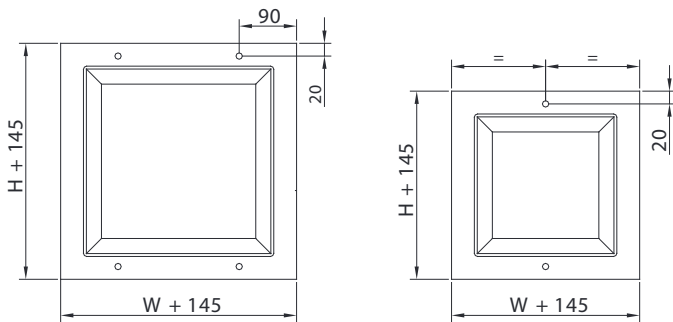
INSTALLATION TABLE

OAK-OAB-OAG-OAL INSTALLATIONS

Screwed



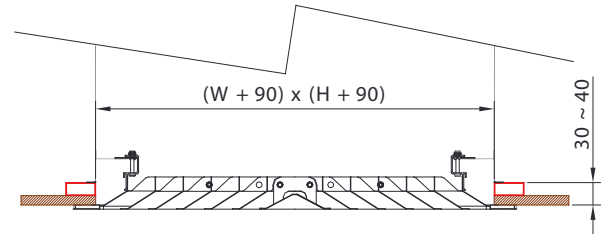
The number of screw holes used is given in the table below.



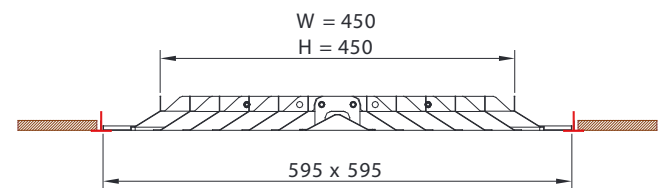
W [Width] [mm]	Number of Top Profile Holes	Number of Bottom Profile Holes
W < 150	1	1
W ≥ 150	2	2

Mounting Screw: DIN 7504 P 3.9x38 Drill bit, phillips, countersunk screw

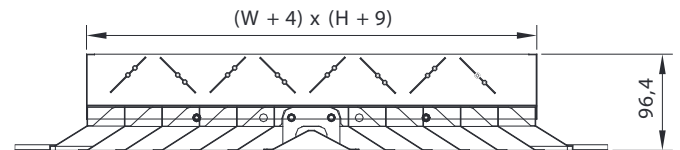
Latched



Tile

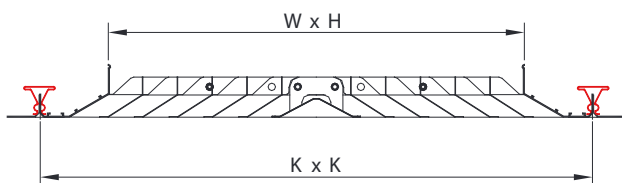


With Damper



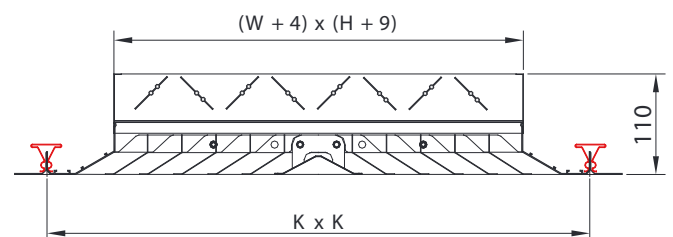
OAK-OAB

Clip-In



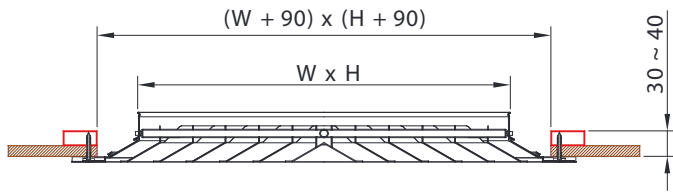
Clip-In Sizes [K x K] [mm]	W[mm]	H[mm]
300 x 300	152	152
600 x 600	452	452

With Damper

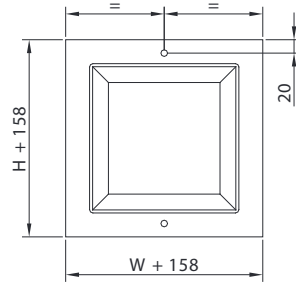
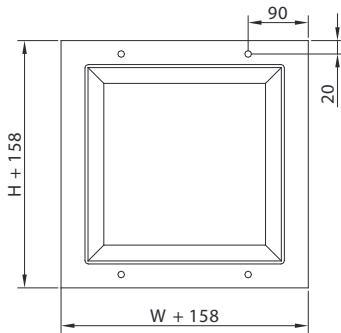


OAP

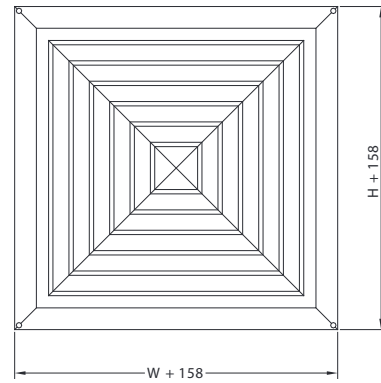
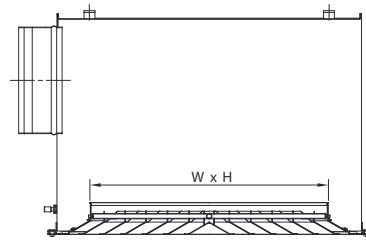
Screwed



The number of screw holes used is given in the table below.



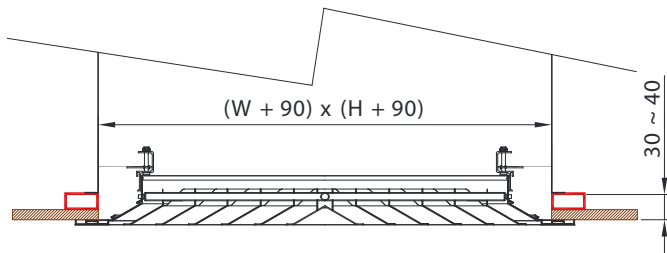
Corner Mounting (with Hepa Filter Box)



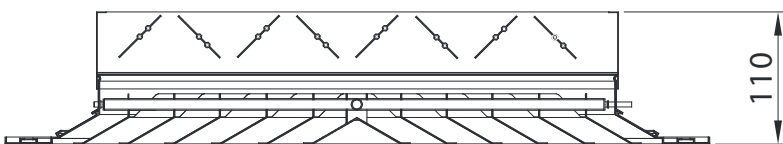
W [Width] [mm]	Number of Top Profile Holes	Number of Bottom Profile Holes
W < 150	1	1
W ≥ 150	2	2

Mounting Screw: DIN 7504 P 3.9x38 Drill bit, phillips, countersunk screw

Latched



With Damper



PRODUCT SELECTION

Example: The air flow rate distributed in the space is determined as 5000m³/h. 5 square anemostats will be used for supply. The height of the ceil is 5 meters. The temperature difference in heating mode is 10K. Make the product selection.

Solution: The air flow rate for a grille, $5000/5 = 1000\text{m}^3/\text{h}$

The grille should supply the air up to 1.7m above the ground. Accordingly, an anemostat with a throw distance of $5-1.7 = 3.3\text{m}$ and an air flow rate of 1000m³/h with a low pressure drop will be selected.

For quick selection, the dimensions corresponding to the appropriate flow and throw distance values are selected from the "Standard Dimensions Performance Data" table.

Accordingly, a square anemostat with the size of 450x450 is selected. Effective area is 0.079m², effective speed is 3m/h, pressure loss is 8.64Pa, throw distance is 3.9m and sound power level is 32.4dB[A].

Throw Distance Correction Table

In the previous example, the throw distance for the 8K heating mode was found to be 4m. For heating mode 10K, refer to the throw distance correction table. The multiplier value is 0.9.

Corrected throw distance = $3,9\text{m} \times 0.9 = 3.51\text{ m}$

Filter Selection

Filter Pressure Drop table should be used for pressure drop calculations that should be applied when choosing a polyurethane or fiber filter.

For example, a flow rate of 1000 m³/h and a throat size of 450x450mm will result in a pressure loss of 8.64Pa. Throat speed is taken as a basis for filter selection. So the throat velocity is:

$$\text{Velocity} \left(\frac{\text{m}}{\text{s}} \right) = \frac{1000 \text{ m}^3/\text{h}}{450 \text{ mm} \times 450 \text{ mm}} \times \left(\frac{1 \text{ h}}{3600 \text{ s}} \right) \times \left(\frac{1 \text{ mm}}{0.001 \text{ m}} \right) \times \left(\frac{1 \text{ mm}}{0.001 \text{ m}} \right) = 1,37 \text{ m/s}$$

Accordingly, in the filter pressure loss table, it is read that a pressure loss of +4 Pa for the polyurethane filter and +37Pa for the fiber filter will occur at a speed of 1.37m/s. Total pressure loss;

With polyurethane filter : $8,64+4 = 12,64\text{ Pa}$

With Fiber Filter: $8,64 + 37 = 45,64\text{ Pa}$

Opposite Blade Damper Condition

Pressure drop and sound power level change in the product with a damper. Damper correction table should be used.

For example, in the product with the damper in the 50% closed position, the pressure multiplier is 2.48 corresponding to the table and the sound generation that needs to be added is +14dB[A].

Total pressure drop: $8,64 \times 2,48 = 21,4\text{ Pa}$

Total Sound Generation: $32,4+14 = 46,4\text{ dB[A]}$

PRODUCT ORDER CODE

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

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

A	Product Type	
	OAK	Table 1. Standard Sizes Table 2. Material Options Table
	OAB	
	OAG	
	OAL	
	OAP	
	O6	
B	Air Distribution Directions	
	50	4 Directions
	51	3 Directions
	52	2 Directions
	53	1 Directions
C	Damper Option	
	ZD	Opposite Blade Damper
	DZ	Without Damper
D	Installation Type	
	VD	Screwed
	KR	Tile
	KL	Clip-In
	MN	Latched
	KM	Corner Installation [With Hepa Filter Box]
	MD	Without Installation Hole
E	Accessories [mm]	
	00	Without Accessories
	BD	Duct Reducer
	EF	Fiber Filter
F	Dimensions [mm]	
	0000.0000	Table 1. Standard Dimesions
G	Paint	
	00	Unpainted
	S1	Standard Painted - RAL 9010
	S2	Standard Painted - RAL 9016
	XX	Special Painted

Sample Coddng: OAK.ALM.50.DZ.VD.00.0450.0450.XX



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Thanks to our "Customer Satisfaction","Zero-defect policy" motto and reinforced by complete certified products, more than 250 employees. DOGU HVAC R&D department 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 standards], 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.





VGF – PRISMATIC FIRE AND SMOKE DAMPER

- ☞ It prevents the spreading to nearfields during fire.
- ☞ Be ingtested and proven by TÜRKAK, it fulfills the duration, isolation and insulation standards against fire and smoke.
- ☞ According to EN-13501 -3, it has the EI-120(S) duration class.
- ☞ Produced up to 200 x 200 mm and 1300 x 800 mm
- ☞ According to several process needs, the frame is painted either with electrostratic powder paint or produced with AISI 304 stainless steel.
- ☞ The mechanism of the blades works with a 24V AC/DC - 230V AC servo motor.

WORKING PRINCIPALS

- ☞ The **VGF – Prismatic Fire and Smoke Damper** is used to prevent any fire, smoke and heat from entering in to other ducts of the air system. It can be installed to wards the supply air direction or the opposite direction. The VGF is tested and proven by TÜRKAK. It fulfills the duration, isolation and insulation standards against fire and smoke. According to EN-13501-3, it has the EI-120(S) duration class.
- ☞ Actuator needs 60 seconds in order to change its on-off position. If electricity is cut off, the blades will close dueto the string mechanism of actuator.
- ☞ **VGF – Prismatic Fire and Smoke Damper** will automatically close when the electro-thermal sensor recognizes a degree of 72°C in- or outside the ducts.

SELECTION

1. Effective Area

W/H (m ²)	200	250	300	350	400	450	500	600	700	800
200	0,028	0,037	0,046	0,055	0,064	0,073	0,082	-	-	-
250	0,035	0,046	0,058	0,069	0,080	0,091	0,102	-	-	-
300	0,042	0,056	0,069	0,083	0,096	0,109	0,123	0,150	0,176	0,203
350	0,049	0,065	0,081	0,096	0,112	0,128	0,143	0,175	0,206	0,237
400	0,057	0,075	0,092	0,110	0,128	0,146	0,164	0,200	0,236	0,272
450	0,064	0,084	0,104	0,124	0,144	0,165	0,185	0,225	0,265	0,306
500	0,071	0,093	0,116	0,138	0,160	0,183	0,205	0,250	0,295	0,340
600	0,085	0,112	0,139	0,166	0,193	0,220	0,246	0,300	0,354	0,408
700	0,099	0,131	0,162	0,193	0,225	0,256	0,288	0,351	0,413	0,476
800	0,113	0,149	0,185	0,221	0,257	0,293	0,329	0,401	0,473	0,544
900	0,128	0,168	0,209	0,249	0,289	0,330	0,370	0,451	0,532	0,613
1000	0,142	0,187	0,232	0,277	0,322	0,366	0,411	0,501	0,591	0,681
1100	0,156	0,206	0,255	0,304	0,354	0,403	0,453	0,551	0,650	0,749
1200	0,170	0,224	0,278	0,332	0,386	0,440	0,494	0,602	0,709	0,817
1300	0,185	0,243	0,301	0,360	0,418	0,477	0,535	0,652	0,769	0,885

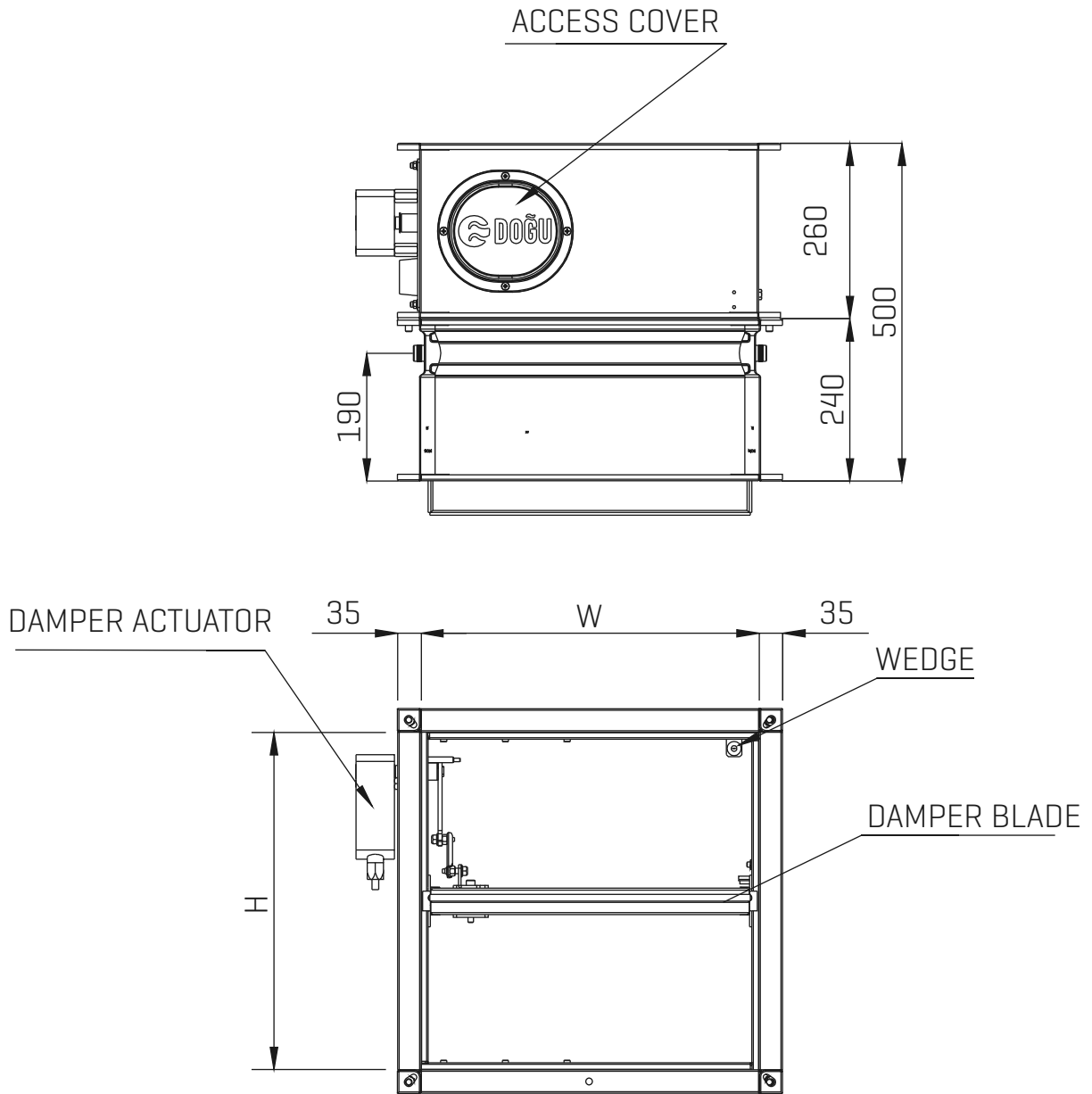
2. Damper Weight

W/H (m ²)	200	250	300	350	400	450	500	600	700	800
200	10,3	11,2	12,2	13,1	14,1	15,1	16,0	-	-	-
250	11,2	12,3	13,4	14,4	15,5	16,6	17,6	-	-	-
300	12,2	13,4	14,5	15,7	16,9	18,1	19,2	21,6	23,9	26,3
350	13,1	14,4	15,7	17,0	18,1	19,6	20,8	23,4	25,9	28,5
400	14,1	15,5	16,9	18,3	19,6	21,1	22,5	25,3	28,1	30,9
450	15,1	16,6	18,1	19,6	21,1	22,6	24,1	27,1	30,1	33,1
500	16,0	17,6	19,2	20,8	22,5	24,1	25,7	29,0	32,2	35,5
600	17,9	19,8	21,6	23,4	25,3	27,1	28,9	32,6	36,2	39,9
700	19,8	21,9	23,9	26,0	28,1	30,1	32,2	36,4	40,5	44,7
800	21,8	24,0	26,3	28,6	30,8	33,1	35,4	39,9	44,5	49,0
900	23,7	26,2	28,6	31,1	33,6	36,0	38,5	43,5	48,4	53,4
1000	25,6	28,3	31,0	33,7	36,4	39,1	41,8	47,2	52,6	58,0
1100	27,5	30,4	33,3	36,3	39,2	42,1	45,1	51,0	56,9	62,8
1200	29,4	32,6	35,7	38,8	42,0	45,1	48,2	54,5	60,7	67,0
1300	31,4	34,7	38,1	41,4	44,7	48,1	51,4	58,0	64,7	71,3

3. Sound Power Level and Pressure Loss

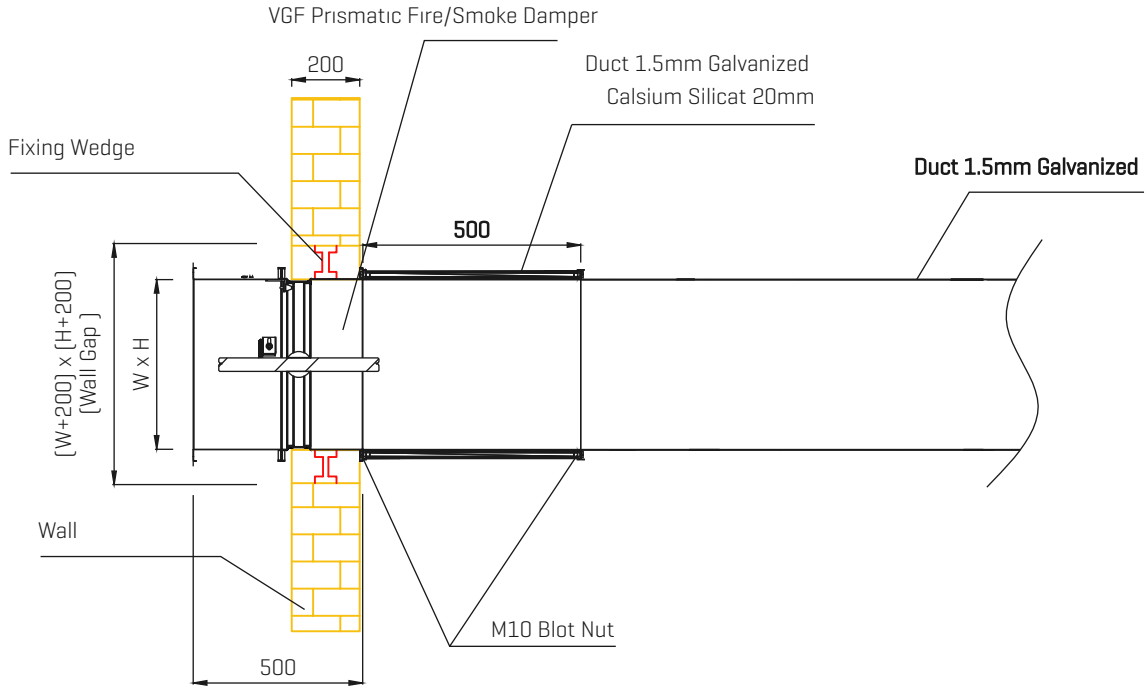
	V(m/s)	h									
		200	250	300	350	400	450	500	600	700	800
Basınç Düşüm Değeri (Pa)	3 m/s	13,4	7,5	5,0	4,5	3,5	3,0	2,5	2,2	2,0	1,5
	4 m/s	23,8	13,8	9,0	7,5	6,0	5,0	4,5	3,5	3,0	2,5
	5 m/s	36,2	21,0	14,0	12,0	9,0	8,0	7,0	5,5	5,0	4,0
	6 m/s	>50	30,0	20,0	17,0	13,0	11,0	10,0	8,0	7,0	6,0
	7 m/s	>50	41,0	28,0	24,0	18,0	16,0	14,0	11,5	10,0	8,0
	8 m/s	>50	>50	36,0	30,0	23,0	20,0	17,0	14,0	12,5	11,0
	9 m/s	>50	>50	46,0	39,0	30,0	27,0	23,0	19,0	16,0	14,0
	10 m/s	>50	>50	>50	48,0	37,0	31,0	28,0	23,0	20,0	17,0
Gürültü Şiddeti (dB)	3 m/s	34	<30	<30	<30	<30	<30	<30	<30	<30	<30
	4 m/s	41	36	33	31	30	<30	<30	<30	<30	<30
	5 m/s	47	42	39	38	36	35	35	35	35	35
	6 m/s	>50	47	44	43	42	42	41	41	41	41
	7 m/s	>50	>50	48	47	46	46	46	46	46	64
	8 m/s	>50	>50	>50	>50	>50	50	50	50	50	50
	9 m/s	>50	>50	>50	>50	>50	>50	>50	>50	>50	>50
	10 m/s	>50	>50	>50	>50	>50	>50	>50	>50	>50	>50

DIMENSIONS



W	200	250	300	350	400	450	500	600	700	800	900	1000	1100	1200	1300
H	200	250	300	350	400	450	500	600	700	800					

MOUNTING SHAPE



MATERIAL AND SURFACE COATING

Parça Adı	Malzeme Cinsi
Frame	1,20 mm Galvanized Sheet Steel
Damper Blade	Ca-Si [CalsiumSilicat]
Frame Gasket	Intumescent Gasket [Swelling with Heat]
Blade Gasket	Fire Proff Gasket
Blade Bearings	Brass Rod - 30mm
Blade Seal	Stainless Sheet Steel
Blade Joint	Galvanized
Blade Shaft	Steel Automat Material

The frame of **VGF – Prismatic Fire and Smoke Damper** is manufactured from galvanized sheet steel without any welding process. Therefore, it has a high corrosion resistance. The material of the blades is Ca-Si [CalsiumSilicat]. Silicone based fire resistant gasket is mounted at the end of the blades. Additionally, intumescent gaskets are placed inside the frame. The blade shaft is manufactured from automat material and then galvanized and gets high corrosion resistance. Bearings are made of brass. Since these two materials are compatible, they do not require lubrication for many years and maintain their first day performance. The blade joints are galvanized. The union of joint mechanism parts is made with 304 grade stainless steel rods.

NOTES



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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 standards. 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 standards], 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.



- ☞ DML, DMA – Linear Grilles with horizontal and linear, aerodynamic blades are used for supply and return air.
- ☞ It is the most preferred product in the supply and return air due to its stylish design and decorative appearance that will adapt to the architecture in places such as fan-coil, convector, radiator.
- ☞ It is suitable for ceiling and wall applications in ventilation and air conditioning systems.
- ☞ Suitable for wall to wall applications. It can be produced modularly.



MATERIAL

- ☞ Aluminum 6063 extrusion profile production
- ☞ Optional AISI 304 quality stainless production

SURFACE COATING

- ☞ RAL 9010 or RAL 9016 electrostatic powder paint as standard
- ☞ Optional
 - Made of stainless steel
 - Different RAL color codes
 - Matt aluminum eloxal finish for a matte and metallic look
 - Unpainted manufacturing

INSTALLATION OPTIONS

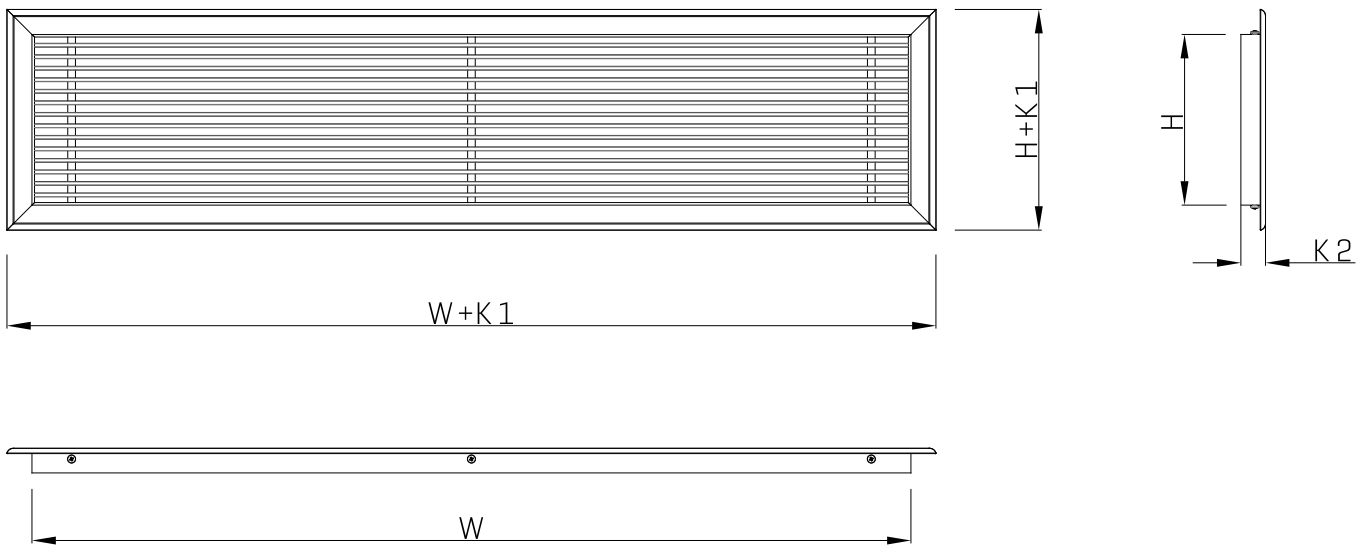
- ☞ Screw System
- ☞ Suspended Ceiling
- ☞ Mounting Bracket
- ☞ Clip-In Ceiling
- ☞ With Latch
- ☞ Long Clip
- ☞ Short Clip

ACCESSORIES

Optional

- ZKD - Opposite Blade Air Adjustment Damper [Production from aluminum 6063 extrusion profile]
- Aluminum Wire
- 10x10 Galvanized Wire
- Fiber Filter
- Polyurethane Filter
- Neck Reducer
- Subframe
- Subframe + Fiber Filter

STANDARD DIMENSIONS



	K1 (mm)	K2 (mm)
22 mm Frame	42	31.8
31 mm Frame	53.4	30
Clip-In Frame	59.2	30
Stainless Frame	58.4	30

Table 1. Standard Sizes

Standard Dimensions		H Height (mm)																
		75	100	150	200	250	300	350	400	450	500	550	600	750	1000	1500	2000	2300
W Width (mm)	150	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	200	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	250	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	300	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	350	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	400	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	450	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	500	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	550	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	600	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	700	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	800	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	900	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	1000	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	1200	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					
	1400	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					
	1600	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					
	1800	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					
	2000	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					
	2150	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					
2300	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						

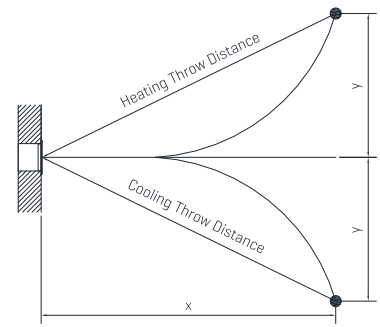
PERFORMANCE DATA

Table 2. Effective Area

Effective Area [m²]		H Height (mm)																
		75	100	150	200	250	300	350	400	450	500	550	600	750	1000	1500	2000	2500
W Width (mm)	150	0.009	0.012	0.017	0.023	0.029	0.035	0.041	0.047	0.052	0.058	0.064	0.070	0.087	0.116	0.174	0.232	0.290
	200	0.012	0.016	0.023	0.031	0.039	0.047	0.054	0.062	0.070	0.077	0.085	0.093	0.116	0.155	0.232	0.310	0.387
	250	0.015	0.019	0.029	0.039	0.048	0.058	0.068	0.077	0.087	0.097	0.107	0.116	0.145	0.194	0.290	0.387	0.484
	300	0.017	0.023	0.035	0.047	0.058	0.070	0.081	0.093	0.105	0.116	0.128	0.139	0.174	0.232	0.349	0.465	0.581
	350	0.020	0.027	0.041	0.054	0.068	0.081	0.095	0.108	0.122	0.136	0.149	0.163	0.203	0.271	0.407	0.542	0.678
	400	0.023	0.031	0.047	0.062	0.077	0.093	0.108	0.124	0.139	0.155	0.170	0.186	0.232	0.310	0.465	0.620	0.774
	450	0.026	0.035	0.052	0.070	0.087	0.105	0.122	0.139	0.157	0.174	0.192	0.209	0.261	0.349	0.523	0.697	0.871
	500	0.029	0.039	0.058	0.077	0.097	0.116	0.136	0.155	0.174	0.194	0.213	0.232	0.290	0.387	0.581	0.774	0.968
	550	0.032	0.043	0.064	0.085	0.107	0.128	0.149	0.170	0.192	0.213	0.234	0.256	0.319	0.426	0.639	0.852	1.065
	600	0.035	0.047	0.070	0.093	0.116	0.139	0.163	0.186	0.209	0.232	0.256	0.279	0.349	0.465	0.697	0.929	1.162
	700	0.041	0.054	0.081	0.108	0.136	0.163	0.190	0.217	0.244	0.271	0.298	0.325	0.407	0.542			
	800	0.047	0.062	0.093	0.124	0.155	0.186	0.217	0.248	0.279	0.310	0.341	0.372	0.465	0.620			
	900	0.052	0.070	0.105	0.139	0.174	0.209	0.244	0.279	0.314	0.349	0.383	0.418	0.523	0.697			
	1000	0.058	0.077	0.116	0.155	0.194	0.232	0.271	0.310	0.349	0.387	0.426	0.465	0.581	0.774			
	1200	0.070	0.093	0.139	0.186	0.232	0.279	0.325	0.372	0.418	0.465	0.511	0.558					
	1400	0.081	0.108	0.163	0.217	0.271	0.325	0.379	0.434	0.488	0.542	0.596	0.650					
	1600	0.093	0.124	0.186	0.248	0.310	0.372	0.434	0.496	0.558	0.620	0.681	0.743					
	1800	0.105	0.139	0.209	0.279	0.349	0.418	0.488	0.558	0.627	0.697	0.767	0.836					
	2000	0.116	0.155	0.232	0.310	0.387	0.465	0.542	0.620	0.697	0.774	0.852	0.929					
	2250	0.131	0.174	0.261	0.349	0.436	0.523	0.610	0.697	0.784	0.871	0.958	1.045					
2500	0.145	0.194	0.290	0.387	0.484	0.581	0.678	0.774	0.871	0.968	1.065	1.162						

Table 3. Supply Data

Flow Rate [m³ / h]		Effective Velocity (m / s)												
		0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	6.0	7.0	8.0
50	Effective Area [m²]	0.0278	0.0139	0.009										
	Pressure Drop [Pa]	1	2	4										
	Throw Distance [m]	1	2	2										
	Sound Power Level [dB(A)]	<15	<15	<15										
100	Effective Area [m²]	0.0556	0.0278	0.019	0.014	0.011	0.009							
	Pressure Drop [Pa]	1	2	4	7	11	15							
	Throw Distance [m]	1	2	2	3	3	3							
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	16							
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	2	4	7	11	15	20	26	33	41	58		
	Throw Distance [m]	1	2	2	3	3	3	4	4	4	4	5		
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	19	23	26	29	32	36		
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	0.012	0.010
	Pressure Drop [Pa]	1	2	4	7	11	15	20	26	33	41	58	78	102
	Throw Distance [m]	1	2	3	3	3	4	4	4	4	5	5	6	6
	Sound Power Level [dB(A)]	<15	<15	<15	<15	16	20	24	28	31	33	38	42	45
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	0.016	0.014
	Pressure Drop [Pa]	1	2	4	7	11	15	20	26	33	41	58	78	102
	Throw Distance [m]	1	2	3	3	3	4	4	4	4	5	5	6	6
	Sound Power Level [dB(A)]	<15	<15	<15	<15	17	22	26	29	32	35	39	43	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	0.020	0.017
	Pressure Drop [Pa]	1	2	4	7	11	15	20	26	33	41	58	78	102
	Throw Distance [m]	2	2	3	3	4	4	4	5	5	5	6	6	6
	Sound Power Level [dB(A)]	<15	<15	<15	<15	18	23	27	30	33	36	40	44	48
600	Effective Area [m²]	0.333	0.167	0.111	0.083	0.067	0.056	0.048	0.042	0.037	0.03333	0.028	0.024	0.021
	Pressure Drop [Pa]	1	2	4	7	11	15	20	26	33	41	58	78	102
	Throw Distance [m]	2	2	3	3	4	4	4	5	5	5	6	6	7
	Sound Power Level [dB(A)]	<15	<15	<15	<15	19	23	27	31	34	36	41	45	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	0.028	0.024
	Pressure Drop [Pa]	1	2	4	7	11	15	20	26	33	41	58	78	102
	Throw Distance [m]	2	2	3	3	4	4	4	5	5	5	6	6	7
	Sound Power Level [dB(A)]	<15	<15	<15	<15	19	24	28	31	34	37	42	46	49
800	Effective Area [m²]	0.444	0.222	0.148	0.111	0.089	0.074	0.064	0.056	0.049	0.0444	0.037	0.032	0.028
	Pressure Drop [Pa]	1	2	4	7	11	15	20	26	33	41	58	78	102
	Throw Distance [m]	2	2	3	3	4	4	4	5	5	5	6	6	7
	Sound Power Level [dB(A)]	<15	<15	<15	<15	20	25	29	32	35	38	42	46	50
900	Effective Area [m²]	0.500	0.250	0.167	0.125	0.100	0.083	0.071	0.063	0.056	0.0500	0.042	0.036	0.031
	Pressure Drop [Pa]	1	2	4	7	11	15	20	26	33	41	58	78	102
	Throw Distance [m]	2	2	3	3	4	4	4	5	5	5	6	6	7
	Sound Power Level [dB(A)]	<15	<15	<15	<15	21	25	29	32	35	38	43	47	50
1000	Effective Area [m²]	0.556	0.278	0.185	0.139	0.111	0.093	0.079	0.069	0.062	0.0556	0.046	0.040	0.035
	Pressure Drop [Pa]	1	2	4	7	11	15	20	26	33	41	58	78	102
	Throw Distance [m]	2	2	3	3	4	4	4	5	5	5	6	6	7
	Sound Power Level [dB(A)]	<15	<15	<15	15	21	26	30	33	36	39	43	47	51
1250	Effective Area [m²]	0.694	0.347	0.232	0.174	0.139	0.116	0.099	0.087	0.077	0.0694	0.058	0.050	0.043
	Pressure Drop [Pa]	1	2	4	7	11	15	20	26	33	41	58	78	102
	Throw Distance [m]	2	2	3	4	4	4	5	5	5	5	6	6	7
	Sound Power Level [dB(A)]	<15	<15	<15	16	22	27	31	34	37	40	44	48	52
1500	Effective Area [m²]	0.833	0.417	0.278	0.208	0.167	0.139	0.119	0.104	0.0926	0.0833	0.069	0.060	0.052
	Pressure Drop [Pa]	1	2	4	7	11	15	20	26	33	41	58	78	102
	Throw Distance [m]	2	3	3	4	4	4	5	5	5	5	6	7	8
	Sound Power Level [dB(A)]	<15	<15	<15	17	23	27	31	35	38	40	45	49	52
1750	Effective Area [m²]	0.972	0.486	0.324	0.243	0.194	0.162	0.139	0.122	0.1080	0.0972	0.081	0.069	0.061
	Pressure Drop [Pa]	1	2	4	7	11	15	20	26	33	41	58	78	102
	Throw Distance [m]	2	3	3	4	4	4	5	5	5	6	7	7	8
	Sound Power Level [dB(A)]	<15	<15	<15	18	23	28	32	35	38	41	46	50	53
2000	Effective Area [m²]	1.111	0.556	0.370	0.278	0.222	0.185	0.159	0.139	0.1235	0.1111	0.093	0.079	0.069
	Pressure Drop [Pa]	1	2	4	7	11	15	20	26	33	41	58	78	102
	Throw Distance [m]	2	3	3	4	4	4	5	5	5	6	7	7	8
	Sound Power Level [dB(A)]	<15	<15	<15	18	24	29	33	36	39	42	46	50	54
2500	Effective Area [m²]		0.694	0.463	0.347	0.278	0.232	0.198	0.174	0.1543	0.1389	0.116	0.099	0.087
	Pressure Drop [Pa]		2	4	7	11	15	20	26	33	41	58	78	102
	Throw Distance [m]		3	3	4	4	4	5	5	5	6	7	8	8
	Sound Power Level [dB(A)]		<15	<15	19	25	30	34	37	40	43	47	51	55
3000	Effective Area [m²]		0.833	0.556	0.417	0.333	0.278	0.238	0.2083	0.1852	0.1667	0.139	0.119	0.104
	Pressure Drop [Pa]		2	4	7	11	15	20	26	33	41	58	78	102
	Throw Distance [m]		3	3	4	4	4	5	5	5	6	7	8	8
	Sound Power Level [dB(A)]		<15	<15	20	26	30	34	38	41	43	48	52	55
4000	Effective Area [m²]		1.111	0.741	0.556	0.444	0.370	0.3175	0.2778	0.2469	0.2222	0.185	0.159	0.139
	Pressure Drop [Pa]		2	4	7	11	15	20	26	33	41	58	78	102
	Throw Distance [m]		3	4	4	4	5	5	6	6	7	7	8	9
	Sound Power Level [dB(A)]		<15	<15	21	27	32	36	39	42	45	49	53	57
5000	Effective Area [m²]			0.926	0.694	0.556	0.4630	0.3968	0.3472	0.3066	0.2778	0.232	0.198	0.1736
	Pressure Drop [Pa]			4	7	11	15	20	26	33	41	58	78	102
	Throw Distance [m]			4	4	5	5	6	6	7	7	8	8	9
	Sound Power Level [dB(A)]			<15	22	28	33	37	40	43	46	50	54	58
7500	Effective Area [m²]				1.042	0.833	0.694	0.595	0.521	0.4630	0.4167	0.347	0.298	0.260
	Pressure Drop [Pa]				7	11	15	20	26	33	41	58	78	102
	Throw Distance [m]				5	5	6	6	7	7	8	9	9	9
	Sound Power Level [dB(A)]				24	30	34	38	42	45	47	52	56	59
10000	Effective Area [m²]					1.111	0.926	0.794	0.6944	0.6173	0.5556	0.463	0.397	0.347
	Pressure Drop [Pa]					11	15	20	26	33	41	58	78	102
	Throw Distance [m]					5	6	6	7	7	8	8	9	10
	Sound Power Level [dB(A)]					31	36	40	43	46	49	53	57	61



Note: The data are obtained when the temperature difference between the air distribution equipment and the ambient air is T=8.

Throw Distance is the distance between the point where the air leaving the dispenser equipment reaches a speed of 0.25 m/s, and the air distribution equipment.

Table 4. Extract Data

Flow Rate [m³/h]		Effective Velocity [m/s]															
		0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	6.0	7.0	8.0	9.0		
50	Effective Area [m²]	0.0278	0.0139														
	Pressure Drop [Pa]	0	1														
	Sound Power Level [dB(A)]	<15	<15														
100	Effective Area [m²]	0.0556	0.0278	0.019	0.014	0.011											
	Pressure Drop [Pa]	0	1	3	5	8											
	Sound Power Level [dB(A)]	<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						
	Pressure Drop [Pa]	0	1	3	5	8	11	15	20	26	32						
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	15	19	23	26	29						
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	0.012	0.010			
	Pressure Drop [Pa]	0	1	3	5	8	11	15	20	26	32	47	65	86			
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	17	21	25	28	31	36	40	43			
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	0.016	0.014	0.012		
	Pressure Drop [Pa]	0	1	3	5	8	11	15	20	26	32	47	65	86	110		
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	18	22	26	29	32	37	41	45	48		
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	0.020	0.017	0.015		
	Pressure Drop [Pa]	0	1	3	5	8	11	15	20	26	32	47	65	86	110		
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	19	23	27	30	33	38	42	46	49		
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	0.024	0.021	0.019		
	Pressure Drop [Pa]	0	1	3	5	8	11	15	20	26	32	47	65	86	110		
	Sound Power Level [dB(A)]	<15	<15	<15	<15	15	20	24	28	31	34	39	43	47	50		
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	0.028	0.024	0.022		
	Pressure Drop [Pa]	0	1	3	5	8	11	15	20	26	32	47	65	86	110		
	Sound Power Level [dB(A)]	<15	<15	<15	<15	16	21	25	28	32	35	39	44	47	50		
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	0.032	0.028	0.025		
	Pressure Drop [Pa]	0	1	3	5	8	11	15	20	26	32	47	65	86	110		
	Sound Power Level [dB(A)]	<15	<15	<15	<15	16	21	25	29	32	35	40	44	48	51		
900	Effective Area [m²]	0.500	0.250	0.167	0.125	0.100	0.083	0.071	0.063	0.056	0.0500	0.042	0.036	0.031	0.028		
	Pressure Drop [Pa]	0	1	3	5	8	11	15	20	26	32	47	65	86	110		
	Sound Power Level [dB(A)]	<15	<15	<15	<15	17	22	26	30	33	36	40	45	48	51		
1000	Effective Area [m²]	0.556	0.278	0.185	0.139	0.111	0.093	0.079	0.069	0.062	0.0556	0.046	0.040	0.035	0.031		
	Pressure Drop [Pa]	0	1	3	5	8	11	15	20	26	32	47	65	86	110		
	Sound Power Level [dB(A)]	<15	<15	<15	<15	17	22	26	30	33	36	41	45	49	52		
1250	Effective Area [m²]	0.694	0.347	0.231	0.174	0.139	0.116	0.099	0.087	0.077	0.0694	0.058	0.050	0.043	0.039		
	Pressure Drop [Pa]	0	1	3	5	8	11	15	20	26	32	47	65	86	110		
	Sound Power Level [dB(A)]	<15	<15	<15	<15	18	23	27	31	34	37	42	46	50	53		
1500	Effective Area [m²]	0.833	0.417	0.278	0.208	0.167	0.139	0.119	0.104	0.0926	0.0833	0.069	0.060	0.052	0.046		
	Pressure Drop [Pa]	0	1	3	5	8	11	15	20	26	32	47	65	86	110		
	Sound Power Level [dB(A)]	<15	<15	<15	<15	19	24	28	32	35	38	43	47	50	54		
1750	Effective Area [m²]	0.972	0.486	0.324	0.243	0.194	0.162	0.139	0.122	0.1080	0.0972	0.081	0.069	0.061	0.054		
	Pressure Drop [Pa]	0	1	3	5	8	11	15	20	26	32	47	65	86	110		
	Sound Power Level [dB(A)]	<15	<15	<15	<15	20	25	29	32	36	38	43	48	51	54		
2000	Effective Area [m²]	1.111	0.556	0.370	0.278	0.222	0.185	0.159	0.139	0.1235	0.1111	0.093	0.079	0.069	0.062		
	Pressure Drop [Pa]	0	1	3	5	8	11	15	20	26	32	47	65	86	110		
	Sound Power Level [dB(A)]	<15	<15	<15	<15	20	25	29	33	36	39	44	48	52	55		
2500	Effective Area [m²]		0.694	0.463	0.347	0.278	0.231	0.198	0.174	0.1543	0.1389	0.116	0.099	0.087	0.077		
	Pressure Drop [Pa]		1	3	5	8	11	15	20	26	32	47	65	86	110		
	Sound Power Level [dB(A)]		<15	<15	15	21	26	30	34	37	40	45	49	53	56		
3000	Effective Area [m²]		0.833	0.556	0.417	0.333	0.278	0.238	0.2083	0.1852	0.1667	0.139	0.119	0.104	0.0926		
	Pressure Drop [Pa]		1	3	5	8	11	15	20	26	32	47	65	86	110		
	Sound Power Level [dB(A)]		<15	<15	16	22	27	31	35	38	41	46	50	53	57		
4000	Effective Area [m²]		1.111	0.741	0.556	0.444	0.370	0.3175	0.2778	0.2469	0.2222	0.185	0.159	0.1389	0.1235		
	Pressure Drop [Pa]		1	3	5	8	11	15	20	26	32	47	65	86	110		
	Sound Power Level [dB(A)]		<15	<15	17	23	28	32	36	39	42	47	51	55	58		
5000	Effective Area [m²]			0.926	0.694	0.556	0.4630	0.3968	0.3472	0.3086	0.2778	0.231	0.1984	0.1736	0.1543		
	Pressure Drop [Pa]			3	5	8	11	15	20	26	32	47	65	86	110		
	Sound Power Level [dB(A)]			<15	18	24	29	33	37	40	43	48	52	56	59		
7500	Effective Area [m²]				1.042	0.833	0.694	0.5952	0.5208	0.4630	0.4167	0.347	0.298	0.2604	0.2315		
	Pressure Drop [Pa]				5	8	11	15	20	26	32	47	65	86	110		
	Sound Power Level [dB(A)]				20	26	31	35	39	42	45	50	54	57	61		
10000	Effective Area [m²]					1.111	0.9259	0.7937	0.6944	0.6173	0.5556	0.463	0.3968	0.3472	0.3086		
	Pressure Drop [Pa]					8	11	15	20	26	32	47	65	86	110		
	Sound Power Level [dB(A)]					27	32	36	40	43	46	51	55	59	62		

Table 5. Throw Distance Correction

Heating Mode [ΔT]	4	6	8	10	12
Throw Distance Factor	1.07	1.02	1	0.90	0.83
Cooling Mode [ΔT]	4	6	8	10	12
Throw Distance Factor	1.31	1.36	1.42	1.48	1.54

Table 6. Damper Pressure Correction

Damper Location	Pressure Drop Factor	Sound Production [dB(A)]
Opened	1.1	+1
25% Closed	1.14	+4
50% Closed	2.48	+14
75% Closed	5.11	+29

Table 7. Filter Pressure Drop

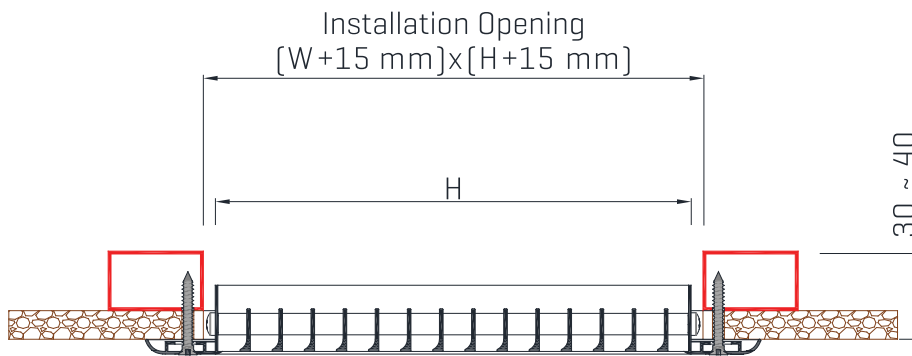
Pressure Drop [Pa]	Filter Type	Air Speed [m/s]														
		0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	6.0	7.0	8.0	9.0	10.0
	Polyurethane Filter	1	3	5	8	11	15	19	24	29	35	48	63	81	100	121
	Fiber Filter	15	28	40	51	62	73	84	94	105	115	135	155	174	193	212

Polyurethane Filter: 6 mm thick 20PPL polyester based polyurethane filter

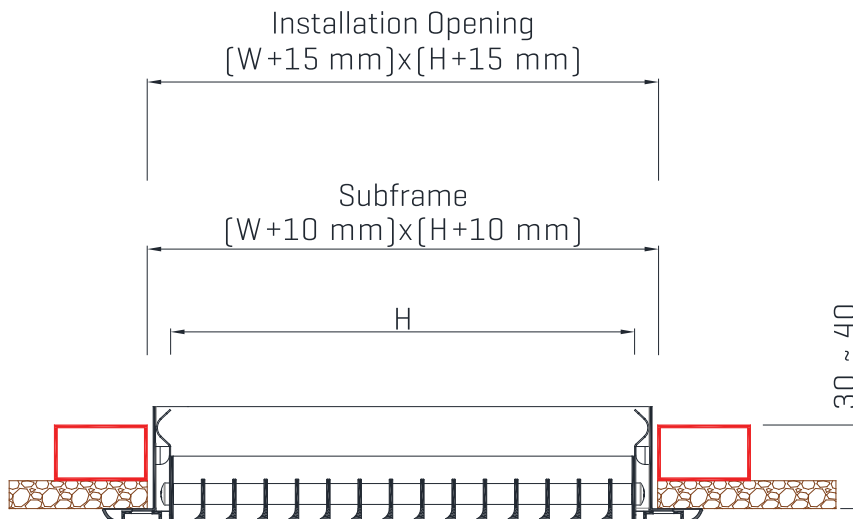
Fiber Filter: EN 16890 ISO COARSE 80% class 10 mm thickness fiber filter

INSTALLATION OPTIONS

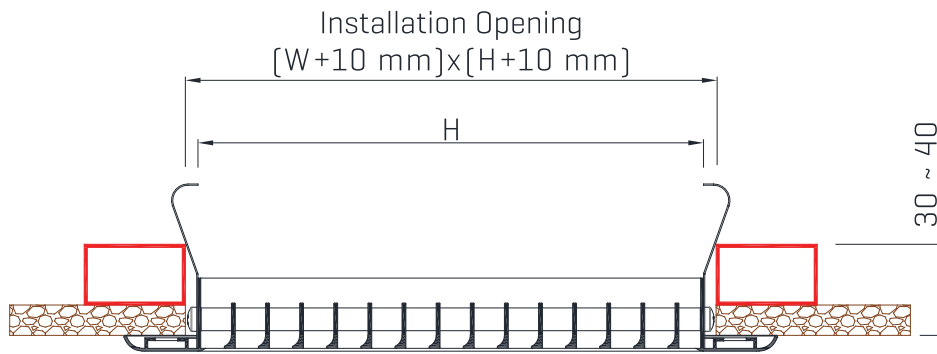
1. SCREW SYSTEM



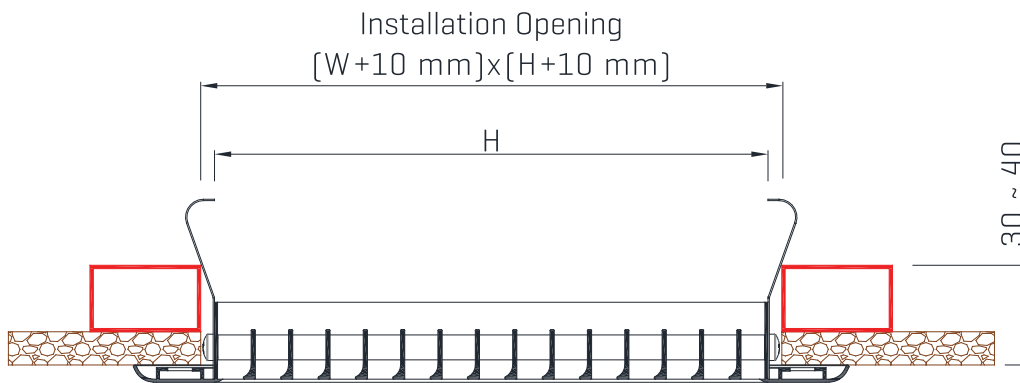
2. SUBFRAME SHORT CLIP



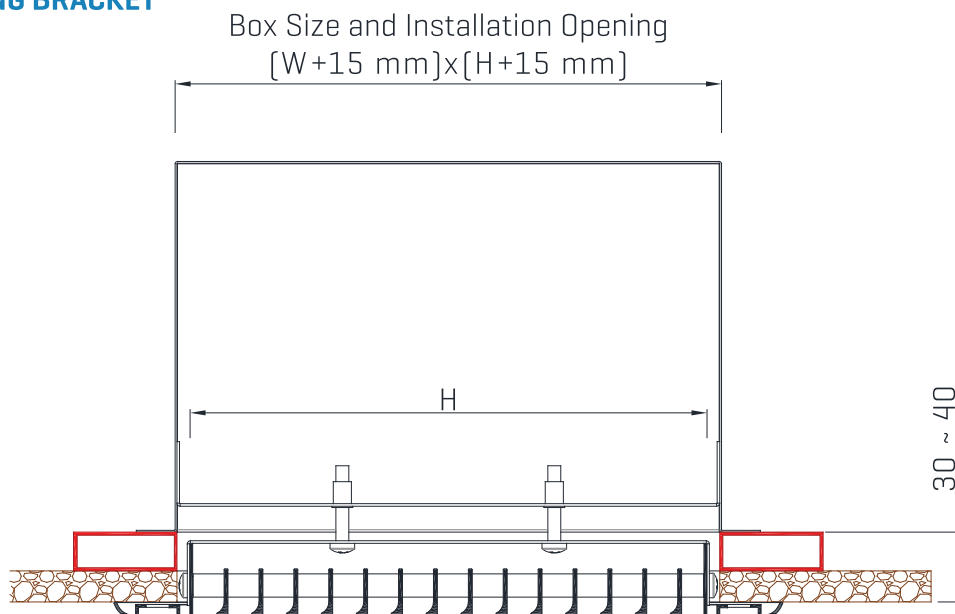
3. LONG CLIPS



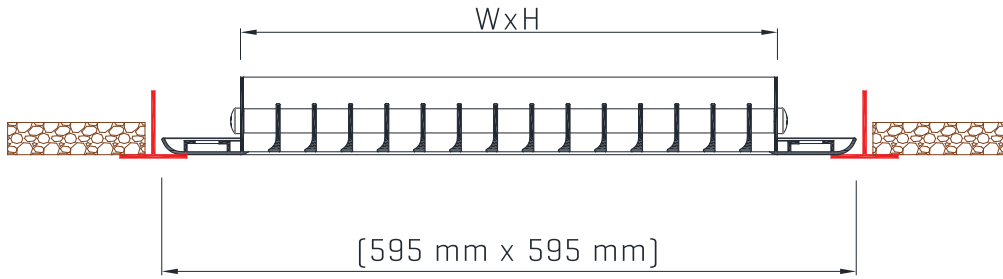
4. WITH LATCH



5. MOUNTING BRACKET



6. SUSPENDED CEILING

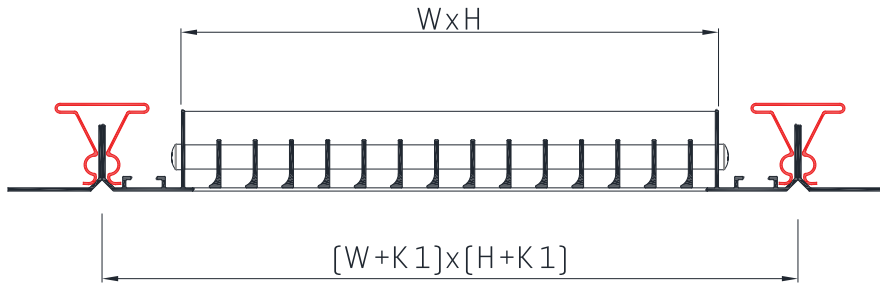


Note:

W and H sizes that can be selected according to the frame sizes specified in the product selection are shown in the table.

	W (mm)	H (mm)
22 mm Frame	553	553
32 mm Frame	541	541
Stainless Frame	536	536

7. CLIP-IN CEILING

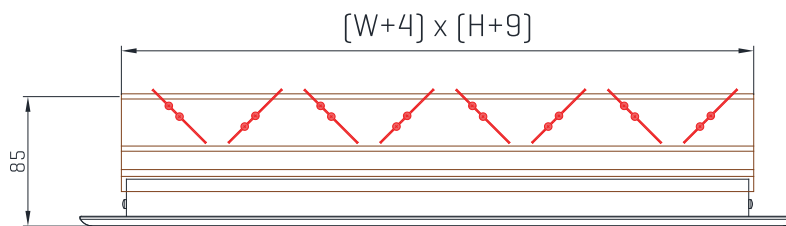


Note:

Stainless frame option is not applied in the mounting form of the clip.

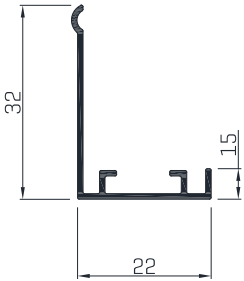
Clip-In Frame K1 = 59.2 mm	W (mm)	H (mm)
600x600	541	541
300x300	241	241

8. WITH DAMPER

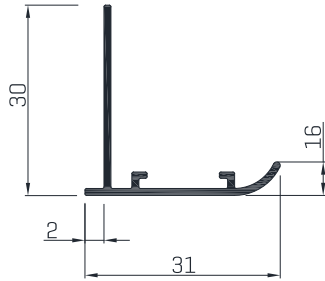


FRAME TYPES

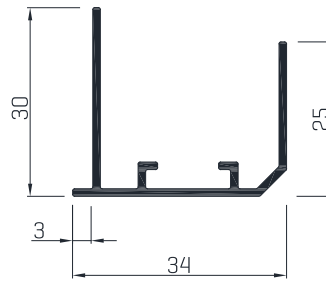
22 mm Frame



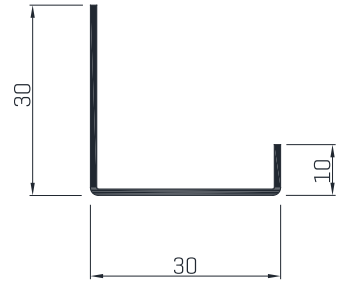
31 mm Frame



Clip-In Frame

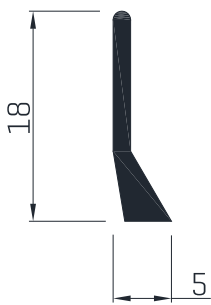


Stainless Frame

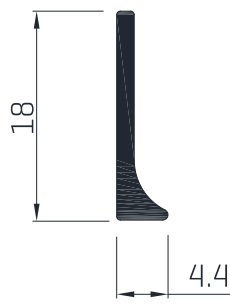


BLADE TYPES

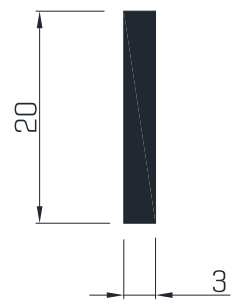
DMA Blade



DML Blade

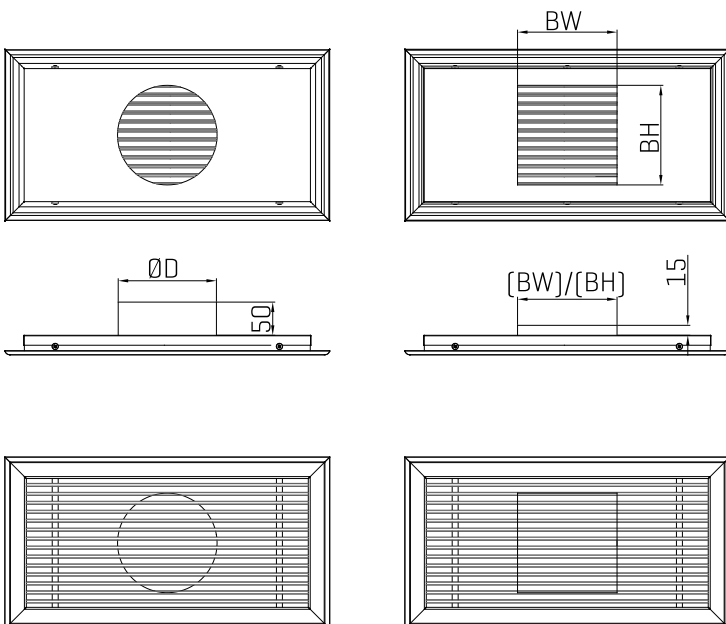


20X3 Flat Stainless



DMA.ALM: 15° angled aluminum blade
 DML.ALM: Standard flat aluminum blade
 DML.PAS: 20x3 stainless flat blade

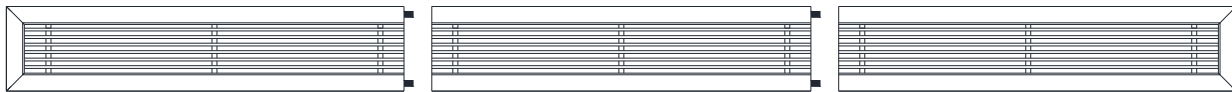
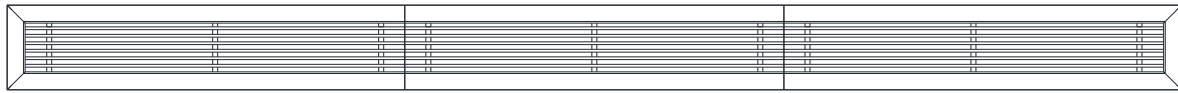
NECK REDUCING



Neck reducer can be made in desired sizes.
ØD [mm]: Neck reducer diameter.
BW [mm]: Neck reducer width.
BH [mm]: Neck reducer height.
Neck reducer constraints:
 $BH + 20 \leq H$
 $BW + 20 \leq W$
 $\text{ØD} + 20 \leq W \text{ and } H$

SIZE PARAMETERS

MAXIMUM MODULE SIZE



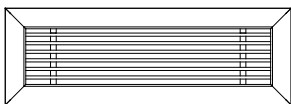
If the width of the linear grille to be ordered is over 2300 mm, the grill length is extended by means of connecting pieces.

Total Number of Pieces=Round up [Order Size/2300]

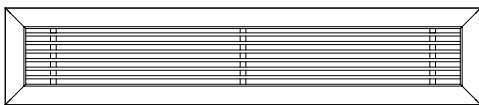
Length of One Piece=Order Size/Number of Pieces

SUPPORT NUMBER PARAMETER

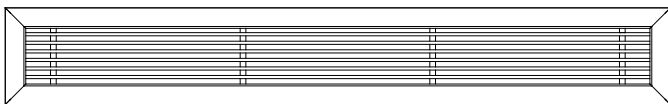
If $150 < W \leq 600$, 2 Support



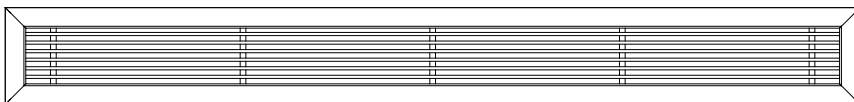
If $600 < W \leq 1200$, 3 Support



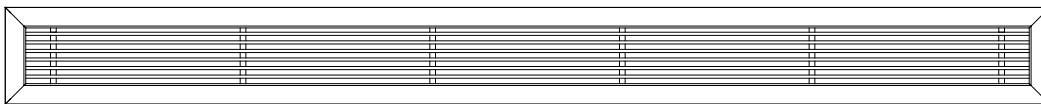
If $1200 < W \leq 1500$, 4 Support



If $1500 < W \leq 2000$, 5 Support



If $2000 < W \leq 2300$, 6 Support



PRODUCT SELECTION

Example: The air flow distributed in the space has been determined as 5000 m³/h. 10 linear grilles will be used for air supply. Temperature difference in heating mode is 8K. Select the product.

Solution: Supply flow rate for a grille, 5000/10 = 500 m³/h

From the supply data table [Table 3], the effective areas corresponding to the appropriate pressure loss and flow rate values are selected.

For example, in an effective area of 0.04 m², the effective velocity is 3.5m/s, pressure loss 20 Pa, throw distance 4 m and sound power 27 dB[A].

The appropriate grille size can be selected from the effective area table as 350 mm x 150 mm corresponding to the value of 0.04 m²

Throw Distance Correction Table

In the previous example, the radius heating mode was found to be 4 m for 8K. For heating mode 10K, Throw Distance Correction Table [Table 5] is referenced. The multiplier value is 0.9.

Corrected throw distance=4 m x 0.9=3.6 m

Filter Status

Filter Pressure Drop Table [Table 7] should be used for pressure loss calculations to be applied in the selection of Polyurethane or Fiber filters.

For example, when selecting 500 m³/h flow rate and throat size 350 mm x 150 mm, pressure drop is 20 Pa. Throat velocity is taken as basis for filter calculation. Accordingly, the throat speed is:

$$\text{Velocity} \left[\frac{\text{m}}{\text{s}} \right] = \frac{500 \text{ m}^3/\text{h}}{350 \text{ mm} \times 150 \text{ mm}} \times \left[\frac{1 \text{ h}}{3600 \text{ s}} \right] \times \left[\frac{1 \text{ mm}}{0.001 \text{ m}} \right] \times \left[\frac{1 \text{ mm}}{0.001 \text{ m}} \right] = 2.65 \text{ m/s}$$

Accordingly, it is read in the filter pressure loss table [Table 7] that a pressure drop of 2.65 m/s will be +12 for the polyurethane filter and +65 Pa for the fiber filter. Total pressure loss,

With Polyurethane Filter: 20+12=32 Pa

With Fiber Filter: 20+65=85 Pa

Opposite Blade Damper Condition

The pressure loss and sound power level changes in the damper product. Damper Correction Table [Table 6] should be used.

For example, the pressure multiplier for the damper product in the 50% closed position of the damper is 2.48 corresponding to the table and the sound generation to be added is +14 dB[A].

Total Static Pressure Loss: 20x2.48=49.6 Pa

Total Sound Production: 27+14=41 dB[A]

PRODUCT ORDER CODES

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

< A > . < B > . < C > . < D > . < E > . < F > . < G > . < H > . < I >

A	Product Type	
	DML	Standard Flat Blade
	DMA	15° Angle Blade
B	Raw Material Type	
	ALM	Aluminum
C	Case Type	
	05	22 mm
	03	32 mm
	09	Clip-In Ceiling
D	Damper	
	ZD	Opposite Blade Damper
	DZ	Without Damper
E	Installation Type	
	VD	Screw System
	KR	Suspended Ceiling
	KL	Clip-In Ceiling
	KP	Mounting Bracket
	MD	Without Mounting Hole
	MN	With Latch
	UK	Long Clips
	KO	Subframe Short Clips
	KK	Short Clips
F	Accessories	
	AT	Aluminum Wire
	10	10x10 Galvanized Wire
	EF	Fiber Filter
	PF	Polyurethane Filter
	00	Without Accessories
	BD	Neck Reducer
G	Horizontal Dimension [W] (mm)	
	0000	You can view it from standard dimensions.
H	Vertical Dimension [H] (mm)	
	0000	You can view it from standard dimensions.
I	Color	
	00	Without Color
	S1	Standard Color - RAL 9010
	S2	Standard Color - RAL 9016
	XX	Special Color

Sample Coding; DML.AL.M.04.DZ.KP.10.00450.0250.SS

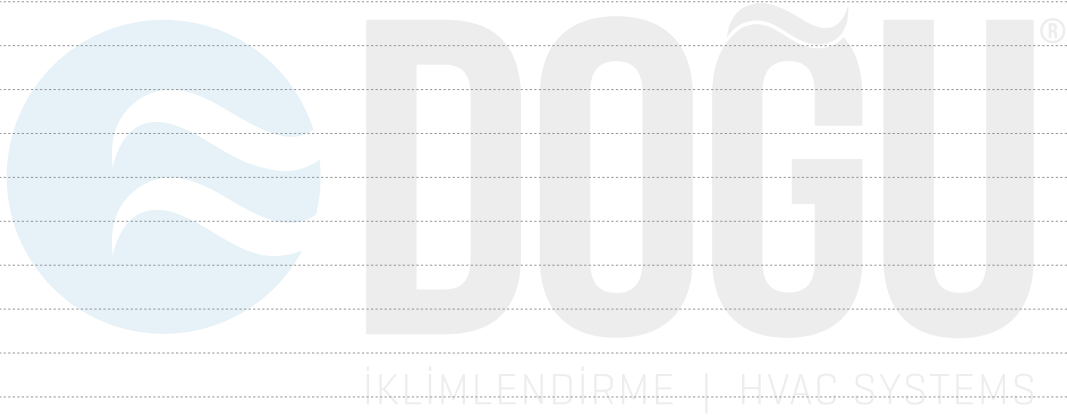
STAINLESS PRODUCT ORDER CODE

DML.PAS.32. < A > . < B > . < C > . < D > . < E > . 00

A	Damper	
	ZD	Opposite Blade Damper
	DZ	Without Damper
B	Installation Type	
	VD	Screw System
	KR	Suspended Ceiling
	KP	Mounting Bracket
	MD	Without Mounting Hole
	MN	With Latch
	UK	Long Clips
	KK	Short Clips
	KO	Subframe with Short Clips
C	Accessories	
	AT	Aluminum Wire
	10	10x10 Galvanized Wire
	EF	Fiber Filter
	PF	Polyurethane Filter
	00	Without Accessories
	BD	Neck Reducer
D	Horizontal Dimension [W] (mm)	
	0000	You can view it from standard dimensions.
E	Vertical Dimension [H] (mm)	
	0000	You can view it from standard dimensions.

Sample Coding; DML.PAS.32.DZ.VD.00.1000.0600.00

NOTES



NOTES





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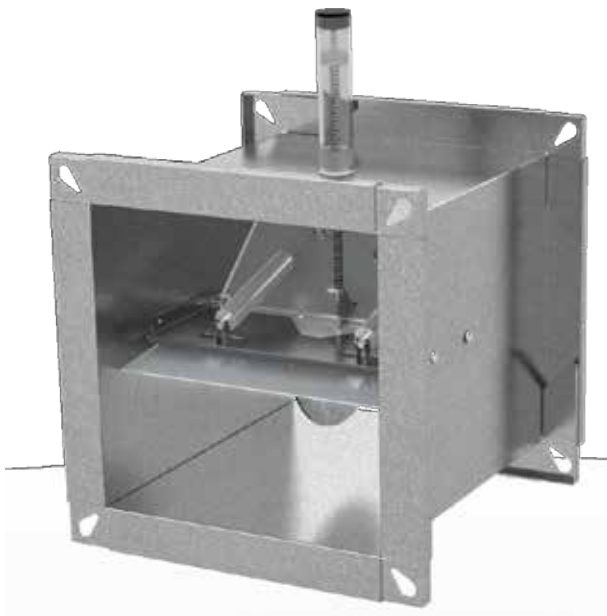
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SEASONS®

 **DOĞU**
İKLİMLENDİRME | HVAC SYSTEMS





ACV
Rectangular Constant
Air Volume Device

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 6 major groups as Air Handling Units, Rooftop Units, Heat/Energy Recovery Units, Air Purifiers, Air Distribution & Management Products and Kitchen Ventilation Equipments 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 2 factories, in total area of 32.000 sqm in which 17.500 sqm indoor space that enables DOGU HVAC manufactures 180 various type of products. Additionally, DOGU HVAC has a powerful sales network with 4 sales offices located in İstanbul, Ankara, Antalya and Adana 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 55 countries.

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- ACV - Rectangular Constant Air Volume Device is used in Rectangular ducts for air flow control in projects with special requirements such as operating rooms, clean rooms, special processes and similar comfort and hygiene.
- Air flow control is used in ventilation applications and in fixing air flow rate in every room.
- The desired air flow rate can be easily calibrated on the device with the help of an allen key.
- Used to adjust the pressure in the air duct between 20 Pa and 1000 Pa.
- All CAV devices produced are calibrated in the HVAC calibration laboratory according to the flow rates specified in the order. In this laboratory, calibration is completed by testing one-to-one field conditions with 7 measuring stations, each with different diameter and nominal flow.
- ACV does not require any power input as it is a completely mechanical system. Constant air flow rate is based on compensating the pressure changes in the system. Depending on the pressure in the duct, when the air flowrate decreases, the torque acting on the wing of the ACV decreases and the wing opens. With the opening of the wing, the air flow through the duct increases and returns to the calibration value.
Conversely, when the air flowrate increases, the torque acting on the blade increases and the wing closes. With the closing of the wing, the air flowrate through the duct decreases and returns to the calibration value. The mechanism, which is precisely designed with a calibration spring according to the position of the wing, ensures successful operation of the ACV with a 10% deviation rate at the calibrated flowrate.
- ACV has a specially designed air viscous piston to minimize the blade oscillations caused by increased turbulence at high pressures.

MATERIAL

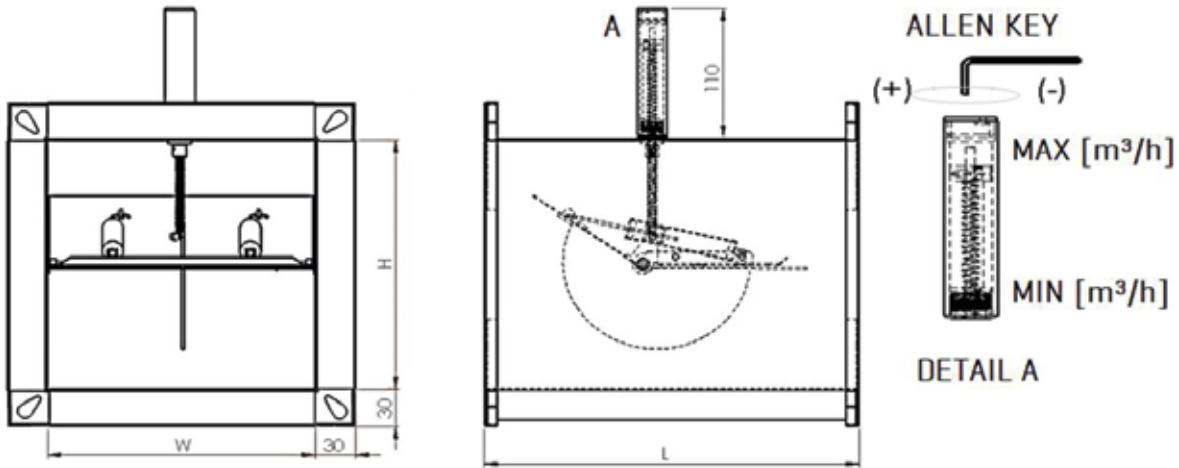
- The casing is manufactured from galvanized steel sheet as standard. AISI 304 quality stainless case option is available.
- Blades and air-viscous piston made of aluminium.
- Plastic tube for airflow calibration.
- Stainless steel calibration spring.
- Standard duct sealing.
- Blade shaft is AISI 304 stainless, shaft bush is PTFE plastic.

ACCESSORY

- Acoustic Insulation:** In order to fulfill the acoustic comfort conditions in the selected product, it is insulated with an optional 19 mm thick foamed rubber. Rubber is surrounded by galvanized sheet metal.

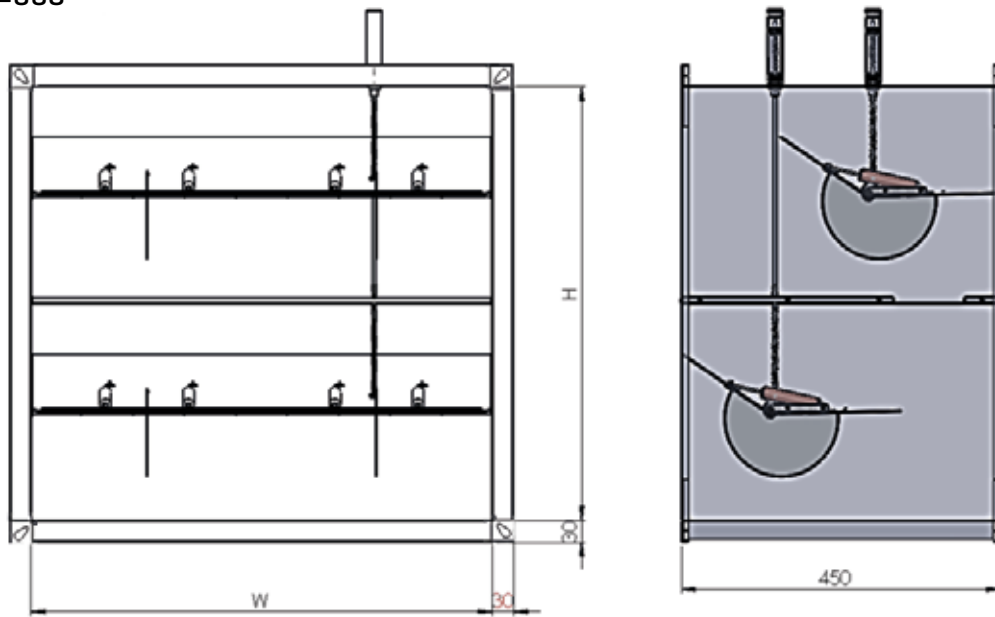
STANDARD DIMENSIONS

W<700 and H<550

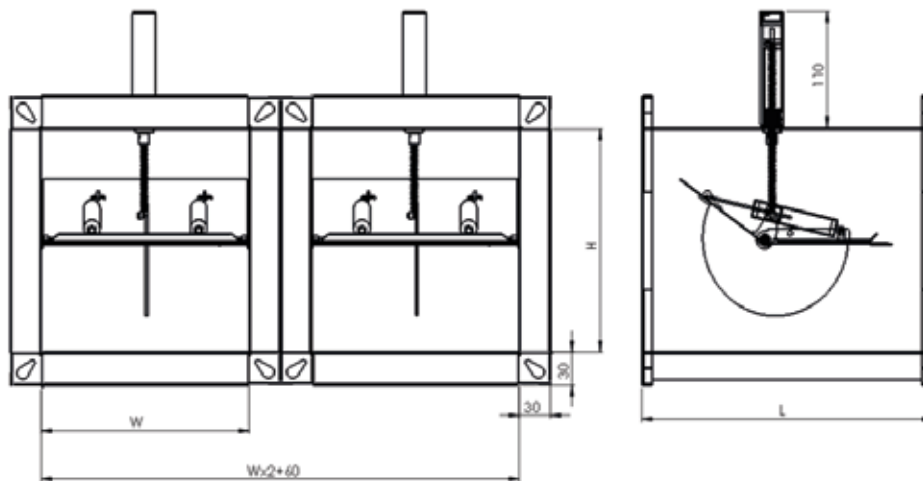


Order Dimension (mm)	W(mm)	H(mm)	L(mm)	Vmin (m³/h)	Vmax (m³/h)
AC V-100x100	100	100	200	110	360
AC V-150x100	150	100	200	160	540
AC V-200x100	200	100	200	210	720
AC V-150x150	150	150	200	240	810
AC V-200x150	200	150	200	320	1080
AC V-300x150	300	150	200	480	1620
AC V-200x200	200	200	250	430	1440
AC V-300x200	300	200	250	650	2160
AC V-400x200	400	200	250	860	2880
AC V-300x300	300	300	350	970	3240
AC V-450x300	450	300	350	1460	4860
AC V-600x300	600	300	350	1950	6480
AC V-600x450	600	450	500	2920	9720

W<700 and H≥550



W≥700 and H<550



PERFORMANCE DATA

VELOCITY & MINIMUM PRESSURE DROP DATA

Air Velocity [m/s]	Pressure Drop [Pa]
3	70
4	75
5	80
6	100
7	120
8	140
9	175
10	210

In the table on the right, data of the minimum pressure drop to be made by ACV according to the air velocity in the duct is given.

Example: For minimum pressure drop for 200x200 ACV 600 m³/h flow rate:

Duct cross section = 0.04 m²

Duct speed = 4.16 m / s

Minimum pressure loss at the desired flow = 75.8 Pa

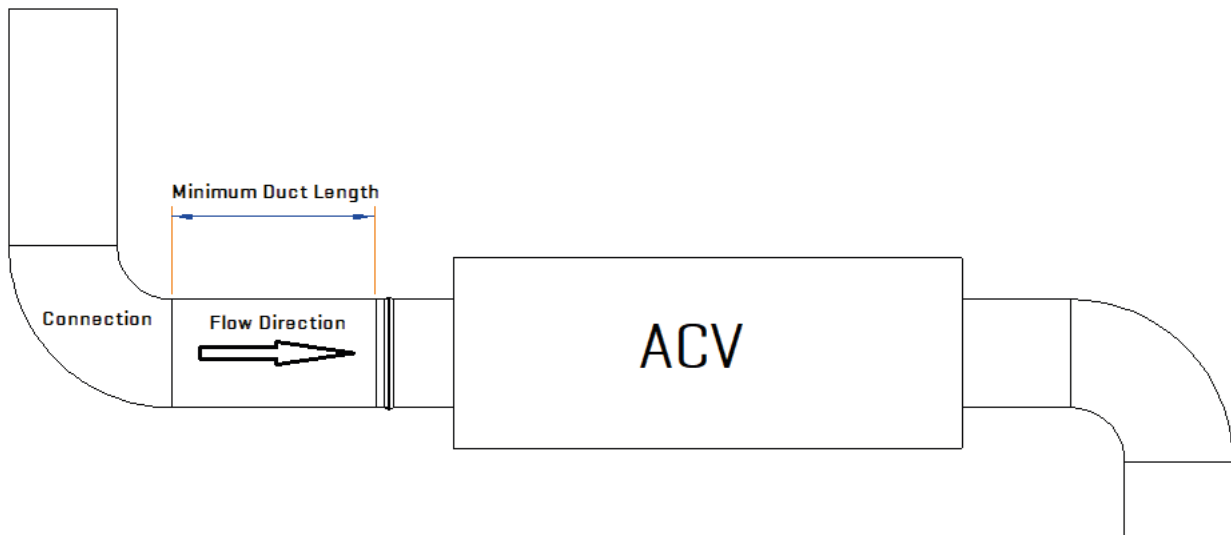
NOISE DATA

Dimension (mm)	Air Velocity (m/s)	Flow Rate (m ³ /h)	Sound Pressure Level [dB(A)]			Noise Generation From Casing [dB(A)]	
			100	200	500	Without Insulation	With Insulation
200x100	3	220	36	43	48	29	21
	6	440	42	49	54	36	29
	9	650	43	50	55	40	31
250x100	3	275	40	46	51	40	37
	6	550	43	50	55	32	24
	9	810	44	51	56	39	30
150x150	3	250	36	43	48	29	21
	6	490	42	49	54	36	27
	9	730	43	50	55	40	33
300x150	3	490	41	48	53	44	37
	6	980	43	50	55	32	25
	9	1460	44	51	56	39	32
200x200	3	440	41	48	53	44	37
	6	870	43	50	55	32	24
	9	1300	44	51	56	39	30
300x200	3	650	42	49	54	37	30
	6	1300	44	51	56	41	32
	9	1950	45	52	57	44	37
400x200	3	870	39	46	51	28	20
	6	1730	41	48	53	33	26
	9	2600	42	49	54	36	28
300x300	3	980	41	48	53	36	28
	6	1950	41	48	53	41	32
	9	2920	42	49	54	43	36
450x300	3	1460	41	48	53	36	29
	6	2920	41	48	53	41	33
	9	4380	42	49	54	43	35
600x300	3	1950	38	45	50	38	29
	6	3890	38	45	50	41	34
	9	5840	39	46	51	45	38
600x450	3	2920	39	46	51	40	32
	6	5840	42	49	54	42	34
	9	8750	42	49	54	46	37

Note: The data were calculated and obtained according to the VDI 2081 standard.

INSTALLATION

Considering the air flow direction arrow on the ACV, it is mounted to the rectangular duct. For duct connections such as elbows, branches and reductions must comply with EN 1505 design.



Connection	Minimum Duct Length
Bend	1 x D
Other Duct Equipmen (Tshaped Connection, reduction etc.)	2 x D
Fire Damper	2 x D
Silencer	2 x D

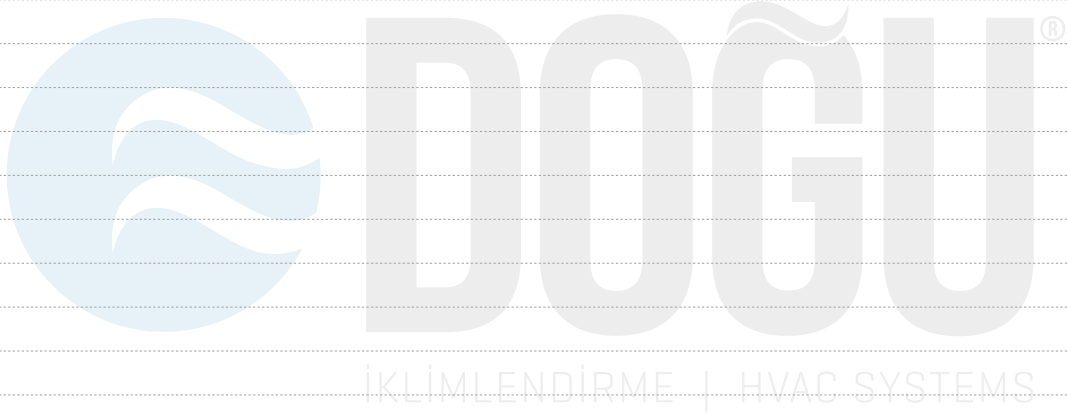
Note: D = Biggest ACV order dimension length [Width(mm) or H[Height(mm)]]

ACV.< A >.KG.< B >.< C >.< D >

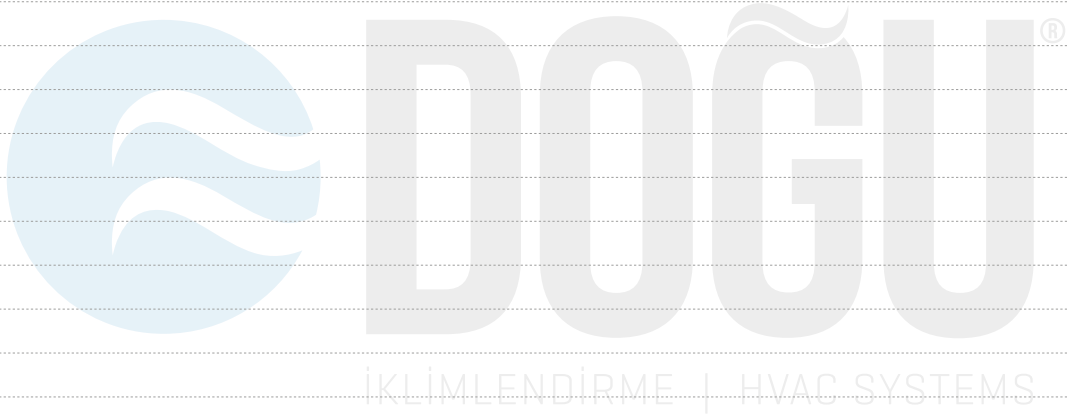
A	Material	
	GAL	Galvanized
	PAS	AISI 304 Stainless Steel
B	Insulation	
	00	Without Insulation
	04	Acoustic Insulation
C	Width [W] (mm)	
	0000	Standard Dimensions
D	Height [W] (mm)	
	0000	Standart Dimensions

Example; ACV.GAL.KG.00.0200.0200

NOTES



NOTES





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İKLİMLENDİRME | HVAC SYSTEMS



FOUR-HPGK
Heat Pump Heat Recovery Unit

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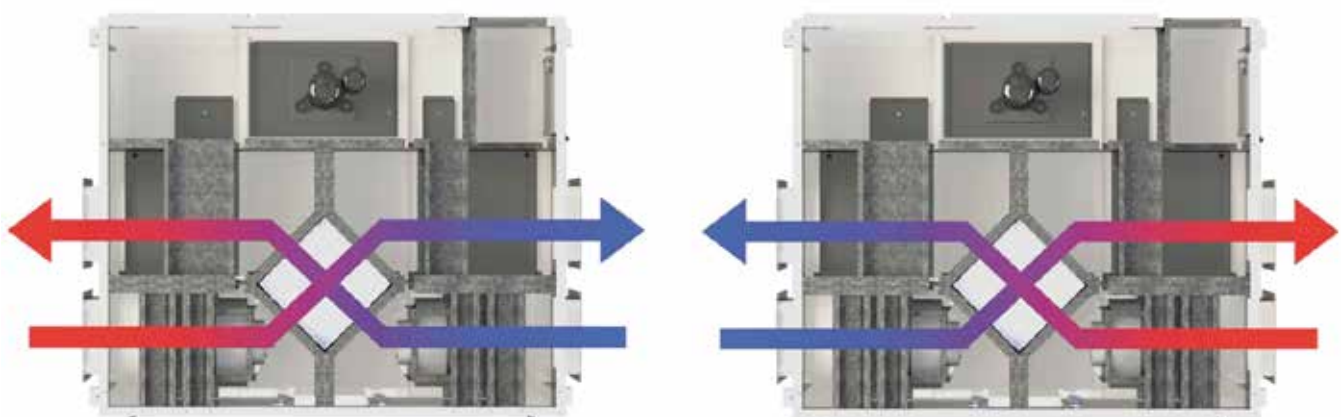
GENERAL FEATURES

Using this device at places where fresh air circulation is not done properly and where air conditioning is used constantly such as malls, restaurants, historic buildings will meet the requested need of fresh air circulation advancedly. Being adjusted to the comfort zone, fresh air is supplied to the environment. By using this device, fresh air is being transferred to the room without any change on the indoor environment. To prevent the overuse of air conditions at new project type buildings, this device is mostly preferred.

The device is compact. There is no need for a condensing unit and it is easy mountable. It is easily functioning with the dashboard.

Working Principles

Heat Pump Heat Recovery Units are used to meet the active need of fresh air of the environment. The device uses the fresh air and the exhaust air combination of the environment through the cross flow heat exchanger to create and supply the adjusted temperative air into inner environment. If the heat transfer is not enough, the heat pump is activated and meets the required aims of conditioning. The compact device can be easily placed at the ceiling.



Summer Type Air Flow Template

Winter Type Air Flow Template

Cross Flow Heat Exchanger

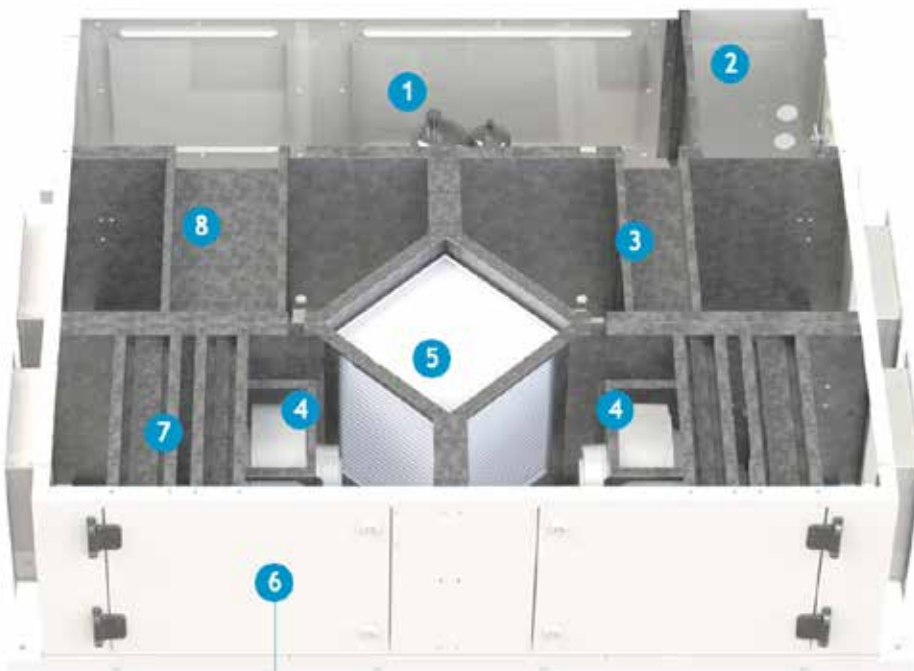
Cross flow heat exchangers do air transferring without mixing the supply and exhaust air over the aluminium plates of the exchanger. On the HPGK, through the optimization of heat exchanger, temperature and humidity efficiency is increased, pressure drop is decreased. A stainless steel drain pan is placed below the exchanger to catch any condensed water.

Heat Pump

The Heat pump is used for the transferring of the condensing water from one environment into another. It is pressed in the refrigerant compressor and it is expanded in the expansion valve. While these environment changings, the heat pump transfers the air through the coils into the environment. The HPGK heat pumps far more efficient than standard heat pumps due to the circulation system of the device. If the outer temperatures are on reasonable levels, the device goes with 'Freecooling' mode without any spend of extra energy

Fans

- Backward curved radial fan.
- Optimal efficiency, low sound level.
- Economic AC fan selection
- High efficiency EC fan selection
- 10 years lifetime (40.000 hours)



- 1- Compressor
- 2- Electric Board
- 3- Evaporator
- 4- Fans
- 5- Heat recovery exchanger
- 6- Intervention lids
- 7- Filters
- 8- Condenser

1. Evaporator and Condenser

Cross flow heat exchangers do air transferring without mixing the supply and exhaust air over the aluminium plates of the exchanger. On the HPGK, through the optimization of heat exchanger, temperature and humidity efficiency is increased, pressure drop is decreased. A stainless steel drain pan is placed below the exchanger to catch any condensed water.

2. Compressor

Adjusted to seasonal working principals. Including the high/low pressure drop feature, all of the features of the heat pump are protected and the lifetime is increased to the max.

3. Electric Boards

The electric board is placed in a separate case so that it stays out of any harm including air flow.

4. Heat Recovery Exchanger

With its special construction, the heat exchanger prevents any type of air leak. According to its capacity, the device is designed to hold the balance between pressure drop and efficiency. All exchangers are EUROVENT certificated. Recuperator has on each of its air ducts AISI304 stainless drainpans.

5. Intervention Lids

To reach the fans easily, there are interventions lids with locks.

6. Filters

Due to ISO ePM Coarse %55 the heat exchanger stays clean and provides efficient function including the increased conditioning quality.

7. Fans

Fans are backward leaning bladed, efficient radial fans.



1. Evaporator and Condenser



3. Electric Board

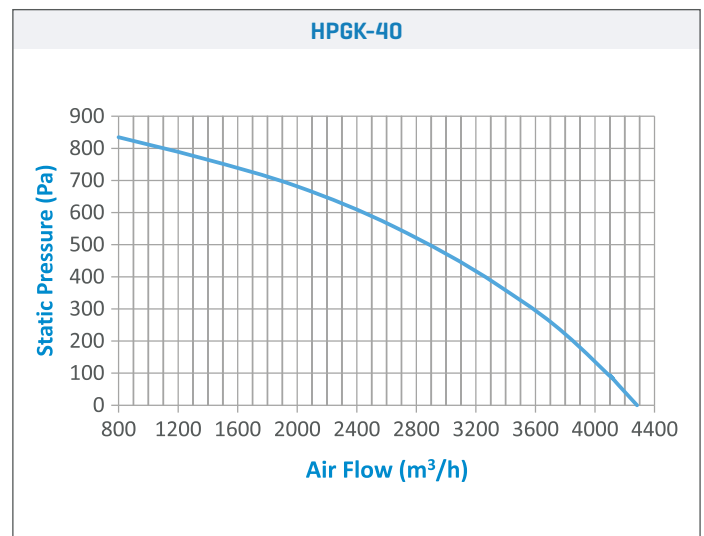
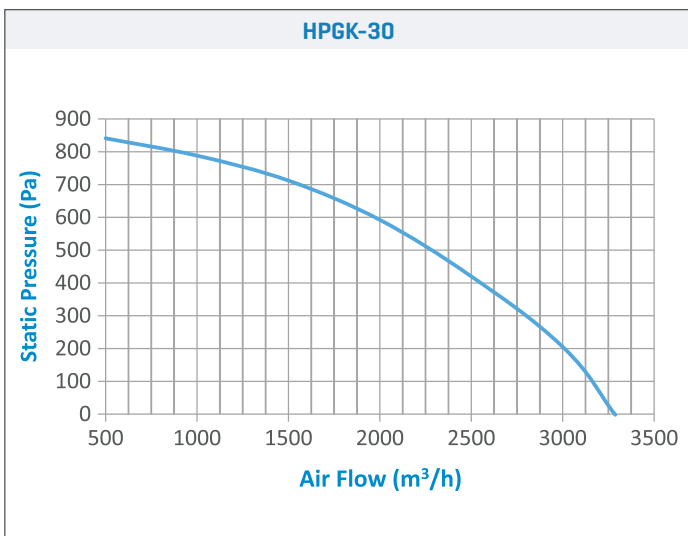
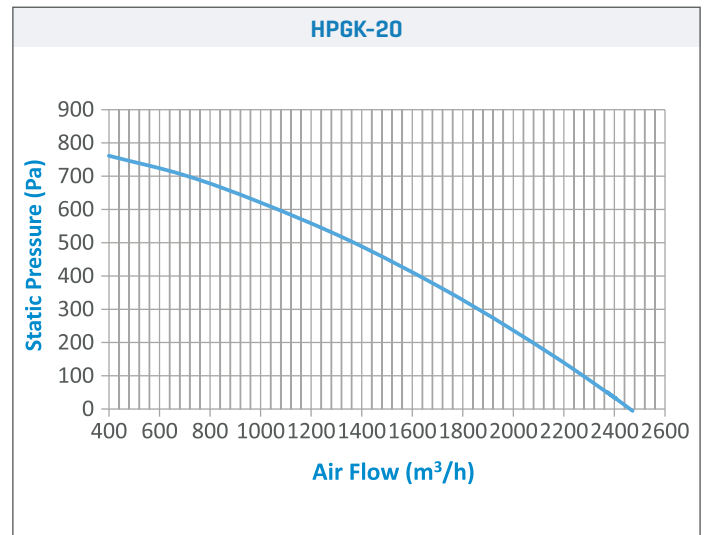
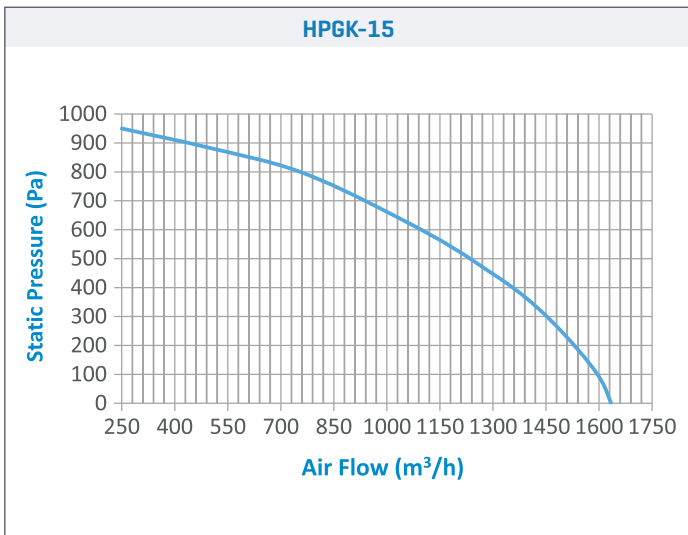
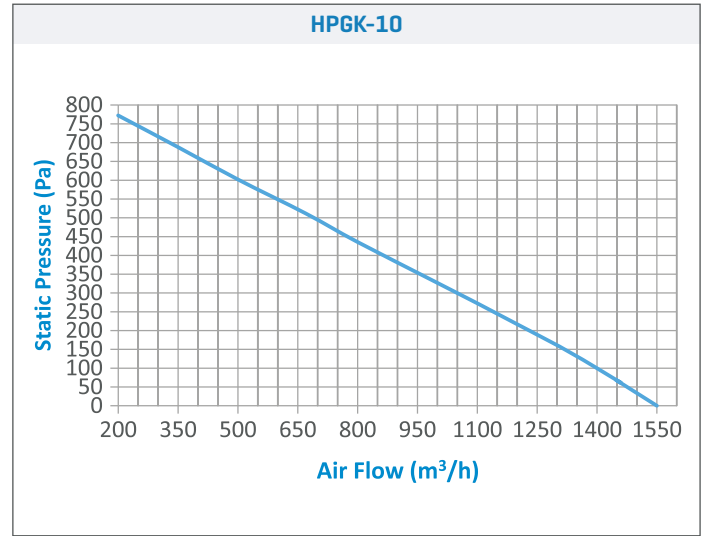
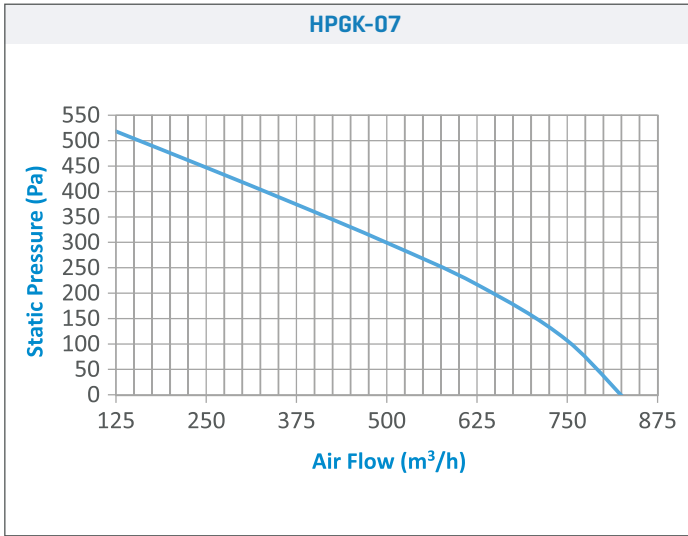


5. Intervention Lids

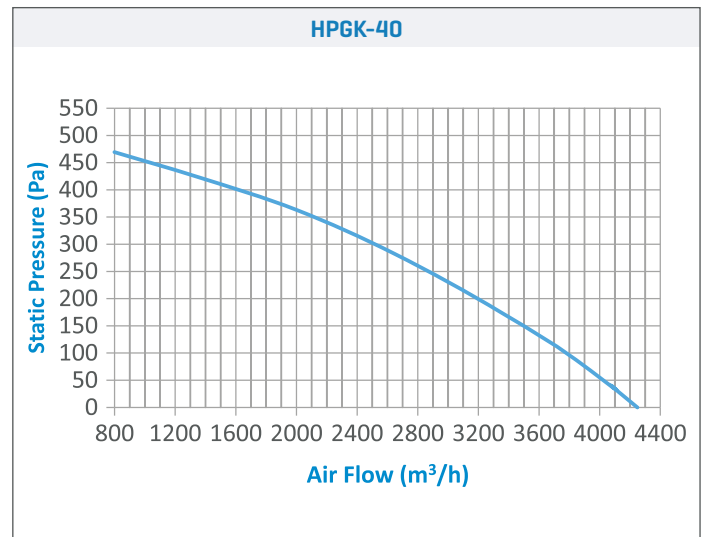
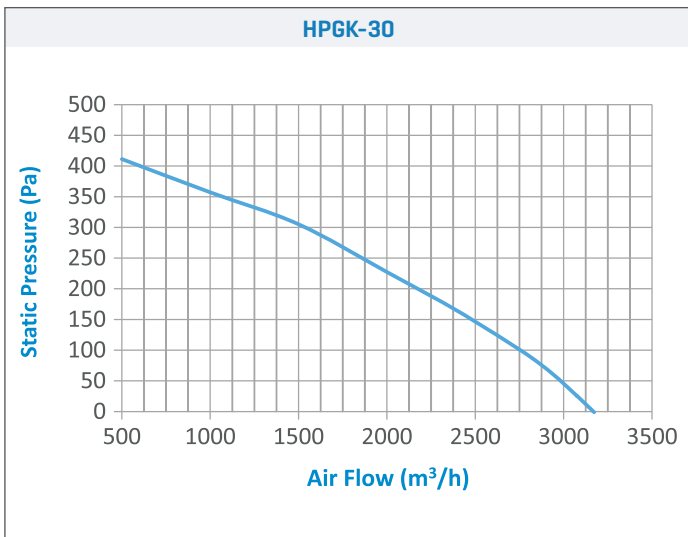
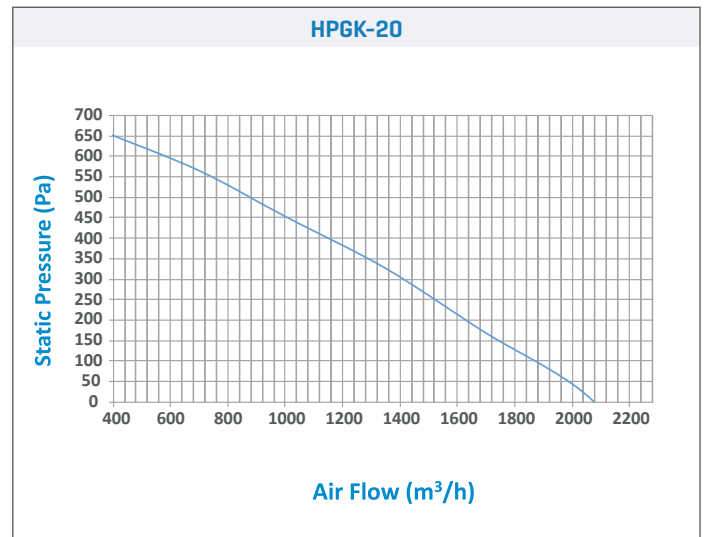
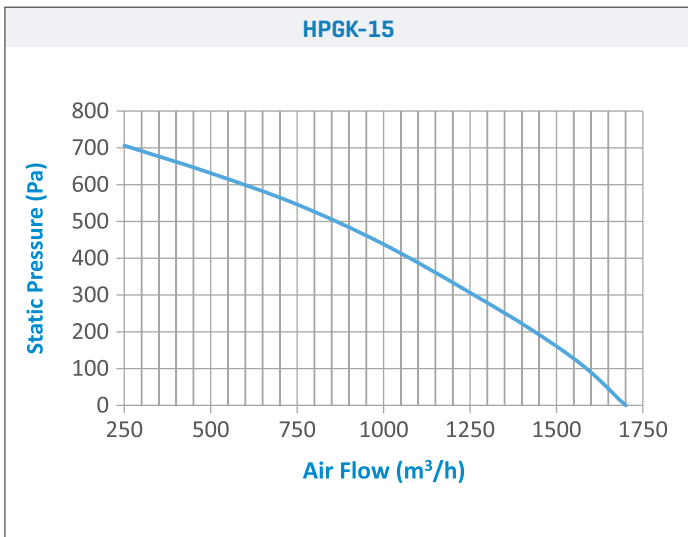
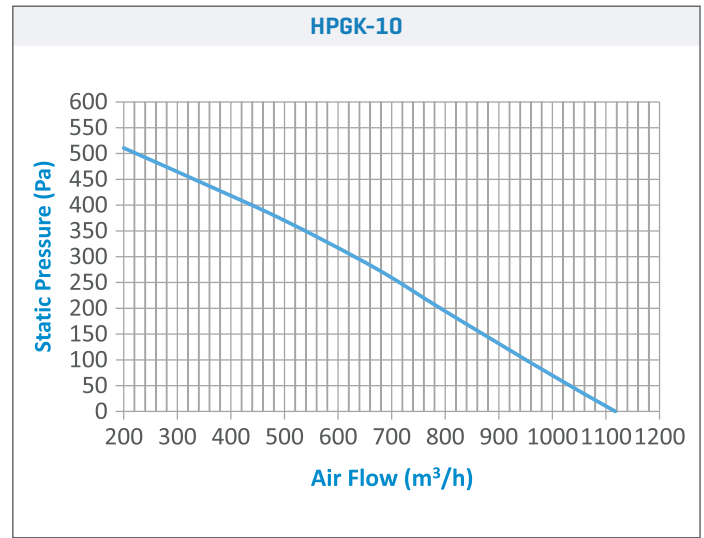
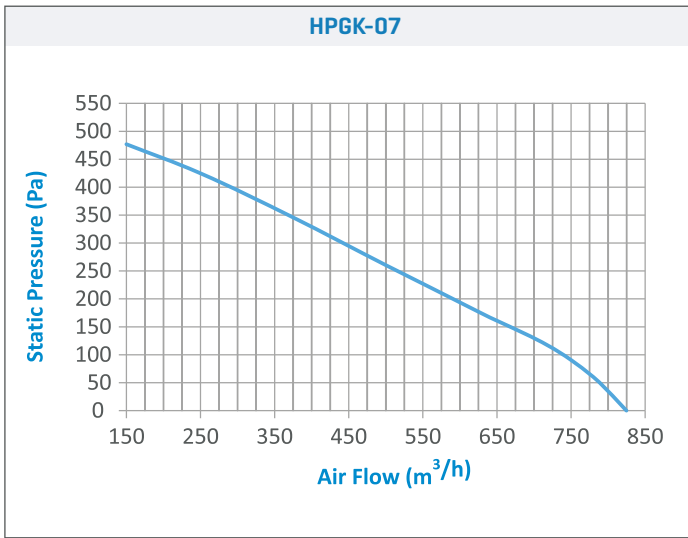


6. Filters and Fans

Performance Statics (EC)



Performance Statics [AC]



Technical Features Chart

HPGK-EC Fans

DEVICES FEATURES		HPGK-07	HPGK-10	HPGK-15	HPGK-20	HPGK-30	HPGK-40
AR => Air	m ³ /h	750	1000	1500	2000	3000	4000
External Static Pressure [Supply]	Pa	126.6	327.04	240.43	236.39	205.16	135.69
Supply Expansion	V-Hz	230-50	230/50	230/50	230/50	380/50	380/50
Total Fan Power	kW	0.34	0.77	0.94	1.00	1.58	2.28
Motor Type		EC	EC	EC	EC	EC	EC

HPGK-AC FANS

DEVICES FEATURES		HPGK-07	HPGK-10	HPGK-15	HPGK-20	HPGK-30	HPGK-40
AR => Air	m ³ /h	750	1000	1500	2000	3000	4000
External Static Pressure [Supply]	Pa	183.4	69.94	160.73	42.19	45.56	55.01
Supply Expansion	V-Hz	230-50	230/50	230/50	230/50	230/50	230/50
Total Fan Power	kW	0.42	0.45	1.03	0.94	1.36	2.6
Motor Type		AC	AC	AC	AC	AC	AC

Compressor

DEVICES FEATURES		HPGK-07	HPGK-10	HPGK-15	HPGK-20	HPGK-30	HPGK-40
Power	kW	1.192	1.379	1.71	2.3	2.8	3.52
Supply Expansion	V-Hz	230-50	230-50	230-50	380-50	380-50	380-50

Cooling Features

GENERAL FEATURES		HPGK-07	HPGK-10	HPGK-15	HPGK-20	HPGK-30	HPGK-40
Total Refrigerant Capacity	kW	4.1	5.42	8.5	11.7	14.9	18.2
Total Cooling COP		3.44	3.93	4.97	5.08	5.32	5.2

Heating Features

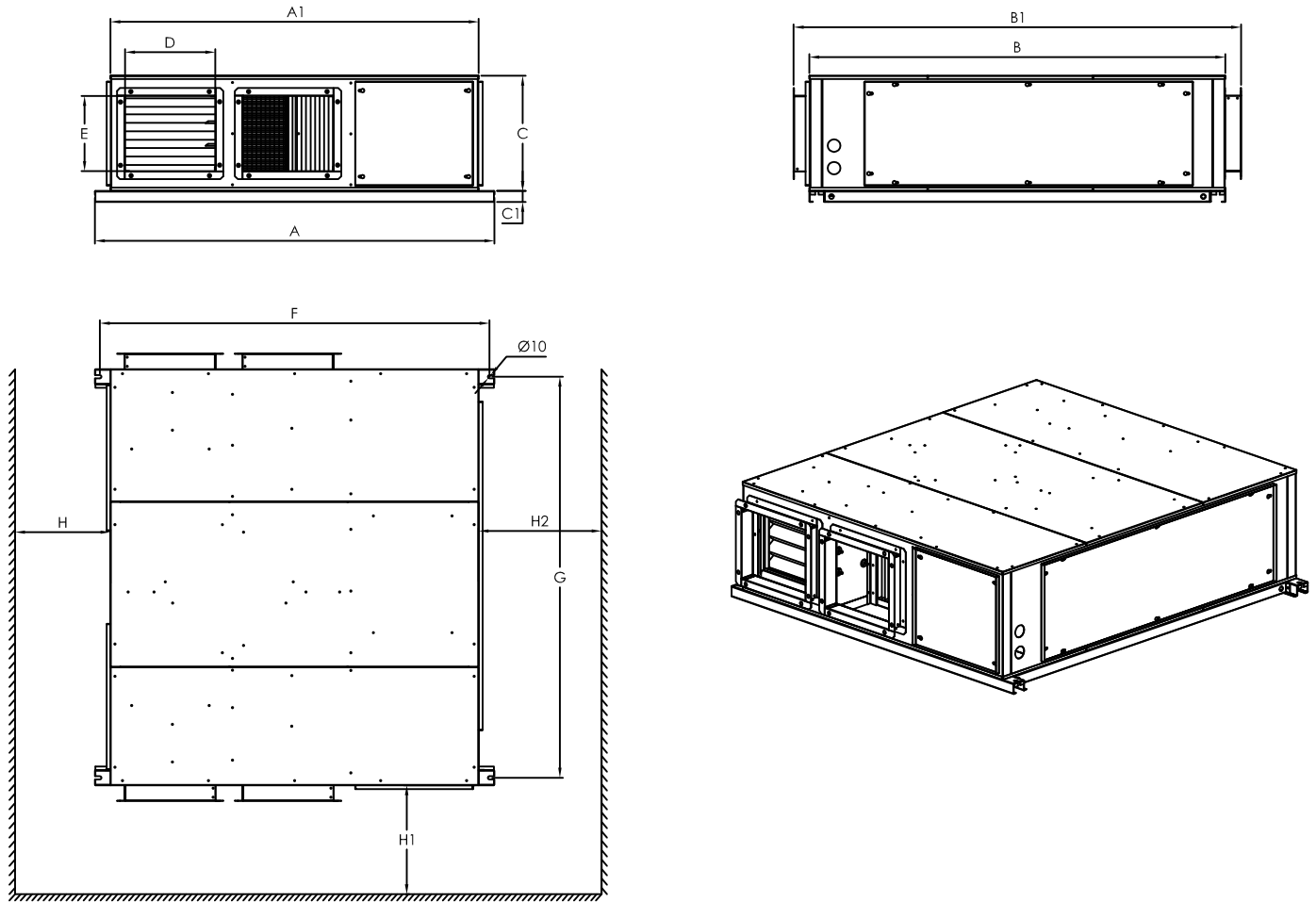
DEVICE FEATURES		HPGK-07	HPGK-10	HPGK-15	HPGK-20	HPGK-30	HPGK-40
Total Heating Capacity	kW	5.535	6.041	10.742	15.729	19.42	25.83
Total Heating COP		4.64	4.38	6.28	6.84	6.93	7.35

Electrical Heater(Optional)

DEVICE FEATURE		HPGK-07	HPGK-10	HPGK-15	HPGK-20	HPGK-30	HPGK-40
Capacity	kW [max.]	1.5	2	4	10	10	10

Filter

DEVICE FEATURE	HPGK-07	HPGK-10	HPGK-15	HPGK-20	HPGK-30	HPGK-40
Splitter Type Filter Class	ISO ePM Coarse %55	ISO ePM Coarse %55	ISO ePM Coarse %55	ISO ePM Coarse %55	ISO ePM Coarse %55	ISO ePM Coarse %55

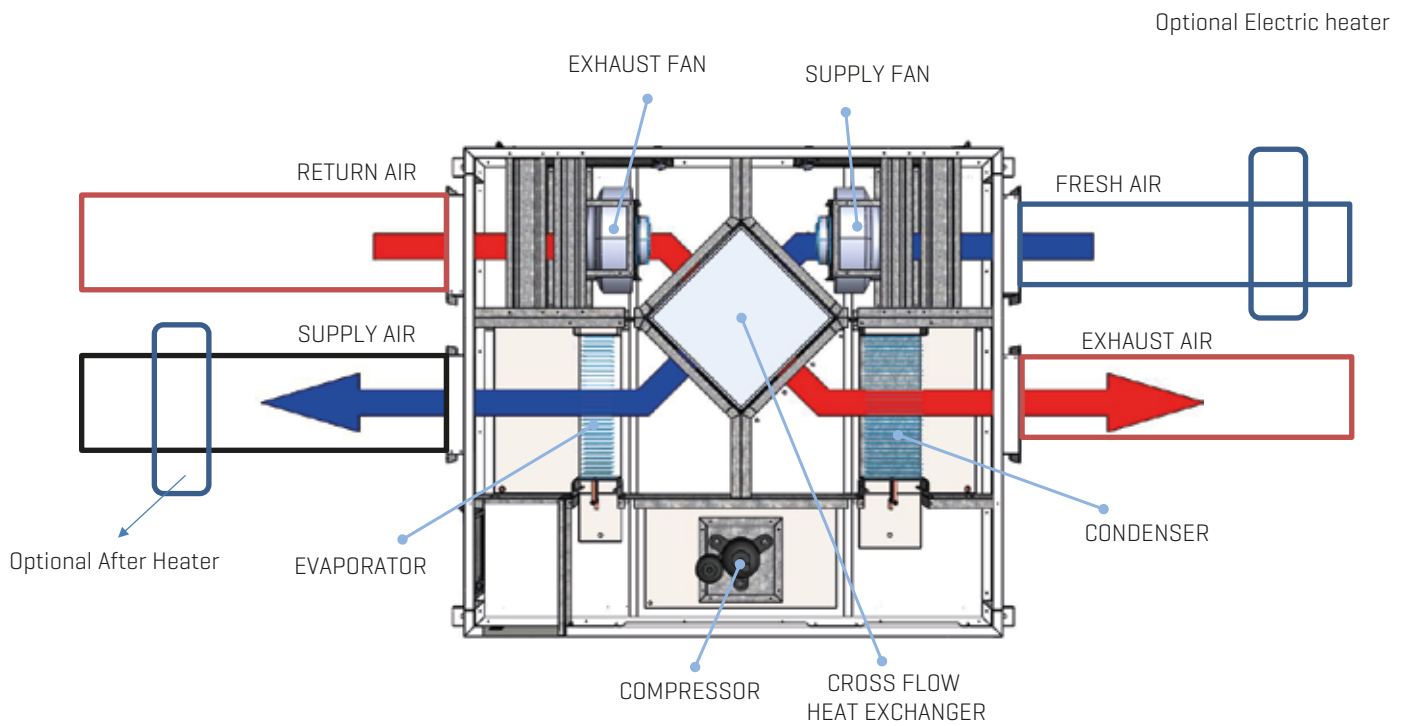


Device Dimensions

	A	A1	B	B1	C	C1	D	E	F	G	H (Min.)	H1 (Min.)	H2 (Min.)	WEIGHT(KG)
HPGK-07	1279	1174.5	1453.5	1557.8	383.5	37	280	210	1245	1403.5	500	500	500	150
HPGK-10	1329	1224.5	1383.5	1487.8	383.5	37	300	210	1295	1333.5	500	500	500	175
HPGK-15	1545	1444.5	1558.5	1662.8	434.5	37	400	310	1515	1508.5	600	500	600	200
HPGK-20	1605	1504.5	1698.5	1802.8	499.5	37	410	410	1575	1648.5	600	500	600	250
HPGK-30	1765	1664.5	1883.5	1987.8	601.5	37	510	510	1735	1833.5	700	500	600	300
HPGK-40	2125	2024.5	1918.5	2024	666.5	37	600	510	2095	1868.5	700	500	600	375

"All dimensions are mm"

Heating Capacity Features



Control Panel

HPGK series device standards includes multifunctional control units and a room control panel. These are general features of the Control Panel;

Features	Working Principal	Situation
On / Off	Done over the room control panel	Standard
Display	Through the screen of the room control panel; fan return speed, fail/alarm notification and temperature value scan be displayed	Standard
Fan Control	The fans can be controlled separately and automatically switched on.	Standard
	Automatic mode on, the pressure sensor helps to adjust the requested values according the wish. On HPGK, if the contamination rises, the fans will increase their air flow to hold the efficiency according the desired conditioning	Optional
	When confronting fan problems, the system will automatically shut down to hold protection mode.	Optional
Heat-Pump Control	Manual selection and cooling/heating selection is made over the room control panel. Being connected to the heating sensor automatically, to reach the aimed comfort temperature, the heat pump system can be used in meeting the required cooling or heating.	Standard
	When cooling and heating is switched on, the gas pressure sensors manages to run the system safely and high efficient with the help of low/high pressure protection equipments.	Standard
	On any problematic occasion with the heat pump system, it will automatically go in the protection mode through its sensors.	Standard
Timer	HPGK can adjust time and date configurations with the room control panel. With the timer mode ,off, special days [holidays], each day of the week can be selected for function.	Standard
BMS	Power control unit and the central control system of the building are equipped to work together.	Standard
Modbus	HPGK devices can be controlled through the Modbus protocol.	Standard
Filter Filthiness	Through the sensors inside the device, the dirtiness can be seen on the control panel. Alarm signs can be seen on the warning side.	Standard



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DMT
Single Deflection Grille

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 4 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 2 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 3 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.



- ☞ DMT – Single Deflection Grille, has one row independently adjustable aerodynamic blades for the advanced air direction control.
- ☞ Suitable for supply or extract air.



MATERIAL

- ☞ Aluminium 6063 extrusion profile production
- ☞ Optional AISI 304 quality stainless steel production

SURFACE COATING

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

INSTALLATION OPTIONS

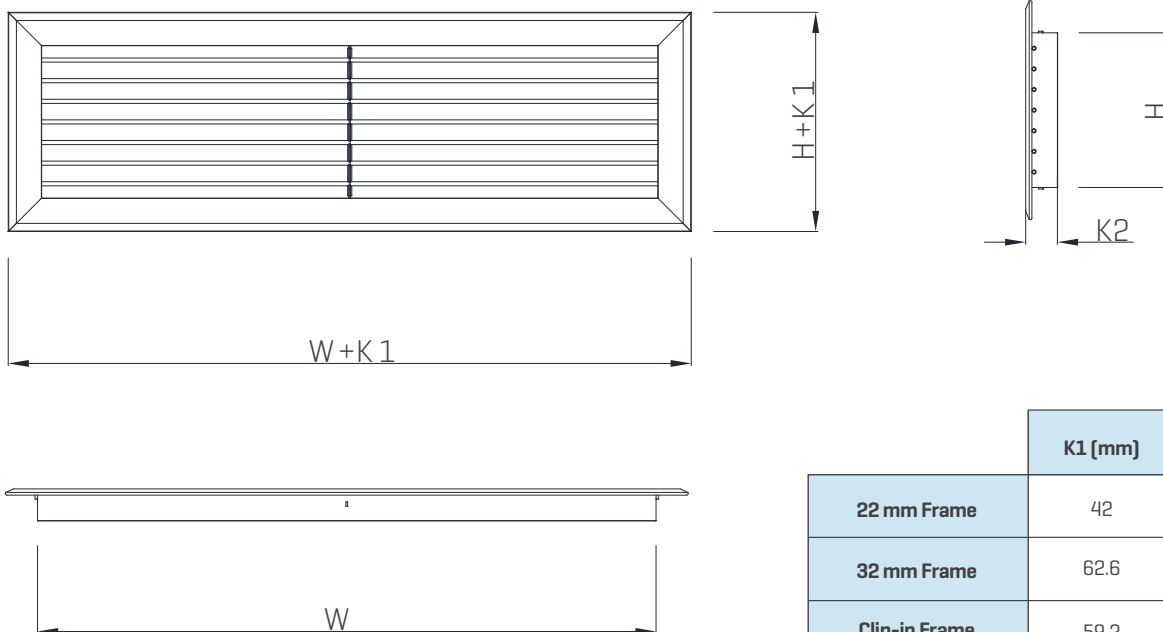
- ☞ Screw System
- ☞ Suspended Ceiling
- ☞ Clip-In Ceiling
- ☞ Mounting Bracket
- ☞ Without Mounting Hole
- ☞ Concealed
- ☞ Long Spring Clip
- ☞ Blind Frame Short Spring Clip

ACCESSORIES

- ☞ Optional
 - ZKD - Opposite Blade Air Adjustment Damper [Production from aluminum 6063 extrusion profile]

PRODUCT SELECTION

STANDARD DIMENSIONS



	K1 [mm]	K2 [mm]
22 mm Frame	42	31.8
32 mm Frame	62.6	31
Clip-in Frame	59.2	30
Stainless-Steel Frame	57.8	30

Table 1. Standard Dimensions

Standard Dimensions		H (Height) (mm)															
		50	100	200	300	400	500	600	700	800	900	1000					
W (Width) (mm)	100	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	200	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	300	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	400	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	500	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	600	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	700	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	800	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	900	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1000	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1100	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1200	✓	✓	✓	✓	✓	✓	✓	✓								
	1300	✓	✓	✓	✓	✓	✓	✓									
	1400	✓	✓	✓	✓	✓	✓	✓									
	1500	✓	✓	✓	✓	✓	✓	✓									
	1600	✓	✓	✓	✓	✓	✓	✓									
	1700	✓	✓	✓	✓	✓	✓	✓									
	1800	✓	✓	✓	✓	✓	✓	✓									

Note: Maximum dimensions for stainless steel production are 1200 mm x 600 mm.

PERFORMANCE DATA

Table 2. Effective Area

Effective Area [m ²]		H (Height) (mm)															
		50	100	200	300	400	500	600	700	800	900	1000					
W (Width) (mm)	100	0.003	0.007	0.013	0.020	0.027	0.033	0.040	0.047	0.053	0.060	0.067					
	200	0.007	0.013	0.027	0.040	0.053	0.067	0.080	0.093	0.106	0.120	0.133					
	300	0.010	0.020	0.040	0.060	0.080	0.100	0.120	0.140	0.160	0.180	0.200					
	400	0.013	0.027	0.053	0.080	0.106	0.133	0.160	0.186	0.213	0.240	0.266					
	500	0.017	0.033	0.067	0.100	0.133	0.166	0.200	0.233	0.266	0.299	0.333					
	600	0.020	0.040	0.080	0.120	0.160	0.200	0.240	0.280	0.319	0.359	0.399					
	700	0.023	0.047	0.093	0.140	0.186	0.233	0.280	0.326	0.373	0.419	0.466					
	800	0.027	0.053	0.106	0.160	0.213	0.266	0.319	0.373	0.426	0.479	0.532					
	900	0.030	0.060	0.120	0.180	0.240	0.299	0.359	0.419	0.479	0.539	0.599					
	1000	0.033	0.067	0.133	0.200	0.266	0.333	0.399	0.466	0.532	0.599	0.666					
	1100	0.037	0.073	0.146	0.220	0.293	0.366	0.439	0.512	0.586	0.659	0.732					
	1200	0.040	0.080	0.160	0.240	0.319	0.399	0.479									
	1300	0.043	0.087	0.173	0.260	0.346	0.433	0.519									
	1400	0.047	0.093	0.186	0.280	0.373	0.466	0.559									
	1500	0.050	0.100	0.200	0.299	0.399	0.499	0.599									
	1600	0.053	0.106	0.213	0.319	0.426	0.532	0.639									
	1700	0.057	0.113	0.226	0.339	0.453	0.566	0.679									
	1800	0.060	0.120	0.240	0.359	0.479	0.599	0.719									

Table 3. Supply 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	7.0	8.0	9.0	10.0
50	Effective Area [m²]	0.0278	0.0139	0.009	0.007	0.006	0.005	0.0040	0.0035							
	Pressure Drop [Pa]	0	1	2	4	6	8	11	15							
	Throw Distance [m]	1	2	2	3	3	3	4	4							
	Sound Pressure Level [dB(A)]	<15	<15	<15	<15	<15	<15	<15	<15	<15						
100	Effective Area [m²]	0.0556	0.0278	0.019	0.014	0.011	0.009	0.008	0.007	0.006	0.006	0.005	0.0040	0.0035		
	Pressure Drop [Pa]	0	1	2	4	6	8	11	15	19	24	34	47	62		
	Throw Distance [m]	1	2	2	3	3	4	4	4	5	5	6	6			
	Sound Pressure Level [dB(A)]	<15	<15	<15	<15	<15	<15	<15	17	20	23	28	32	35		
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	0.008	0.007	0.0062	0.0056
	Pressure Drop [Pa]	0	1	2	4	6	8	11	15	19	24	35	48	63	80	100
	Throw Distance [m]	1	2	2	3	3	4	4	4	5	5	6	6	7	7	7
	Sound Pressure Level [dB(A)]	<15	<15	<15	<15	<15	<15	16	20	23	26	31	35	38	42	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	0.012	0.010	0.009	0.008
	Pressure Drop [Pa]	0	1	2	4	6	8	11	15	19	24	35	48	63	81	100
	Throw Distance [m]	1	2	3	3	3	4	4	4	5	5	6	6	7	7	7
	Sound Pressure Level [dB(A)]	<15	<15	<15	<15	<15	<15	18	21	25	28	32	37	40	43	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	0.016	0.014	0.012	0.011
	Pressure Drop [Pa]	0	1	2	4	6	8	11	15	19	24	35	48	63	81	100
	Throw Distance [m]	1	2	3	3	3	4	4	4	5	5	6	6	7	7	7
	Sound Pressure Level [dB(A)]	<15	<15	<15	<15	<15	<15	19	23	26	29	34	38	41	45	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	0.024	0.020	0.017	0.015	0.014
	Pressure Drop [Pa]	0	1	2	4	6	8	11	15	19	24	35	48	63	81	101
	Throw Distance [m]	1	2	3	3	3	4	4	4	5	5	6	6	7	7	7
	Sound Pressure Level [dB(A)]	<15	<15	<15	<15	<15	16	20	24	27	30	35	39	42	46	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	0.024	0.021	0.019	0.017
	Pressure Drop [Pa]	0	1	2	4	6	8	11	15	19	24	35	48	63	81	101
	Throw Distance [m]	1	2	3	3	3	4	4	4	5	5.0	6	6	7	7	7
	Sound Pressure Level [dB(A)]	<15	<15	<15	<15	<15	17	21	25	28	31	36	40	43	46	49
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	0.028	0.024	0.022	0.019
	Pressure Drop [Pa]	0	1	2	4	6	8	11	15	19	24	35	48	64	81	101
	Throw Distance [m]	1	2	3	3	3	4	4	4	5	5.0	6	6	7	7	7
	Sound Pressure Level [dB(A)]	<15	<15	<15	<15	<15	18	22	25	28	31	36	40	44	47	50
800	Effective Area [m²]	0.444	0.222	0.148	0.111	0.089	0.074	0.064	0.056	0.049	0.0444	0.037	0.032	0.028	0.025	0.022
	Pressure Drop [Pa]	0	1	2	4	6	8	11	15	19	24	35	48	64	81	101
	Throw Distance [m]	1	2	3	3	3	4	4	4	5	5.0	6	6	7	7	7
	Sound Pressure Level [dB(A)]	<15	<15	<15	<15	<15	18	22	26	29	32	37	41	45	48	51
900	Effective Area [m²]	0.500	0.250	0.167	0.125	0.100	0.083	0.071	0.063	0.056	0.0500	0.042	0.036	0.031	0.028	0.025
	Pressure Drop [Pa]	0	1	2	4	6	8	11	15	19	24	35	48	64	81	101
	Throw Distance [m]	1	2	3	3	3	4	4	4	5	5.1	6	6	7	7	7
	Sound Pressure Level [dB(A)]	<15	<15	<15	<15	<15	19	23	26	30	32	37	41	45	48	51
1000	Effective Area [m²]	0.556	0.278	0.185	0.139	0.111	0.093	0.079	0.069	0.062	0.0556	0.046	0.040	0.035	0.031	0.028
	Pressure Drop [Pa]	0	1	2	4	6	8	11	15	19	24	35	48	64	81	101
	Throw Distance [m]	1	2	3	3	3	4	4	4	5	5.1	6	6	7	7	8
	Sound Pressure Level [dB(A)]	<15	<15	<15	<15	<15	19	23	27	30	33	38	42	46	49	52
1250	Effective Area [m²]	0.694	0.347	0.232	0.174	0.139	0.116	0.099	0.087	0.077	0.0694	0.058	0.050	0.043	0.039	0.035
	Pressure Drop [Pa]	0	1	2	4	6	8	12	15	19	24	35	48	64	82	101
	Throw Distance [m]	1	2	3	3	4	4	4	5	5	5.1	6	6	7	7	8
	Sound Pressure Level [dB(A)]	<15	<15	<15	<15	15	20	24	28	31	34	39	43	46	50	52
1500	Effective Area [m²]	0.417	0.278	0.208	0.167	0.139	0.119	0.104	0.0926	0.0833	0.069	0.060	0.052	0.046	0.042	
	Pressure Drop [Pa]	1	2	4	6	8	12	15	19	24	35	48	64	82	102	
	Throw Distance [m]	2	3	3	4	4	4	5	5	5.1	6	6	7	7	8	
	Sound Pressure Level [dB(A)]	<15	<15	<15	16	21	24	29	32	35	40	44	47	50	53	
1750	Effective Area [m²]	0.486	0.324	0.243	0.194	0.162	0.139	0.122	0.1080	0.0972	0.081	0.069	0.061	0.054	0.049	
	Pressure Drop [Pa]	1	2	4	6	8	12	15	19	24	35	49	64	82	102	
	Throw Distance [m]	2	3	3	4	4	4	5	5	5	6	6	7	7	8	
	Sound Pressure Level [dB(A)]	<15	<15	<15	17	22	26	29	33	35	40	44	48	51	54	
2000	Effective Area [m²]	0.556	0.370	0.278	0.222	0.185	0.159	0.139	0.1235	0.1111	0.093	0.079	0.069	0.062	0.056	
	Pressure Drop [Pa]	1	2	4	6	8	12	15	19	24	35	49	64	82	102	
	Throw Distance [m]	2	3	3	4	4	4	5	5	5	6	6	7	7	8	
	Sound Pressure Level [dB(A)]	<15	<15	<15	17	22	26	30	33	36	41	45	49	52	55	
2500	Effective Area [m²]	0.694	0.463	0.347	0.278	0.232	0.198	0.174	0.1543	0.1389	0.116	0.099	0.087	0.077	0.069	
	Pressure Drop [Pa]	1	2	4	6	8	12	15	19	24	35	49	64	82	102	
	Throw Distance [m]	2	3	3	4	4	4	5	5	5	6	6	7	7	8	
	Sound Pressure Level [dB(A)]	<15	<15	<15	17	23	27	31	34	37	42	46	50	53	56	
3000	Effective Area [m²]	0.556	0.417	0.333	0.278	0.238	0.2083	0.1852	0.1667	0.139	0.119	0.104	0.093	0.0833		
	Pressure Drop [Pa]	2	4	6	8	12	15	20	24	35	49	64	82	102		
	Throw Distance [m]	3	3	4	4	4	4	5	5	5	6	6	7	7	8	
	Sound Pressure Level [dB(A)]	<15	<15	18	24	28	32	35	38	43	47	50	54	56		
4000	Effective Area [m²]	0.694	0.556	0.444	0.370	0.3968	0.2778	0.2469	0.2222	0.185	0.159	0.139	0.1235	0.1111		
	Pressure Drop [Pa]	2	4	6	8	12	15	20	24	36	49	65	82	102		
	Throw Distance [m]	3	3	4	4	4	5	5	5	6	6	7	7	8		
	Sound Pressure Level [dB(A)]	<15	<15	20	25	30	33	36	39	44	48	52	55	58		
5000	Effective Area [m²]	0.694	0.556	0.4630	0.595	0.3472	0.3086	0.2778	0.232	0.198	0.1736	0.1543	0.1389			
	Pressure Drop [Pa]	4	6	8	12	15	20	24	36	49	65	83	103			
	Throw Distance [m]	3	4	4	5	5	5	5	6	7	7	8	8			
	Sound Pressure Level [dB(A)]	<15	21	26	32	34	37	40	45	49	53	56	59			
7500	Effective Area [m²]	0.694	0.595	0.521	0.4630	0.4167	0.347	0.298	0.260	0.232	0.208					
	Pressure Drop [Pa]	9	12	15	20	24	36	49	65	83	103					
	Throw Distance [m]	4	5	5	5	5	6	7	7	8	8					
	Sound Pressure Level [dB(A)]	28	32	36	39	42	47	51	54	58	60					
10000	Effective Area [m²]	0.6944	0.6173	0.5556	0.463	0.397	0.347	0.309	0.2778							
	Pressure Drop [Pa]	15	20	25	36	49	65	83	103							
	Throw Distance [m]	5	5	6	6	7	7	8	8							
	Sound Pressure Level [dB(A)]	37	40	43	48	52	56	59	62							

Note: Data were obtained with the air distribution equipment when the ambient air temperature difference is T=8K
 Throw distance is the distance between the point where the

Table 4. Extract 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	7.0	8.0	9.0	10.0
50	Effective Area [m²]	0.0278	0.0139	0.0093	0.0069	0.006	0.005	0.004	0.003							
	Pressure Drop [Pa]	0	1	2	3	5	7	10	13							
	Sound Pressure Level [dB(A)]	<15	<15	<15	<15	<15	<15	<15	<15	<15						
100	Effective Area [m²]	0.0556	0.0278	0.019	0.014	0.011	0.009	0.008	0.007	0.006	0.006	0.005	0.004	0.0035		
	Pressure Drop [Pa]	0	1	2	3	5	7	10	13	17	21	30	42	56		
	Sound Pressure Level [dB(A)]	<15	<15	<15	<15	<15	<15	<15	15	18	21	26	30	34		
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	0.008	0.007	0.0062	0.0056
	Pressure Drop [Pa]	0	1	2	3	5	7	10	13	17	21	31	43	57	73	91
	Sound Pressure Level [dB(A)]	<15	<15	<15	<15	<15	<15	<15	18	22	25	29	34	37	41	43
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	0.012	0.010	0.009	0.008
	Pressure Drop [Pa]	0	1	2	3	5	7	10	14	17	22	32	44	58	74	93
	Sound Pressure Level [dB(A)]	<15	<15	<15	<15	<15	<15	17	20	24	26	31	36	39	42	45
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	0.016	0.014	0.012	0.011
	Pressure Drop [Pa]	0	1	2	3	5	7	10	14	18	22	32	44	59	75	94
	Sound Pressure Level [dB(A)]	<15	<15	<15	<15	<15	<15	18	22	25	28	33	37	41	44	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	0.020	0.017	0.015	0.014
	Pressure Drop [Pa]	0	1	2	3	5	8	10	14	18	22	32	45	59	76	95
	Sound Pressure Level [dB(A)]	<15	<15	<15	<15	<15	<15	19	23	26	29	34	38	42	45	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	0.024	0.021	0.019	0.017
	Pressure Drop [Pa]	0	1	2	3	5	8	11	14	18	22	33	45	60	76	95
	Sound Pressure Level [dB(A)]	<15	<15	<15	<15	<15	16	20	24	27	30	35	39	43	46	49
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	0.028	0.024	0.022	0.019
	Pressure Drop [Pa]	0	1	2	3	5	8	11	14	18	22	33	45	60	77	96
	Sound Pressure Level [dB(A)]	<15	<15	<15	<15	<15	17	21	24	28	31	35	40	43	47	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	0.032	0.028	0.025	0.022
	Pressure Drop [Pa]	0	1	2	3	5	8	11	14	18	22	33	46	60	77	97
	Sound Pressure Level [dB(A)]	<15	<15	<15	<15	<15	17	21	25	28	31	36	40	44	47	50
900	Effective Area [m²]	0.500	0.250	0.167	0.125	0.100	0.083	0.071	0.063	0.056	0.0500	0.042	0.036	0.031	0.028	0.025
	Pressure Drop [Pa]	0	1	2	3	5	8	11	14	18	23	33	46	61	78	97
	Sound Pressure Level [dB(A)]	<15	<15	<15	<15	<15	18	22	26	29	32	37	41	45	48	51
1000	Effective Area [m²]	0.556	0.278	0.185	0.139	0.111	0.093	0.079	0.069	0.062	0.0556	0.046	0.040	0.035	0.031	0.028
	Pressure Drop [Pa]	0	1	2	3	5	8	11	14	18	23	33	46	61	78	97
	Sound Pressure Level [dB(A)]	<15	<15	<15	<15	<15	18	23	26	29	32	37	41	45	48	51
1250	Effective Area [m²]	0.694	0.347	0.232	0.174	0.139	0.116	0.099	0.087	0.077	0.0694	0.058	0.050	0.043	0.039	0.035
	Pressure Drop [Pa]	0	1	2	3	5	8	11	14	18	23	34	46	61	79	98
	Sound Pressure Level [dB(A)]	<15	<15	<15	<15	15	19	24	27	30	33	38	42	46	49	52
1500	Effective Area [m²]		0.417	0.278	0.208	0.167	0.139	0.119	0.104	0.0926	0.0833	0.069	0.060	0.052	0.046	0.0417
	Pressure Drop [Pa]		1	2	3	5	8	11	14	19	23	34	47	62	79	99
	Sound Pressure Level [dB(A)]		<15	<15	<15	15	20	25	28	31	34	39	43	47	50	53
1750	Effective Area [m²]		0.486	0.324	0.243	0.194	0.162	0.139	0.122	0.1080	0.0972	0.081	0.069	0.061	0.054	0.0486
	Pressure Drop [Pa]		1	2	3	5	8	11	15	19	23	34	47	62	80	100
	Sound Pressure Level [dB(A)]		<15	<15	<15	16	21	25	29	32	35	40	44	48	51	54
2000	Effective Area [m²]		0.556	0.370	0.278	0.222	0.185	0.159	0.139	0.1235	0.1111	0.093	0.079	0.069	0.062	0.0556
	Pressure Drop [Pa]		1	2	3	5	8	11	15	19	23	34	47	63	80	100
	Sound Pressure Level [dB(A)]		<15	<15	<15	17	22	26	30	33	36	41	45	48	52	54
2500	Effective Area [m²]		0.694	0.463	0.347	0.278	0.231	0.198	0.174	0.1543	0.1389	0.116	0.099	0.087	0.077	0.0694
	Pressure Drop [Pa]		1	2	3	6	8	11	15	19	24	35	48	63	81	101
	Sound Pressure Level [dB(A)]		<15	<15	<15	18	23	27	31	34	37	42	46	49	53	55
3000	Effective Area [m²]			0.556	0.417	0.333	0.278	0.238	0.2083	0.1852	0.1667	0.139	0.119	0.104	0.0926	0.0833
	Pressure Drop [Pa]			2	3	6	8	11	15	19	24	35	48	64	82	102
	Sound Pressure Level [dB(A)]			<15	<15	19	24	28	31	35	38	42	47	50	53	56
4000	Effective Area [m²]			0.741	0.556	0.444	0.370	0.3175	0.2778	0.2469	0.2222	0.185	0.159	0.1389	0.1235	0.1111
	Pressure Drop [Pa]			2	4	6	8	11	15	19	24	35	49	64	83	103
	Sound Pressure Level [dB(A)]			<15	<15	20	25	29	33	36	39	44	48	52	55	58
5000	Effective Area [m²]				0.694	0.556	0.4630	0.3968	0.3472	0.3086	0.2778	0.231	0.1984	0.1736	0.1543	0.1389
	Pressure Drop [Pa]				4	6	8	11	15	19	24	36	49	65	83	104
	Sound Pressure Level [dB(A)]				<15	21	26	30	34	37	40	45	49	53	56	59
7500	Effective Area [m²]						0.694	0.5952	0.5208	0.4630	0.4167	0.347	0.2976	0.2604	0.2315	0.2083
	Pressure Drop [Pa]						8	12	15	20	25	36	50	66	85	106
	Sound Pressure Level [dB(A)]						28	32	36	39	42	47	51	55	58	61
10000	Effective Area [m²]								0.6944	0.6173	0.5556	0.463	0.3968	0.3472	0.3086	0.2778
	Pressure Drop [Pa]								16	20	25	37	50	67	86	107
	Sound Pressure Level [dB(A)]								37	40	43	48	52	56	59	62

Note: Data were obtained with the air distribution equipment when the ambient air temperature difference is T=8K

Table 5. Throw Distance Correction

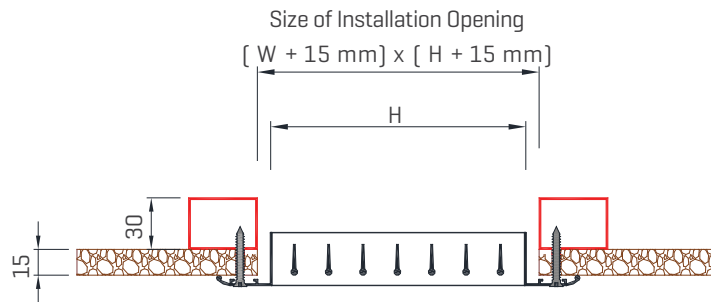
Heating Mode (ΔT)	4	6	8	10	12
Throw Distance Coefficient	1.07	1.02	1	0.90	0.83
Cooling Mode (ΔT)	4	6	8	10	12
Throw Distance Coefficient	1.31	1.36	1.42	1.48	1.54

Table 6. Damper Pressure Correction

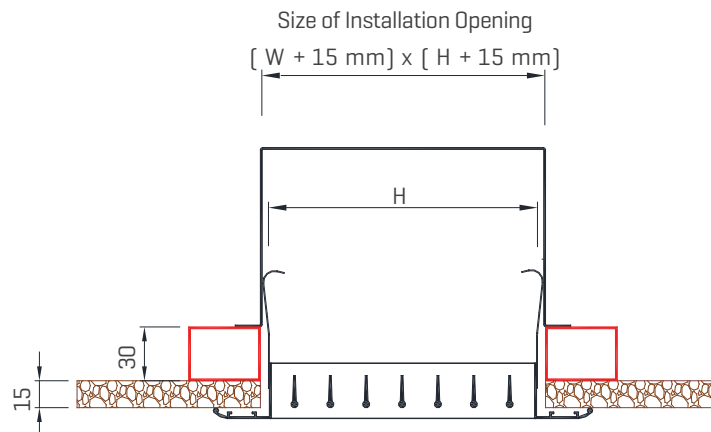
Damper Position	Pressure Correction Factor	Noise Generation [dB(A)]
Open	1.1	+1
25% Closed	1.14	+4
50% Closed	2.48	+14
75% Closed	5.11	+29

INSTALLATION

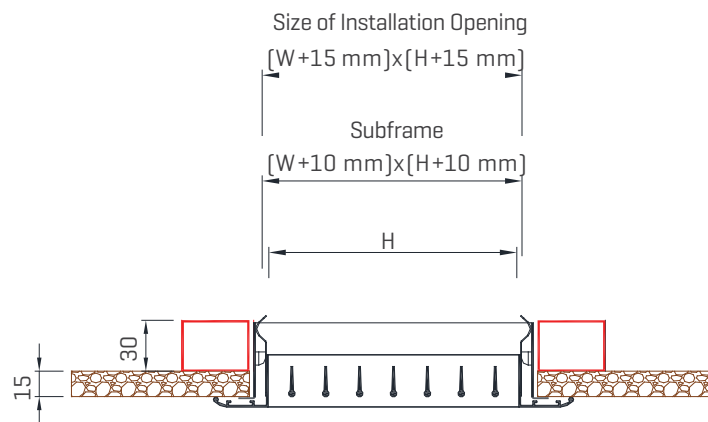
1. SCREW SYSTEM



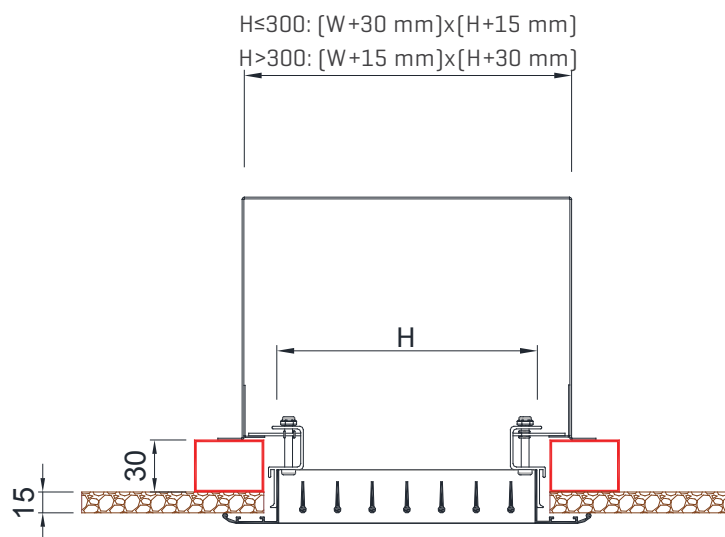
2. LONG SPRING CLIP



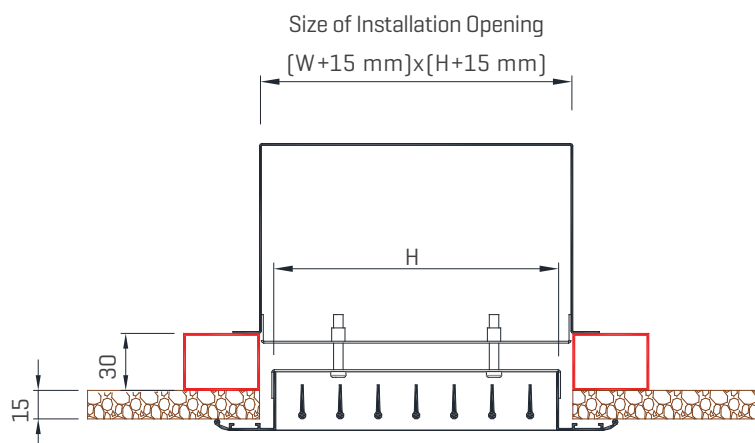
3. SHORT SPRING CLIP WITH SUBFRAME



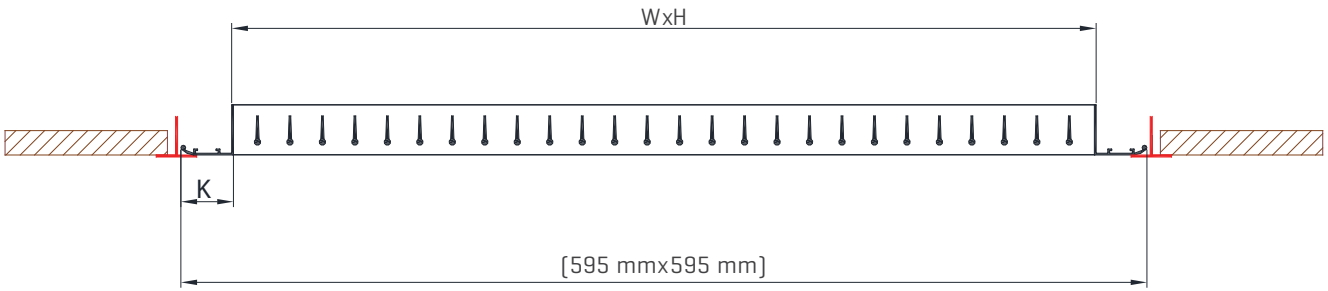
4. CONCEALED



5. MOUNTING BRACKETED



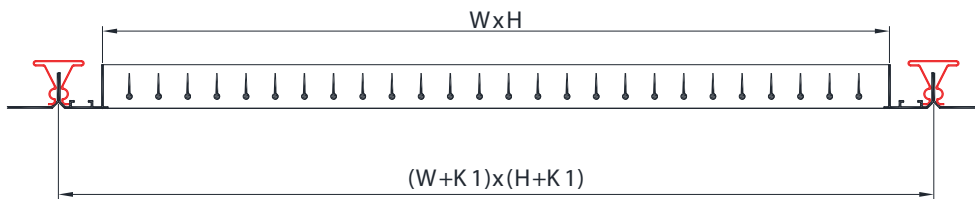
6. SUSPENDED CEILING



W and H dimensions that can be selected according to the frame sizes specified in the product selection, are shown in the adjacent table.

	W (mm)	H (mm)
22 mm Frame	553	553
32 mm Frame	532	532
Stainles-Steel Frame	537	537

7. CLIP-IN CEILING

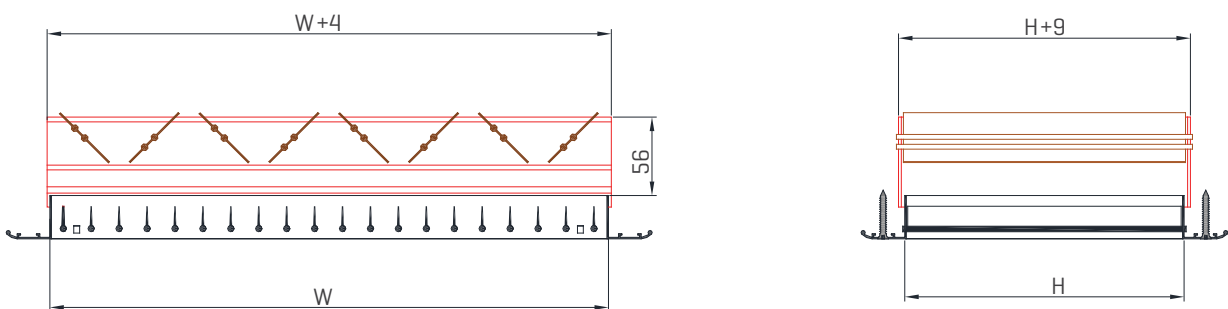


Clip-In Frame K1 = 59 mm	W (mm)	H (mm)
600x600	541	541
300x300	241	241

Note:

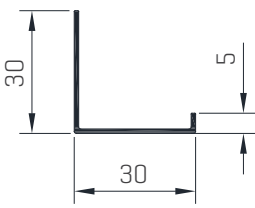
When the raw material of the product is selected as stainless steel, Clip-In assembly can not be done.

8. WITH DAMPER

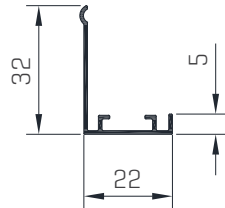


FRAME TYPES

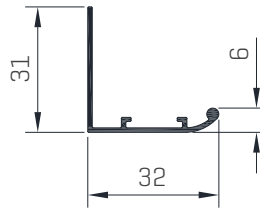
Stainless Steel Frame



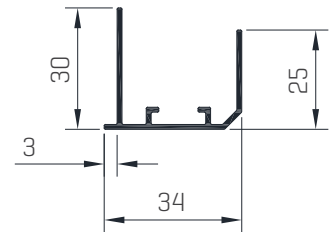
22 mm Frame



32 mm Frame



Clip-In Frame



SIZE PARAMETERS

MAXIMUM MODULE SIZE

The standard dimensions of one module can be selected between 100 mmx50mm and 1800 mmx1000 mm. For the stainless-steel production, maximum module dimension is 1200 mmx600 mm. If the order dimension exceeds the module length, grilles will be produced by modular.

SUPPORT NUMBER PARAMETERS

The number of support used increases as the width of the grill increases. The maximum number of supports in a single piece products is 2 pieces.

If $W < 600$, without support



$600 \leq W \leq 1200$, with 1 support



If $1200 < W \leq 1800$, with 2 support



PRODUCT SELECTION

Example: Occupied zone air flowrate has determined 2500 m³/h. 5 pieces of Double Deflection Grille would be used for supply air. Heating temperature difference is 8K.

Solution: For one grille, flowrate is $2500/5 = 500$ m³/h

From the section "Performance Data" (Table 3) the effective areas are corresponding the pressure drop, throw distance, noise generation and flowrate values. Convenient values will be picked.

For example, effective area 0.031 m², effective speed 4.5 m/s, pressure drop 19 Pa, throw distance 5 m and noise generation 27 dB[A].

Suitable grille dimension can be selected 500 mm x 100 mm with the 0.031 m² from "Effective Area" table (Table 2).

Throw Distance Correction Table

For example, the heating temperature difference is 10 K, the heating temperature at 8 K has found 8 m in the Performance Data table.

Throw distance correction table (Table 5), heating mode at 10 K throw correction factor is 0.9. So the new value of the throw distance is, Throw distance = 5 m x 0.9 = 4.5 m

Damper Condition

To determine pressure drop and noise generation with damper, the additional values needed from the "Damper Correction Table" (Table 6).

For example, damper level 50% closed, pressure correction factor would be multiplied to the performance table pressure value.

Likewise, noise generation value will be added to the performance table noise generation value.

For 50% closed damper condition,

Pressure correction factor is 2.48

Noise generation factor is +14 dB[A]

Total static pressure drop: $19 \times 2.48 = 47.12$ Pa

Total noise generation: $27 + 14 = 41$ dB[A]

PRODUCT ORDER CODES

You can place your orders for aluminum or stainless products according to the coding style by looking at the separate tables given below.

ALUMINUM PRODUCT ORDER CODE

DMT.ALM. < B > . < C > . < D > . < E > . < F >

A	Frame Type	
	03	22 mm Frame
	06	32 mm Frame
	09	Clip-In Frame
B	Damper	
	ZD	Opposite Blade Damper
	DZ	Without Damper
C	Installation Type	
	VD	Screw System
	KR	Suspended Ceiling
	KL	Clip-in Ceiling
	KP	Mounting Bracket
	MD	Without Mounting Hole
	MN	Concealed
	UK	Long Spring Clip
	KK	Bling Casing Short Spring Clip
D	Horizontal Dimension [W] [mm]	
	0000	You can view it from standard dimensions.
E	Vertical Dimension [H] [mm]	
	0000	You can view it from standard dimensions.
F	Paint	
	00	Unpainted
	S1	Standard Painted - RAL 9010
	S2	Standard Painted - RAL 9016
	XX	Special Painted

Sample Coding; DMT.ALM.01.DZ.VD.0100.0600.S1

STAINLESS-STEEL PRODUCT ORDER CODE**DMT.PAS.32.< A > . < B > . < C > . < D > . 00**

A	Damper	
	ZD	Opposite Blade Damper
	DZ	Without Damper
B	Installation Type	
	VD	Screw System
	KR	Suspended Ceiling
	KP	Mounting Bracket
	MD	Without Mounting Hole
	MN	Concealed
	UK	Long Spring Clip
	KK	Bling Cased Short Spring Clip
C	Horizontal Dimension (W) [mm]	
	0000	You can view it from standard dimensions.
D	Vertical Dimension (H) [mm]	
	0000	You can view it from standard dimensions.

Sample Coding; DMT.PAS.32.DZ.VD.0100.0600.00



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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 4 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 standards. 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 2 factories, in total area of 45.000 sqm in which 25.000 sqm indoor space that enables DOGU HVAC manufactures 180 various type of products. Additionally, DOGU HVAC has a powerful sales network with 4 sales offices located in İstanbul, Ankara, Antalya and Adana 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 55 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 standards], 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 TSEK, CE and GOST-R quality certifications.



FOUR-RTER

- Left and right switchable service direction for all modals.
- High efficient EC fans with low sound level.
- High efficiency heat recovery
- Hygienic condensate drip tray.
- Full integrated plug & play control system.
- Duble skin, 50 mm insullation.



Heat Exchanger

- High efficiency sorption rotary heat exchanger.
- Special application for the anti-freeze protection.

Fans

- New generation EC fans.
- Low power consumption.
- Low sound level.
- 10 years lifetime. (40.000 hours)

Options

- Electrical Heater
- DX/Heating/Cooling Coil
- Attenuator
- Dampers

General Features

RTER-1 switchable duct connection(top or side) and interchangeable service doors with new fan positioning acc.to new regulation for Rotary wheeled units(to prevent the leakage of exhaust air to suply air).

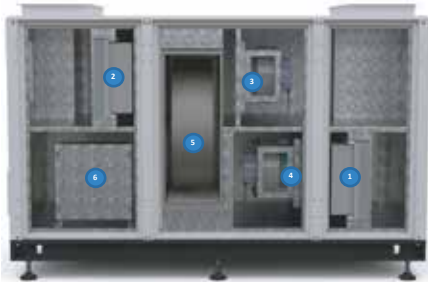
RTER-2 only side outlet (not switchable) and interchangeable service doors.

RTER-3 switchable duct connection(top or side) and interchangeable service doors (with smaller dimensions)

Filters

- Large filtering area for energy efficiency and long service period.
- High efficiency ISO ePM1 55% and ePM10 75% filters on supply, ePM10 75% filter on extract air side.

RTER-1



RTER-2



RTER-3



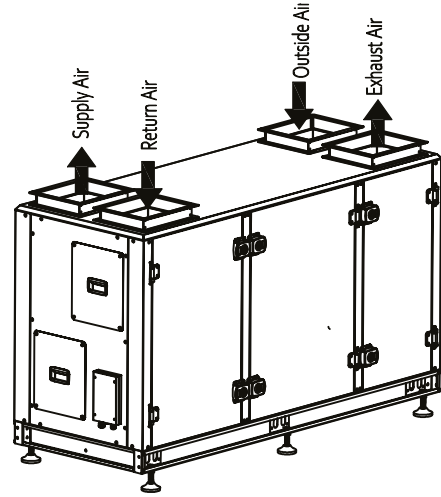
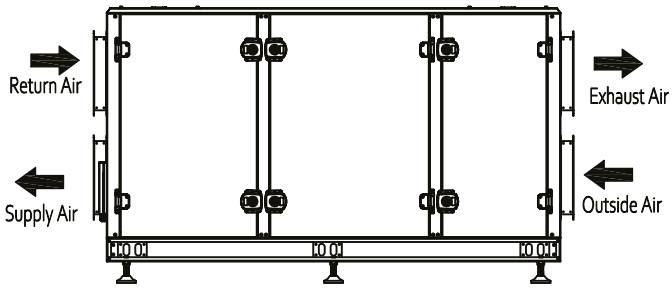
1. Supply filter
2. Exhaust filter
3. Supply Fan
4. Exhaust Fan
5. Rotary Heat Exchanger
6. Control panel

	Power [W]		Voltage [V] / Current [A]		RPM [1/min]	
	Supply Fan	Extract Fan	Supply Fan	Extract Fan	Supply Fan	Extract Fan
RTER 010	170	170	230/1,4	230/1,4	2510	2510
RTER 018	500	500	230/2,2	230/2,2	3740	3740
RTER 025	660	660	230/2,9	230/2,9	2900	2900
RTER 035	750	750	230/3,3	230/3,3	2100	2100
RTER 050	1320	1320	380/2,1	380/2,1	2060	2060
RTER 070	1850	1850	380/2,9	380/2,9	2180	2180
RTER 090	2730	2730	380/4,2	380/4,2	2730	2730
RTER 110	3510	3510	380/5,4	380/5,4	1910	1910
RTER 140	4700	4700	380/7,3	380/7,3	1750	1750
RTER 200	6750	6750	380/10,3	380/10,3	1500	1500

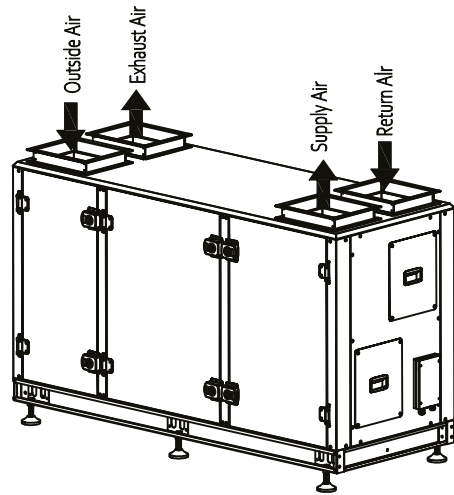
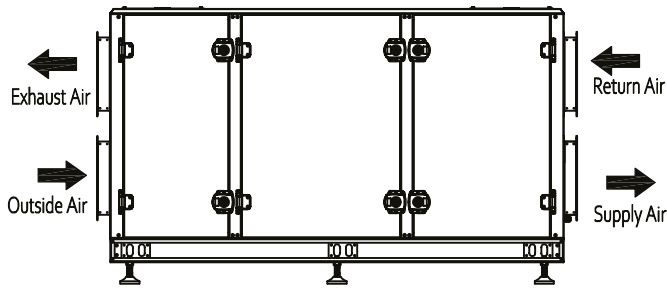
	RTER 010	RTER 018	RTER 025	RTER 035	RTER 050	RTER 070	RTER 090	RTER 110	RTER 140	RTER 200
MAXIMUM AIR FLOW [m³/h]	1075	1800	2500	3500	5000	7000	9000	11000	14000	20000
P [EXTERNAL] [Pa]	0	0	0	0	0	0	0	0	0	0
NOMINAL AIR FLOW [m3/h]	920	1500	2300	2800	4400	5800	8900	11000	13500	18500
P [EXTERNAL] [Pa]	200	200	200	200	200	200	200	200	200	200

RTER-1

LEFT

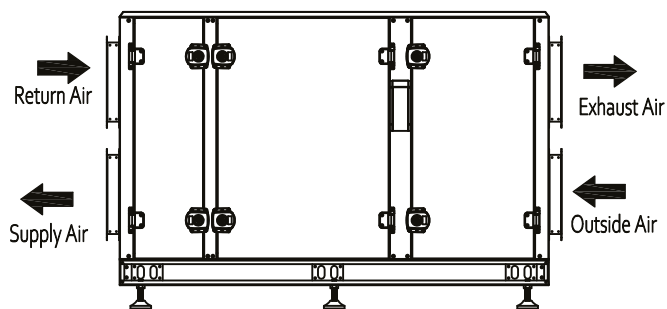


RIGHT

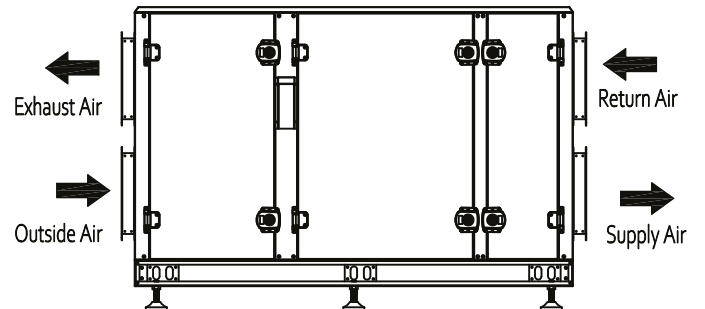


RTER-2

LEFT

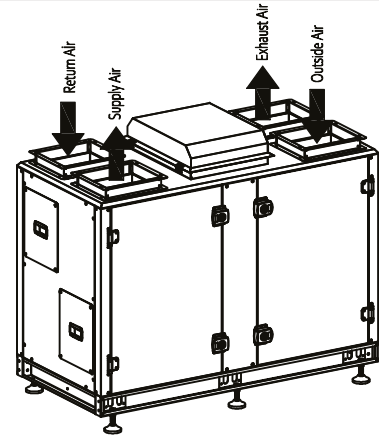
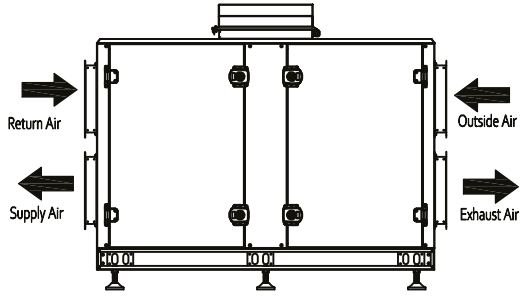


RIGHT

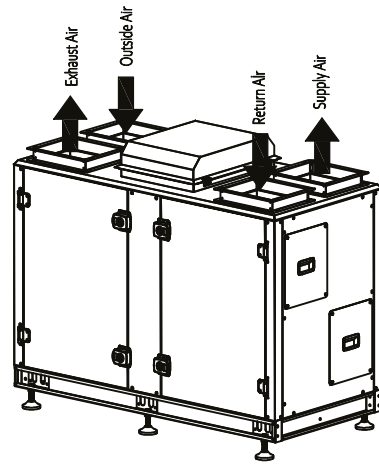
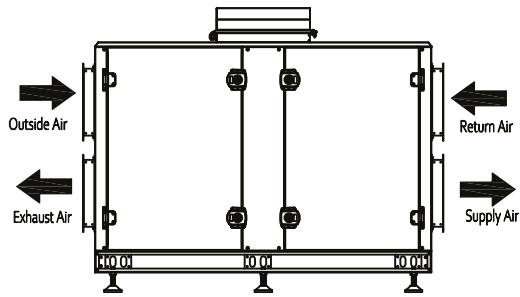


RTER-3 [1000/1800/2500/3500/5000/7000]

LEFT

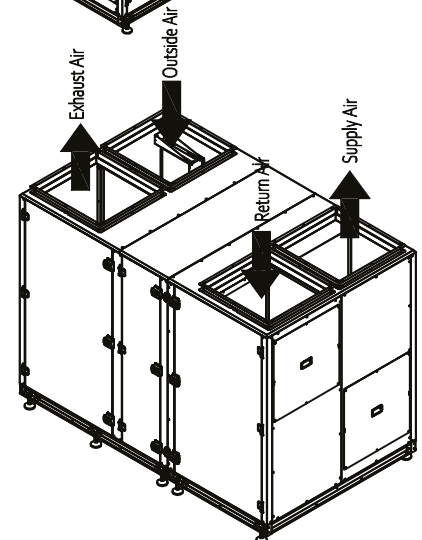
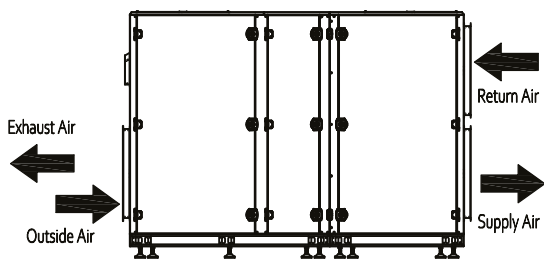
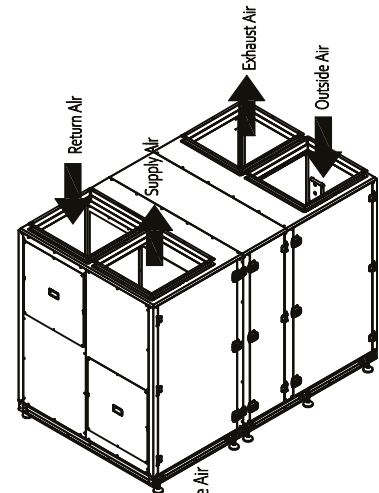
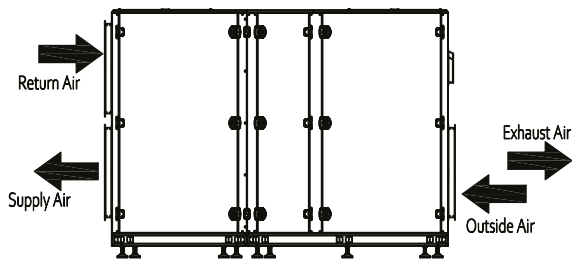


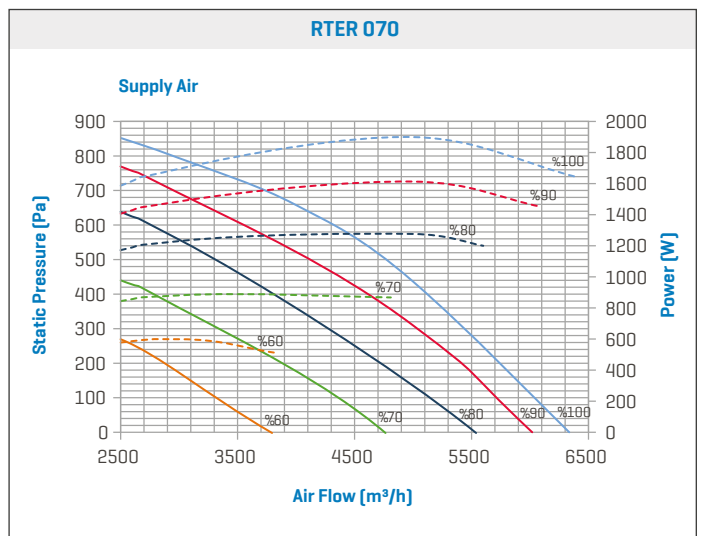
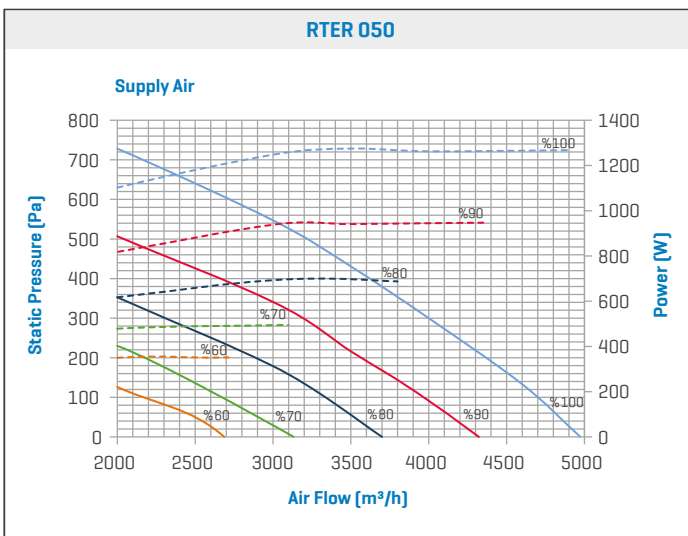
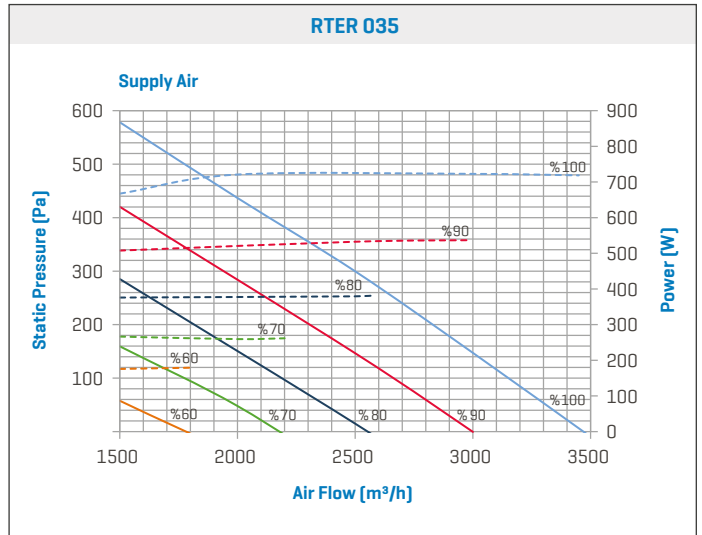
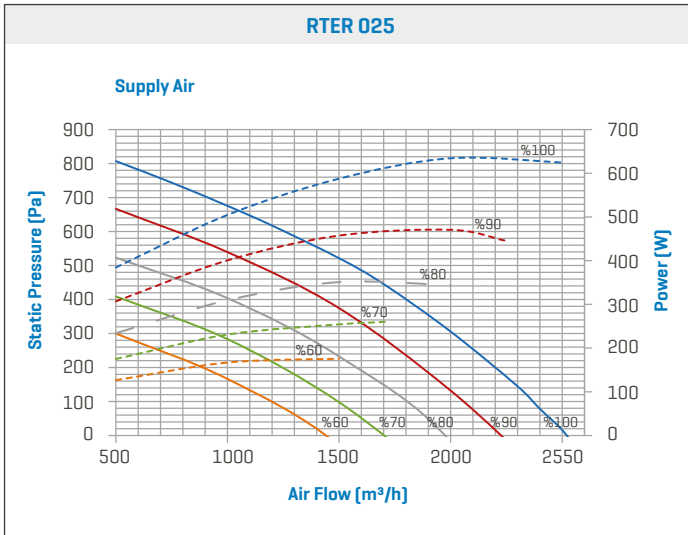
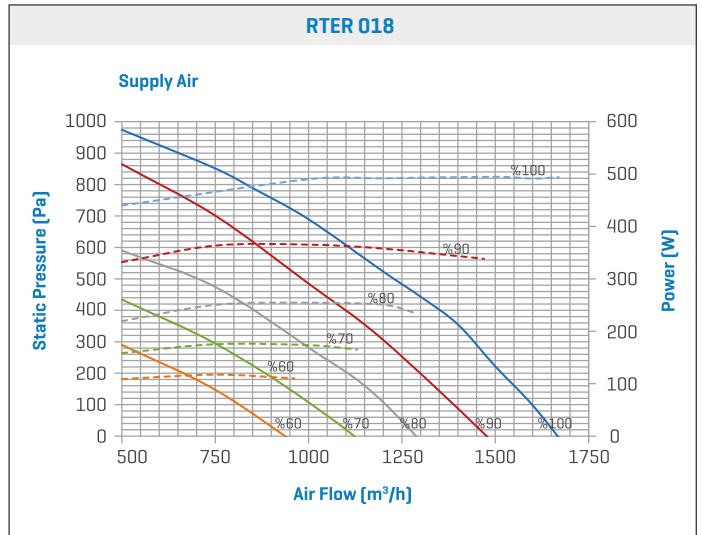
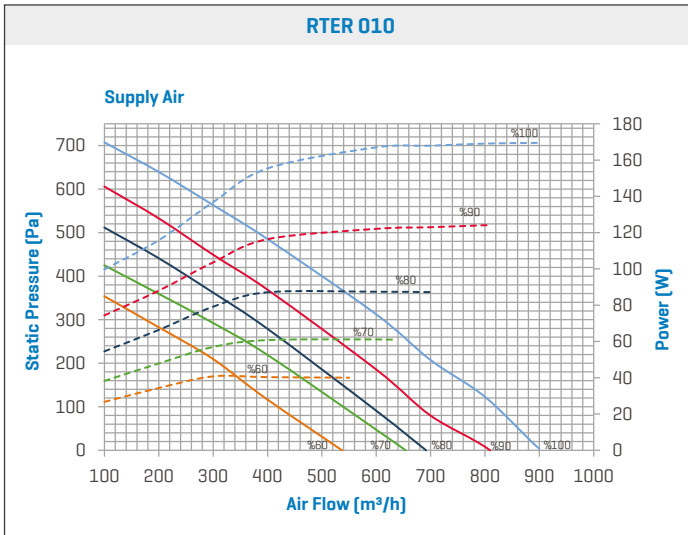
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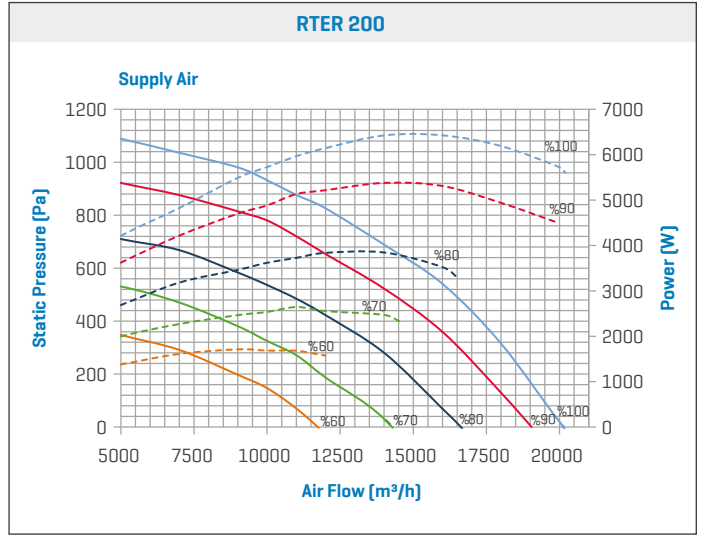
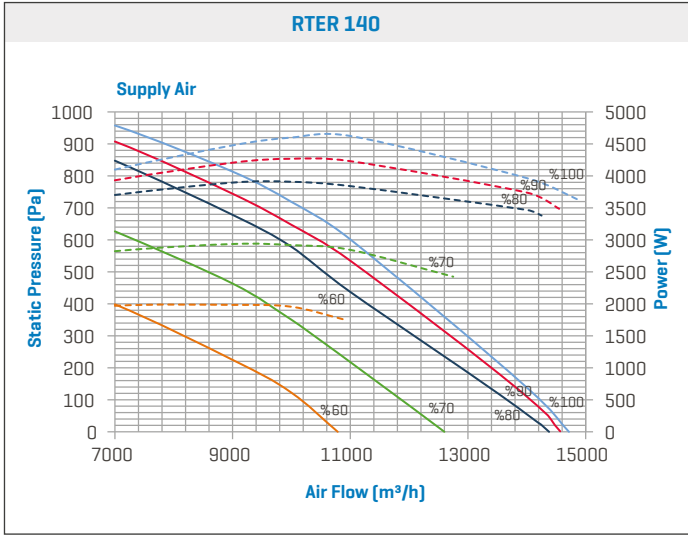
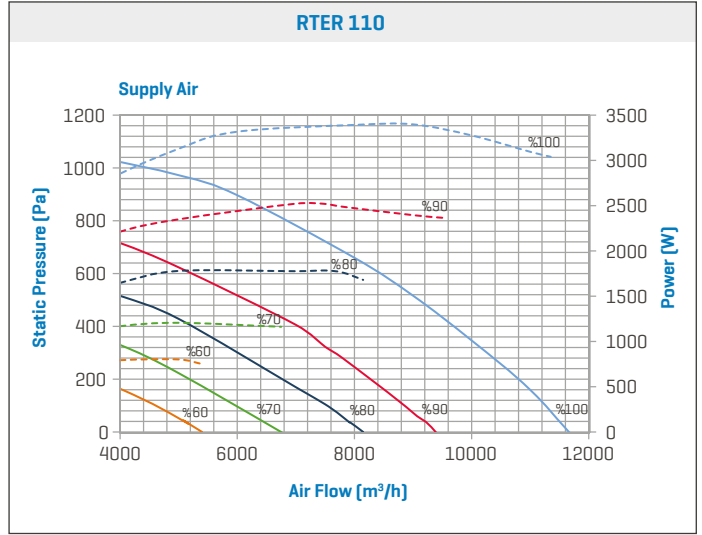
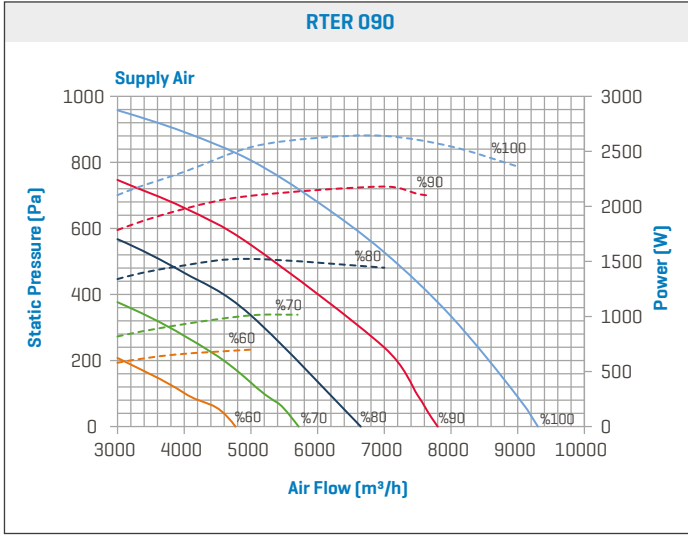


RTER-3 [9000/11000/14000/20000]

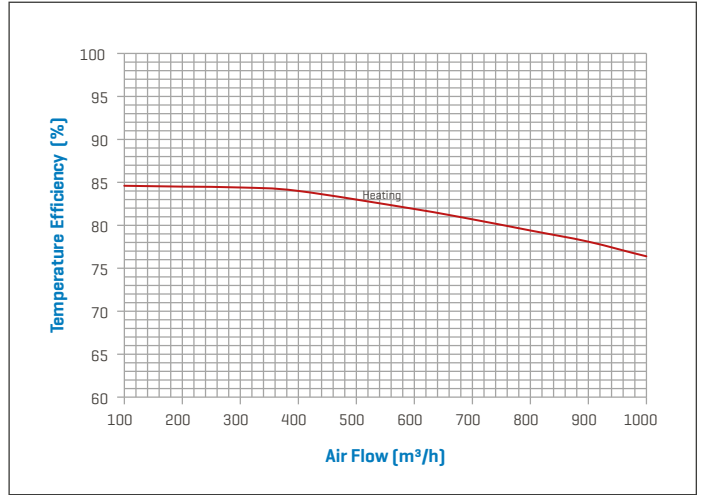
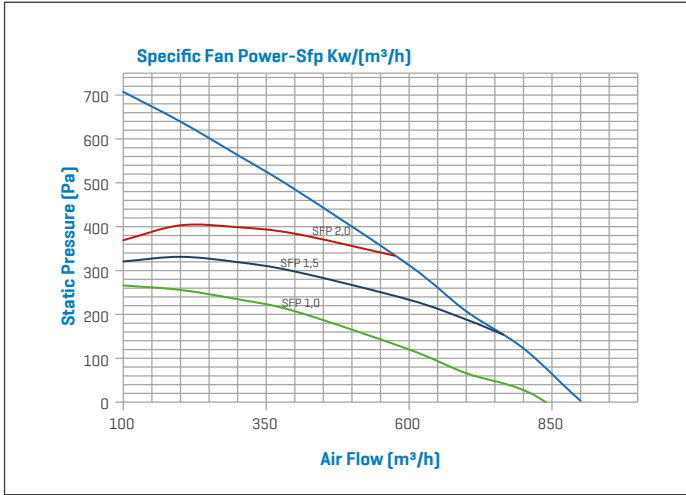
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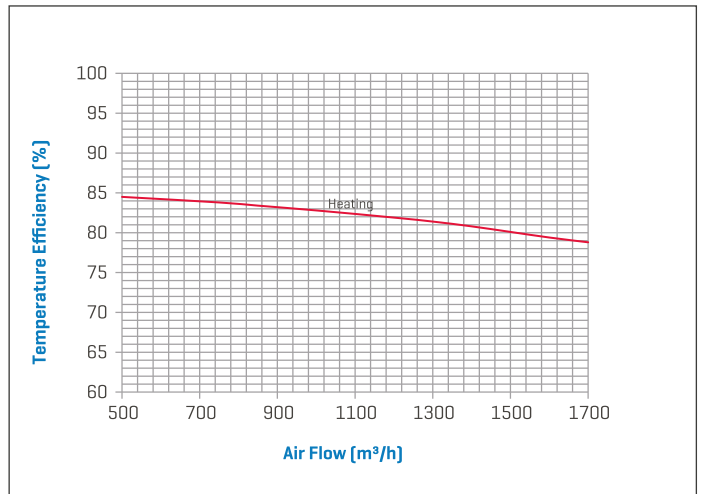
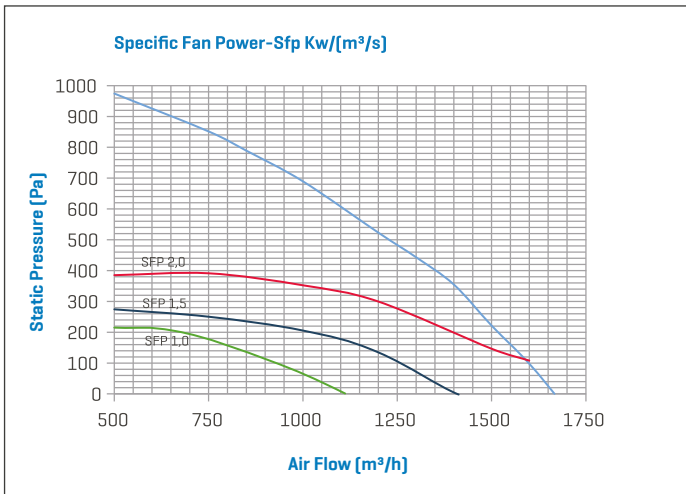




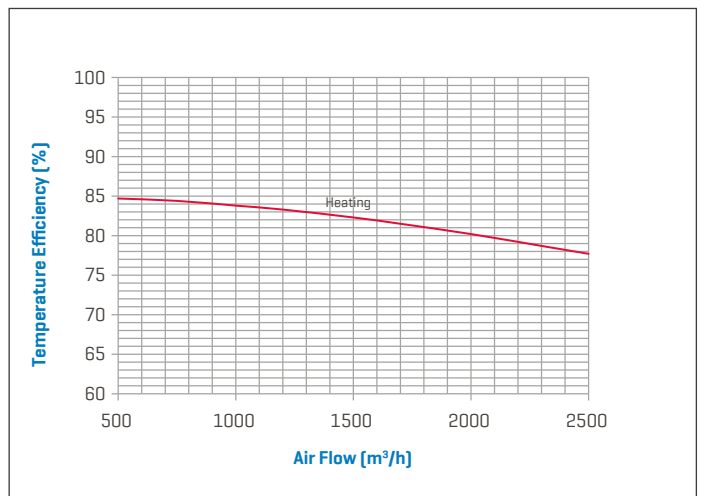
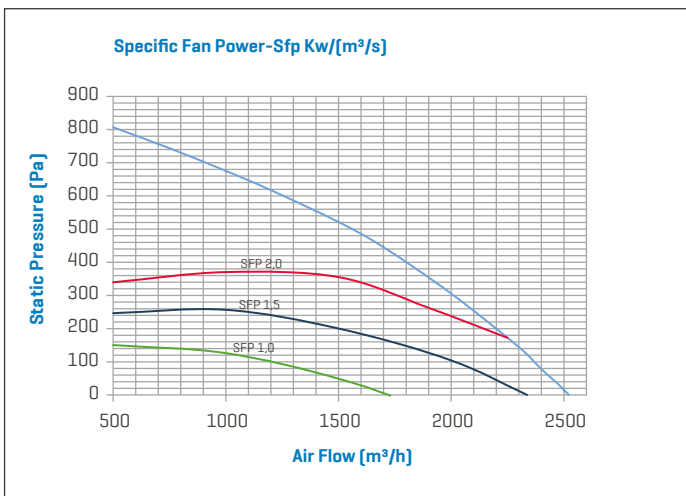
RTER 010



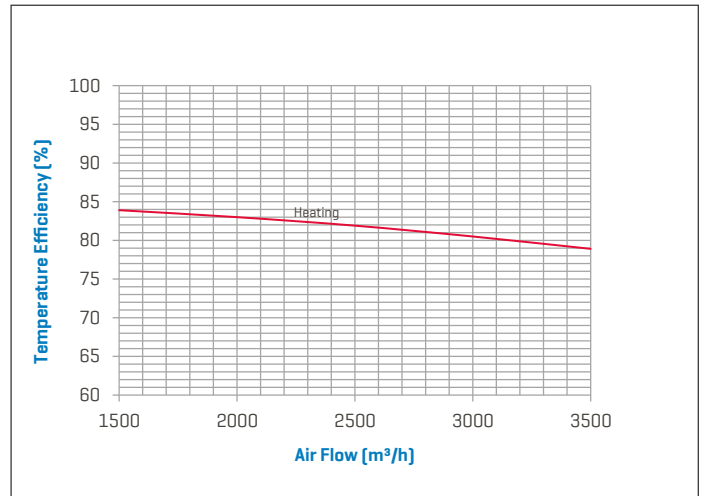
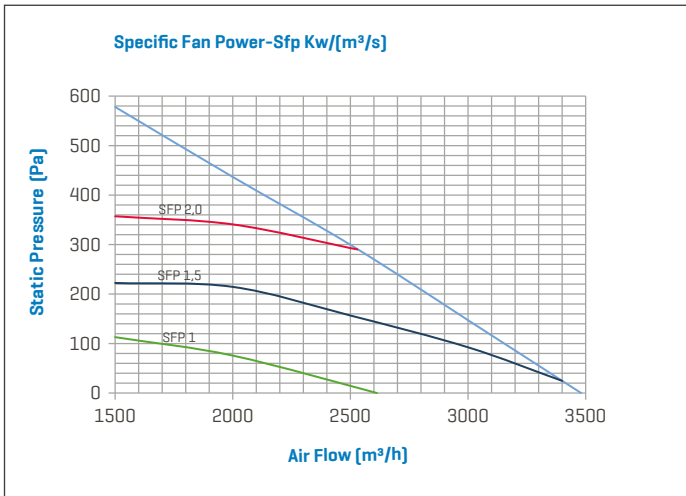
RTER 018



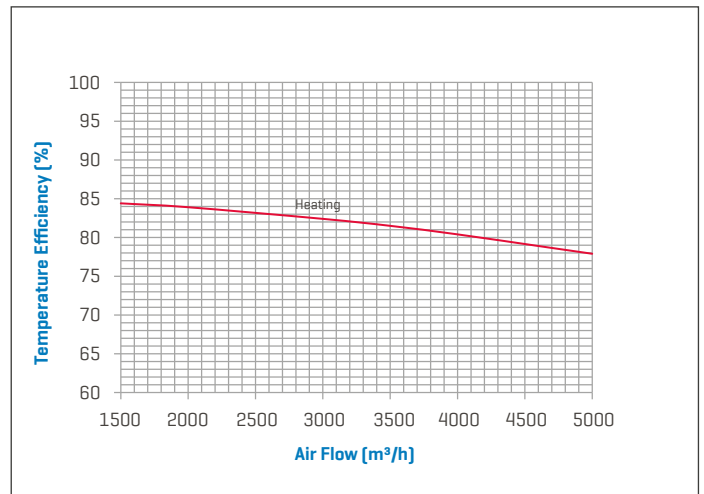
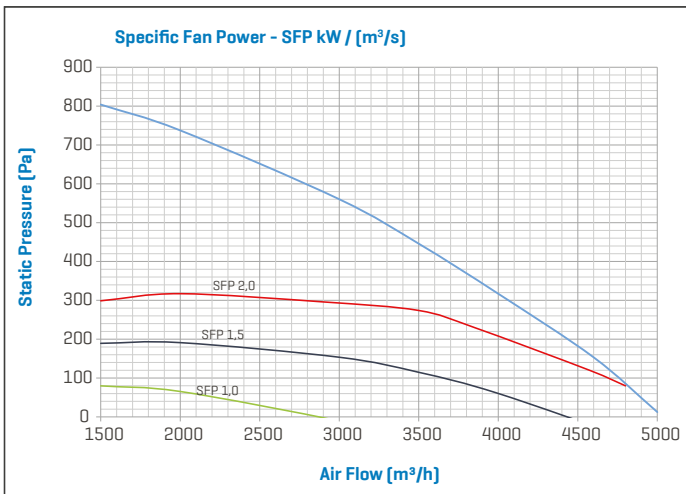
RTER 025



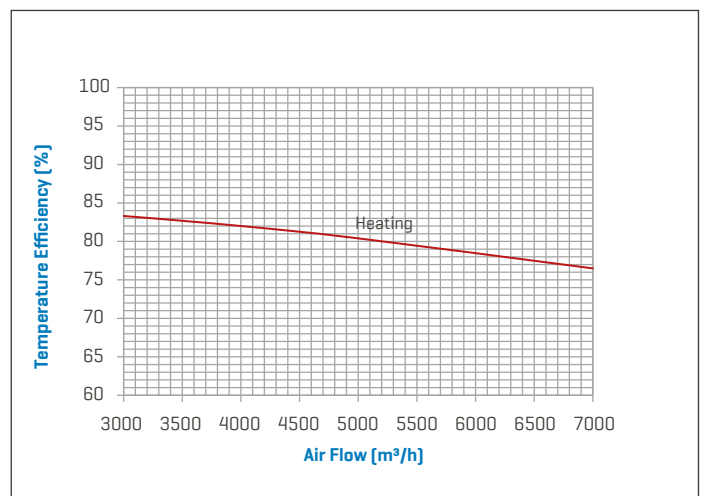
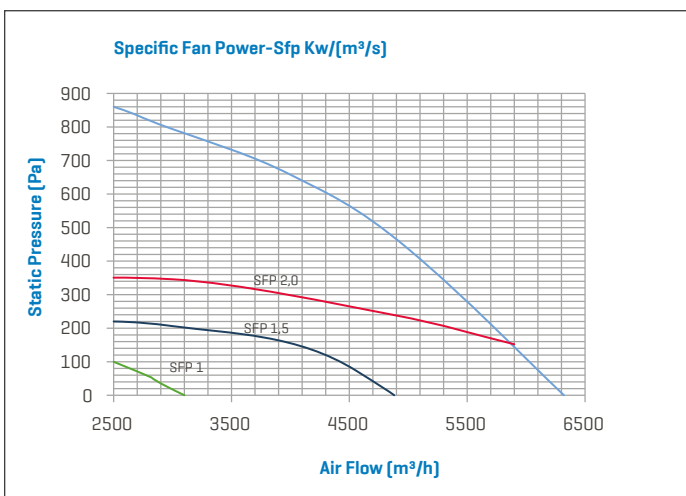
RTER 035



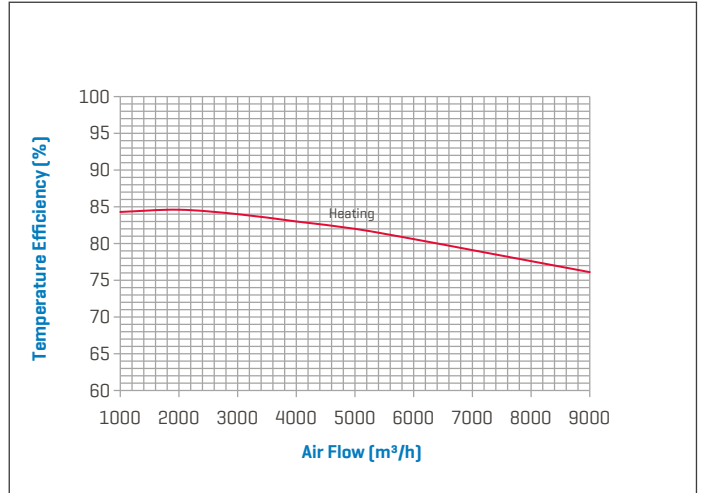
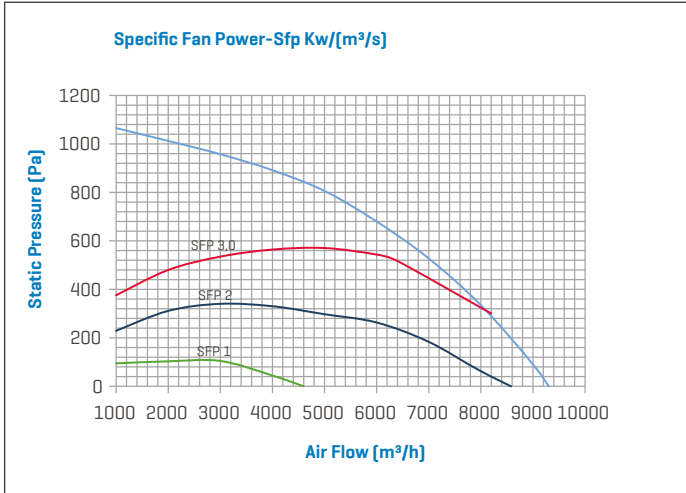
RTER 050



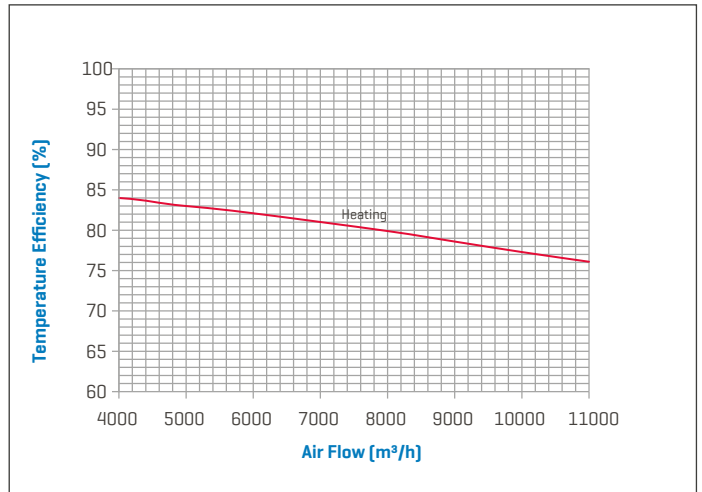
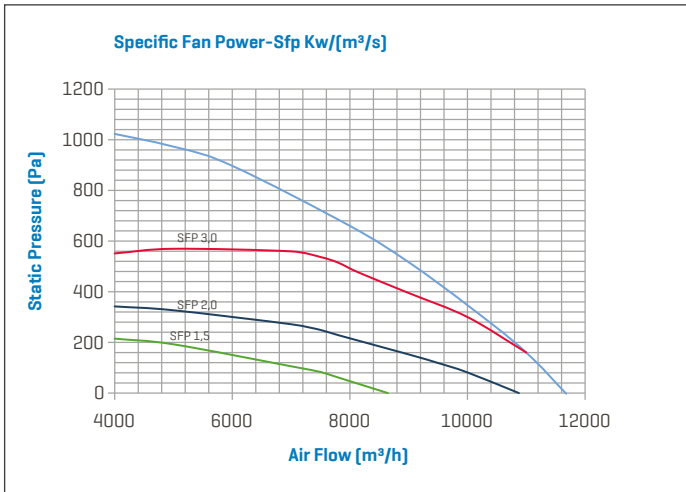
RTER 070



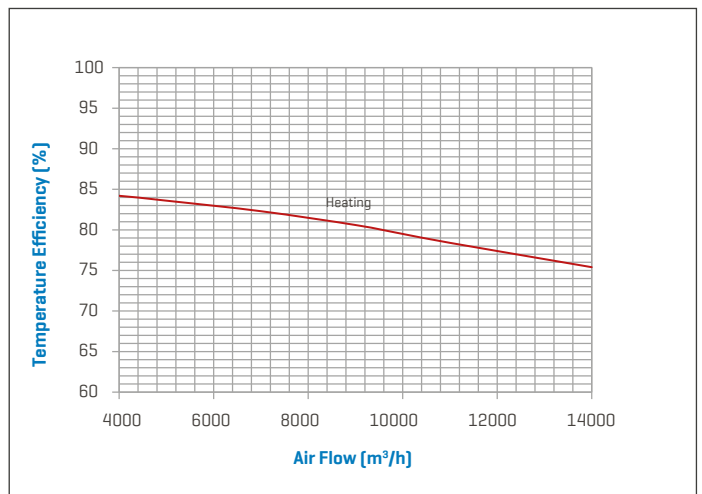
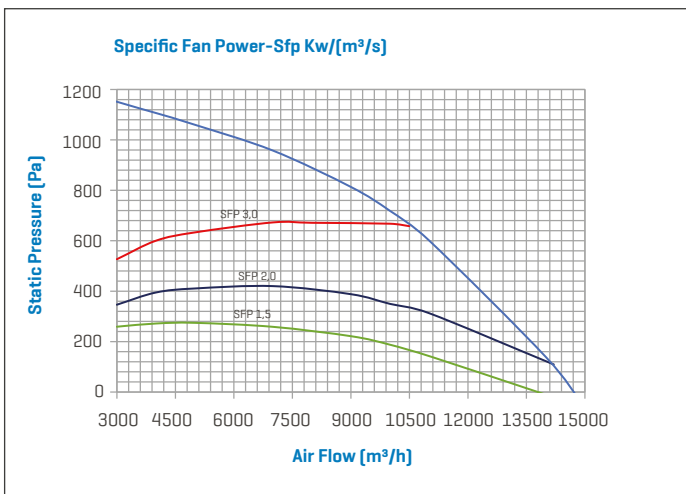
RTER 090



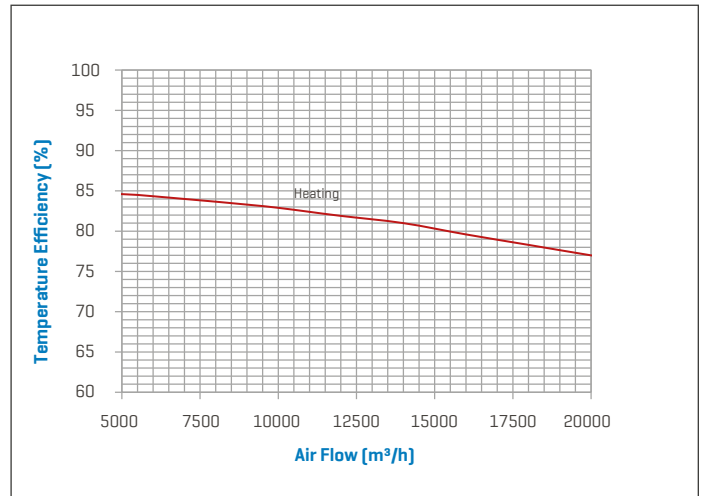
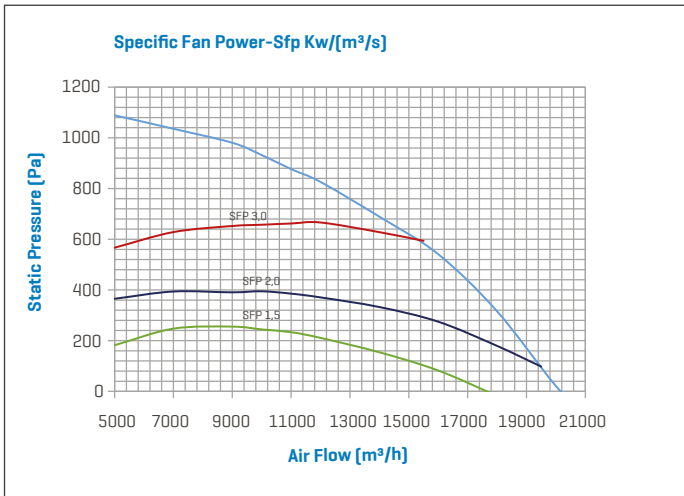
RTER 110



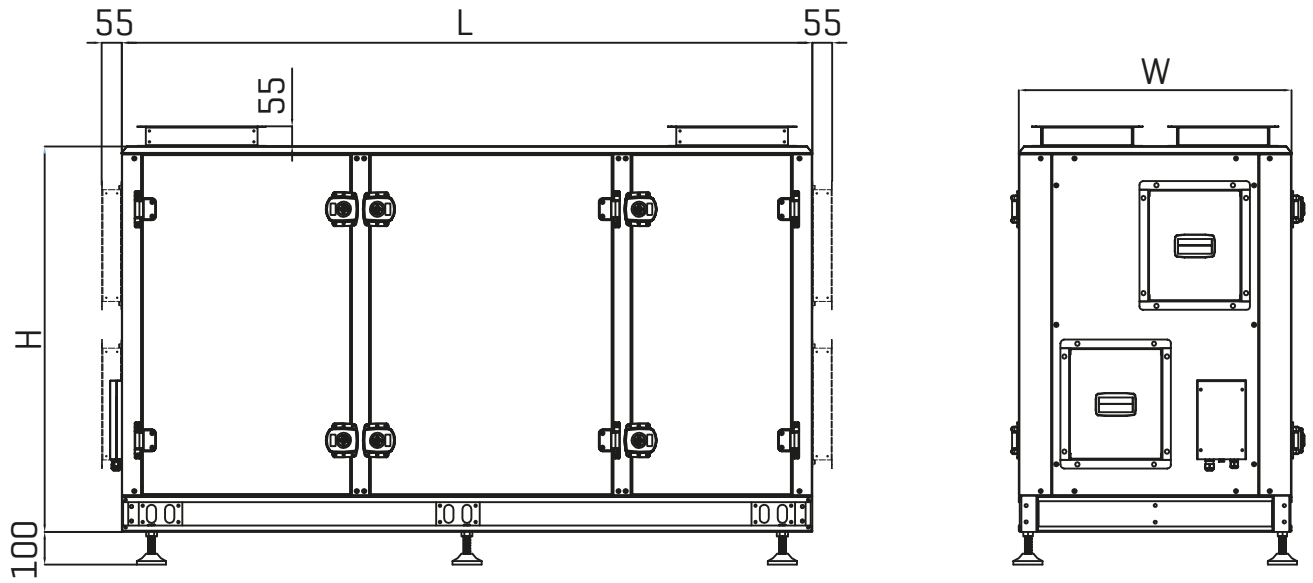
RTER 140



RTER 200



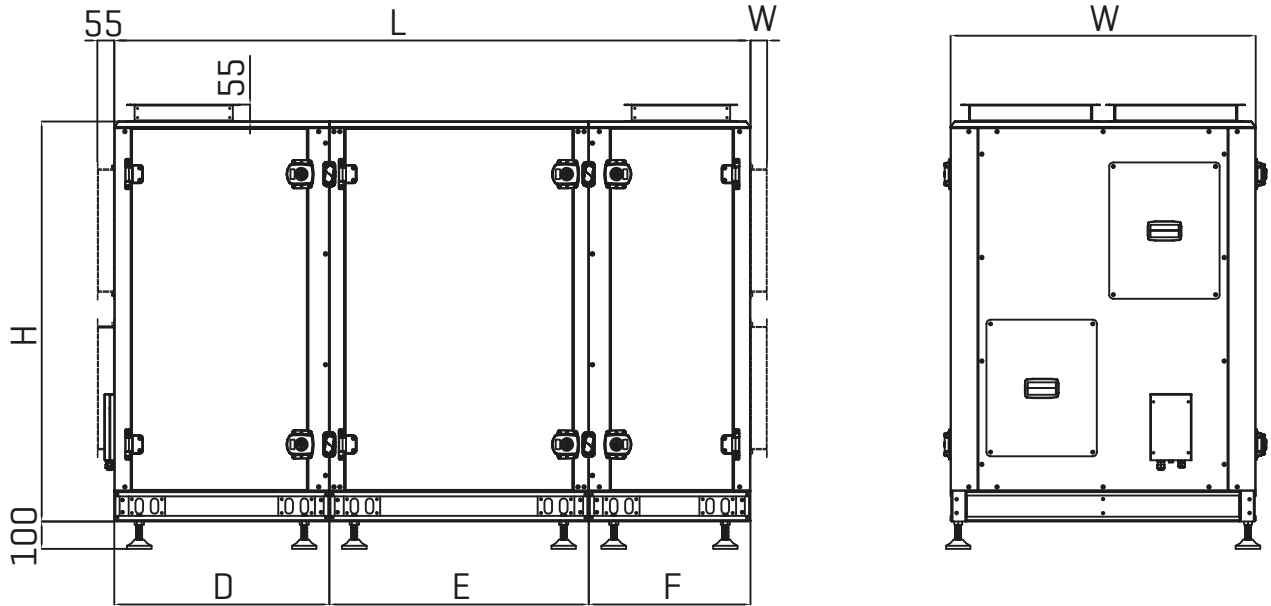
RTER-1 DIMENSIONS



CAPACITY	L	W	H	A	B	C	KG
RTER010-1	1900	700	1060	300	225	800	200
RTER018-1	1900	750	1060	300	250	850	206
RTER025-1	1980	850	1160	300	310	950	253

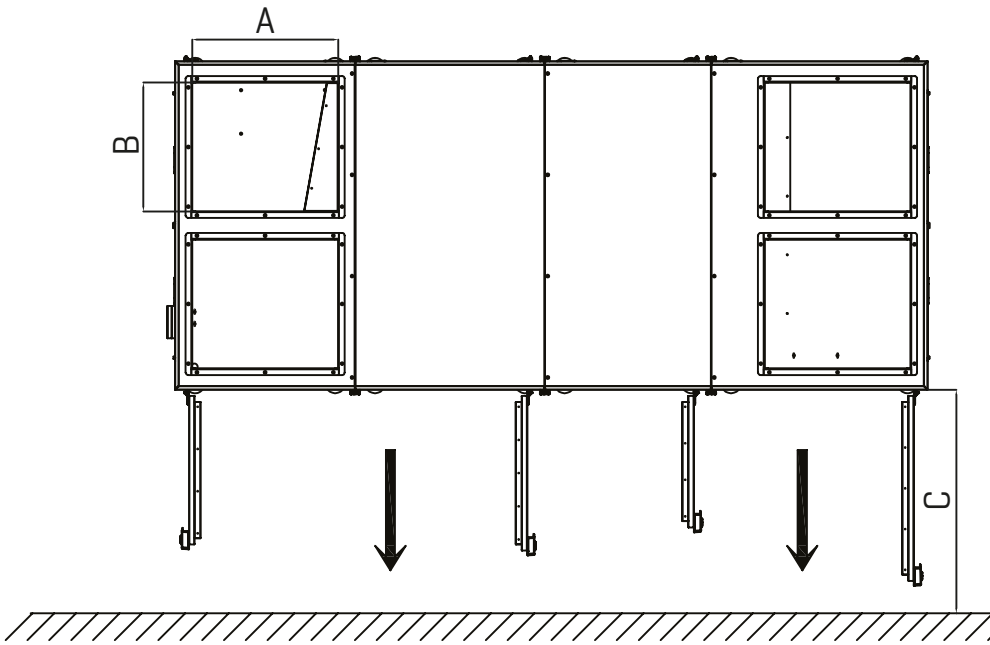
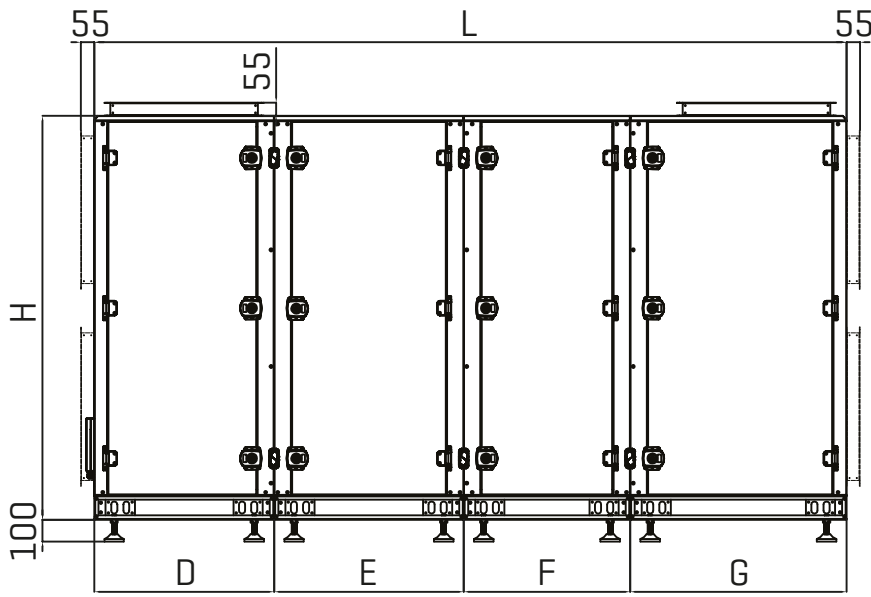
*All units are in mm.

RTER-1 DIMENSIONS



CAPACITY	L	W	H	A	B	C	D	E	F	KG
RTER035-1	2085	1000	1310	315	400	1100	705	850	530	416
RTER050-1	2340	1120	1430	400	400	1220	790	850	700	610

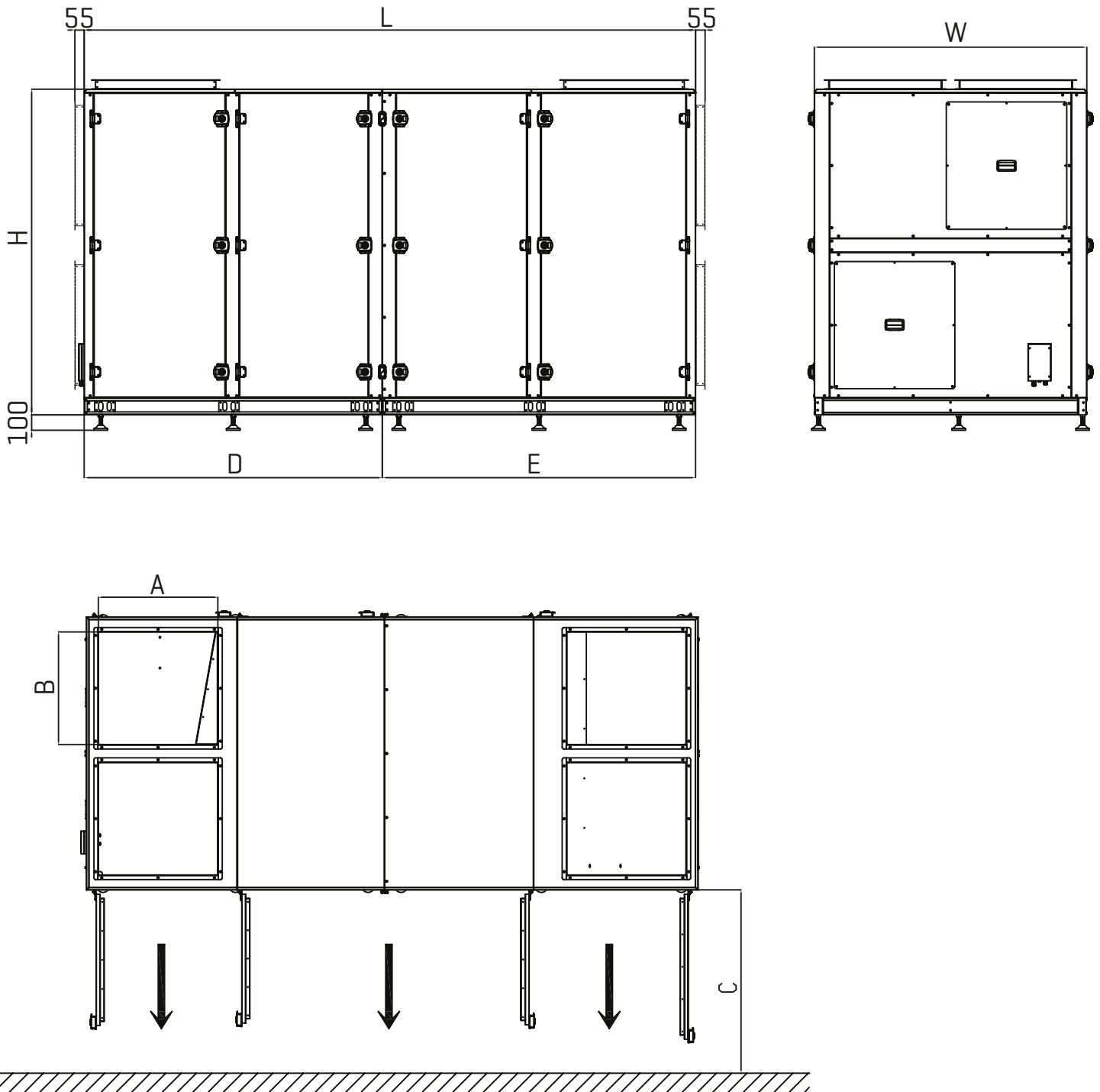
*All units are in mm.



CAPACITY	L	W	H	A	B	C	D	E	F	G	KG
RTER070-1	2895	1230	1540	500	460	1330	640	780	685	790	832
RTER098-1	3095	1350	1660	600	530	1450	740	780	685	890	976
RTER110-1	3095	1475	1785	600	595	1575	740	780	685	890	1040

*All units are in mm.

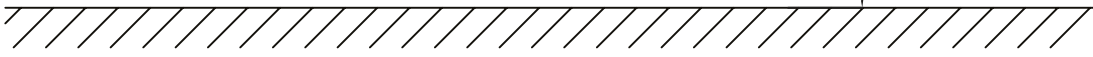
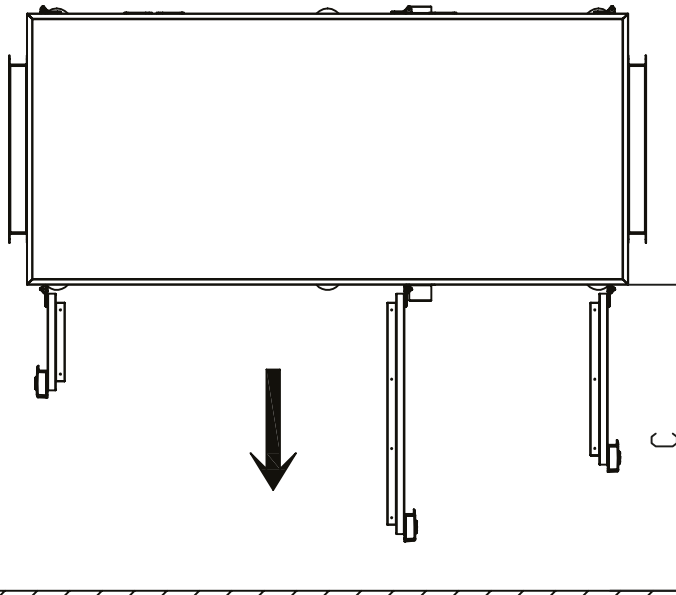
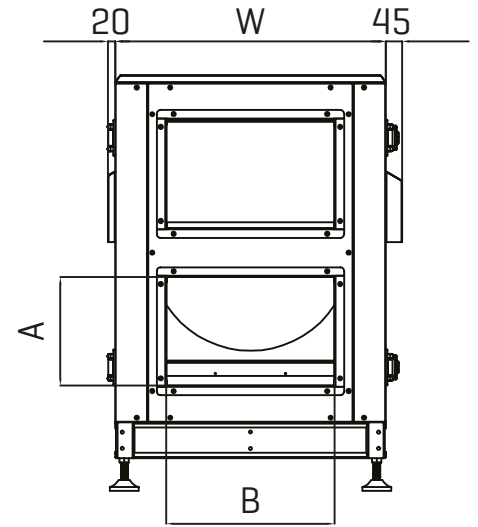
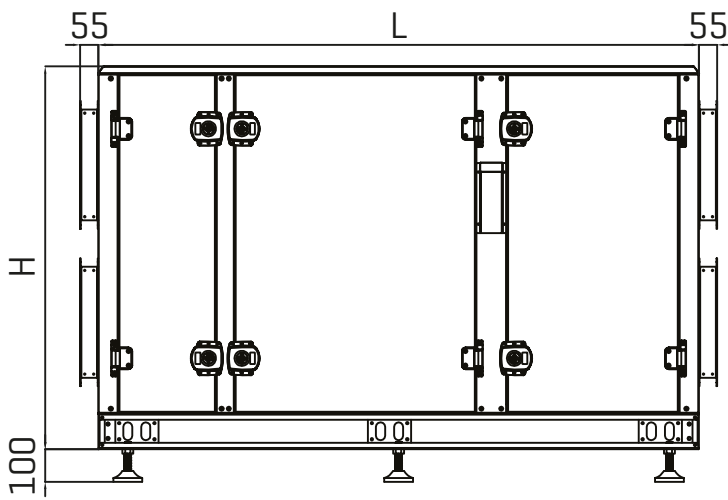
RTER-1 DIMENSIONS



CAPACITY	L	W	H	A	B	C	D	E	F	KG
RTER140-1	3590	1600	1910	700	660	1700	1750	1840	0	1445
RTER200-1	3530	2025	2250	900	800	2125	1300	1200	1030	2160

*All units are in mm.

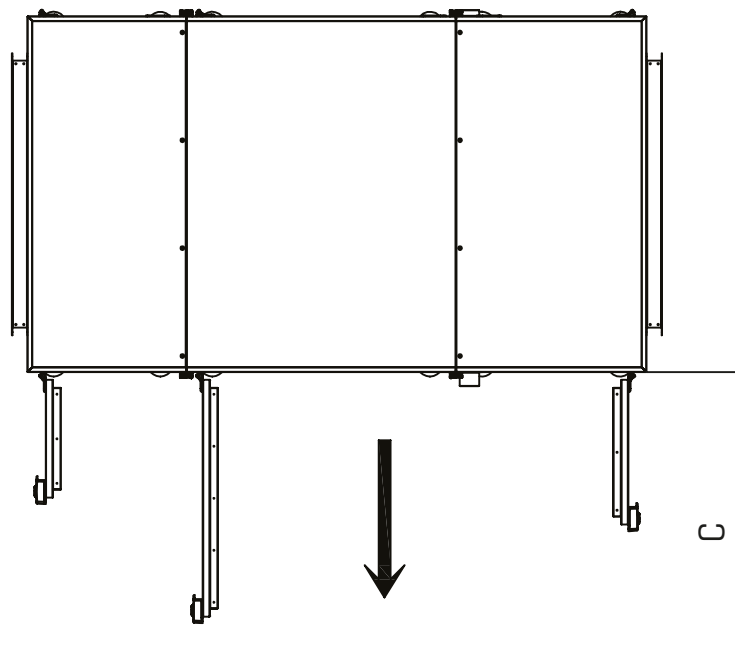
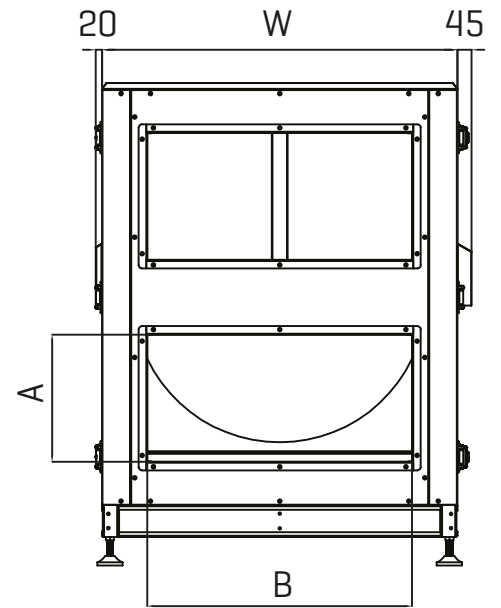
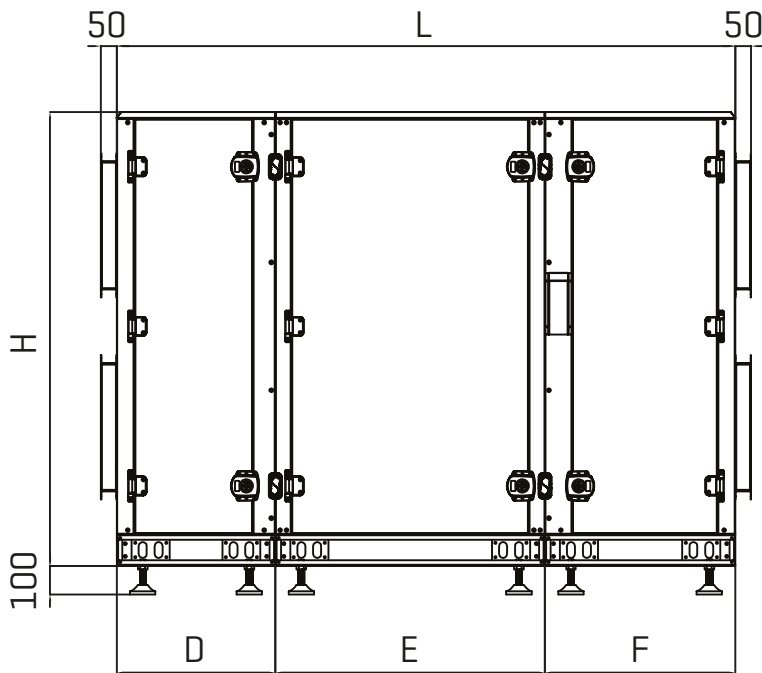
RTER-2 DIMENSIONS



CAPACITY	L	W	H	A	B	C	D	E	KG
RTER010-2	1665	700	961	415	300	865	0	0	185
RTER018-2	1665	750	961	465	300	915	0	0	195
RTER025-2	1745	850	1061	565	300	1015	0	0	210
RTER035-2	1720	1000	1211	715	400	1165	825	895	396

*All units are in mm.

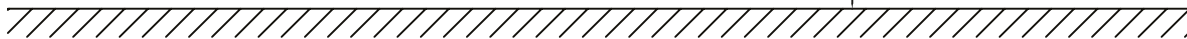
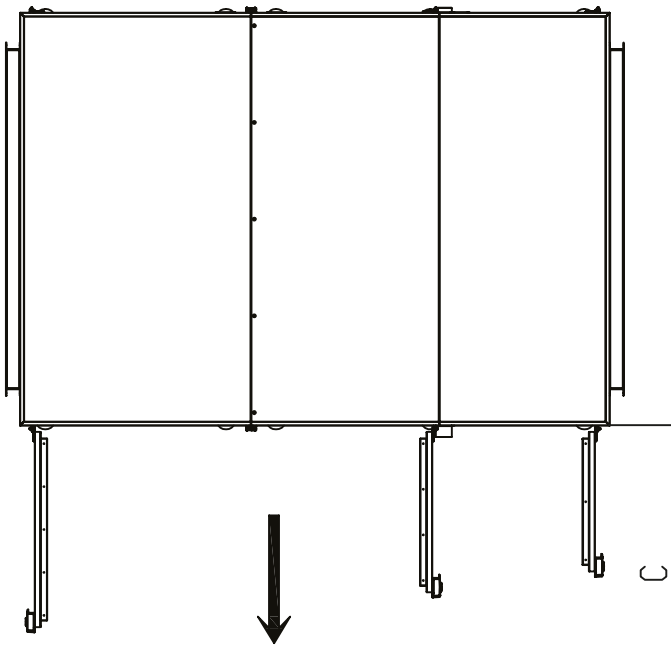
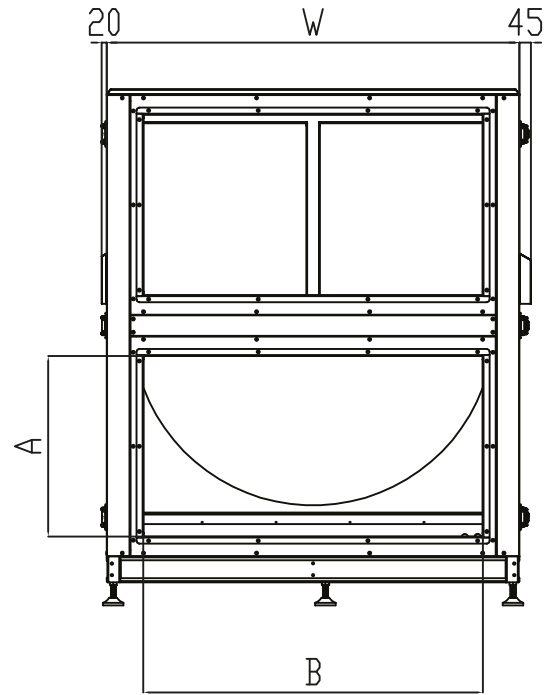
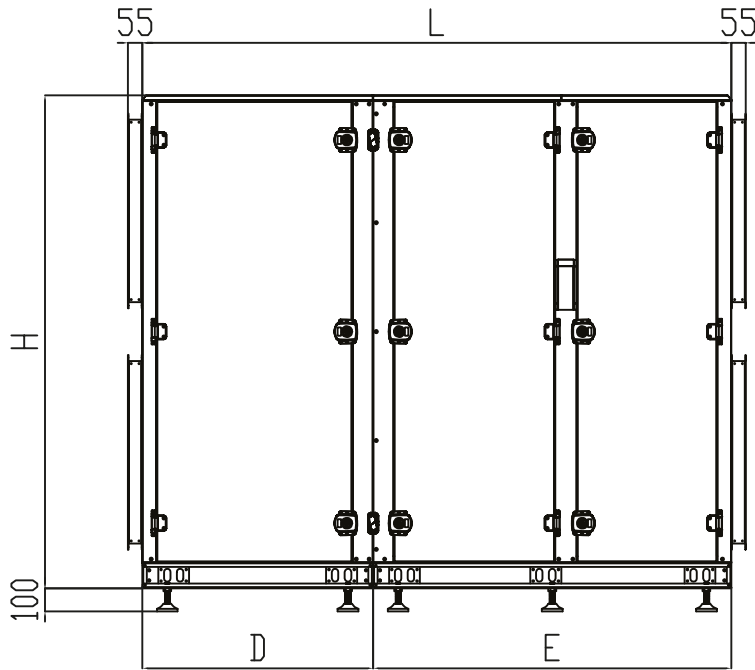
RTER-2 DIMENSIONS



CAPACITY	L	W	H	A	B	C	D	E	F	KG
RTER050-2	1950	1120	1430	835	400	1285	500	850	600	600
RTER070-2	2050	1230	1441	945	500	1330	765	685	600	825
RTER090-2	2050	1350	1661	1060	600	1450	765	685	600	920
RTER110-2	2050	1475	1786	1190	600	1575	765	685	600	970

*All units are in mm.

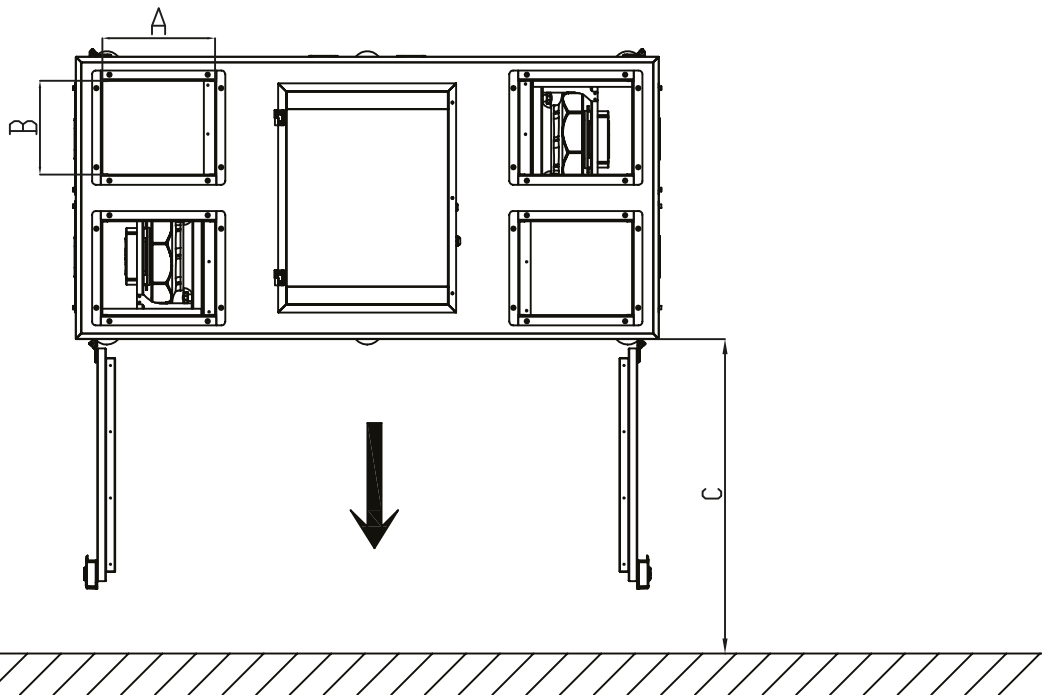
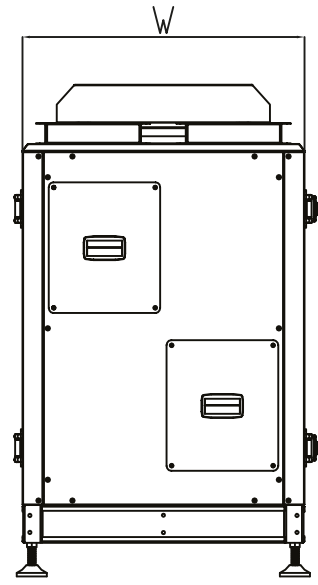
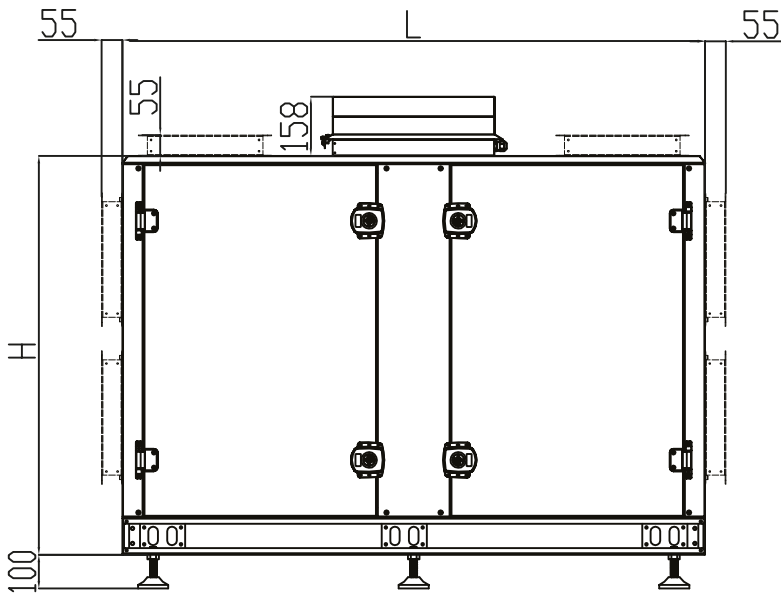
RTER-2 DIMENSIONS



CAPACITY	L	W	H	A	B	C	D	E	KG
RTER140-2	2285	1600	1911	1315	700	1765	895	1390	1250
RTER200-2	2365	2025	2250	1725	900	2190	975	1390	2000

*All units are in mm.

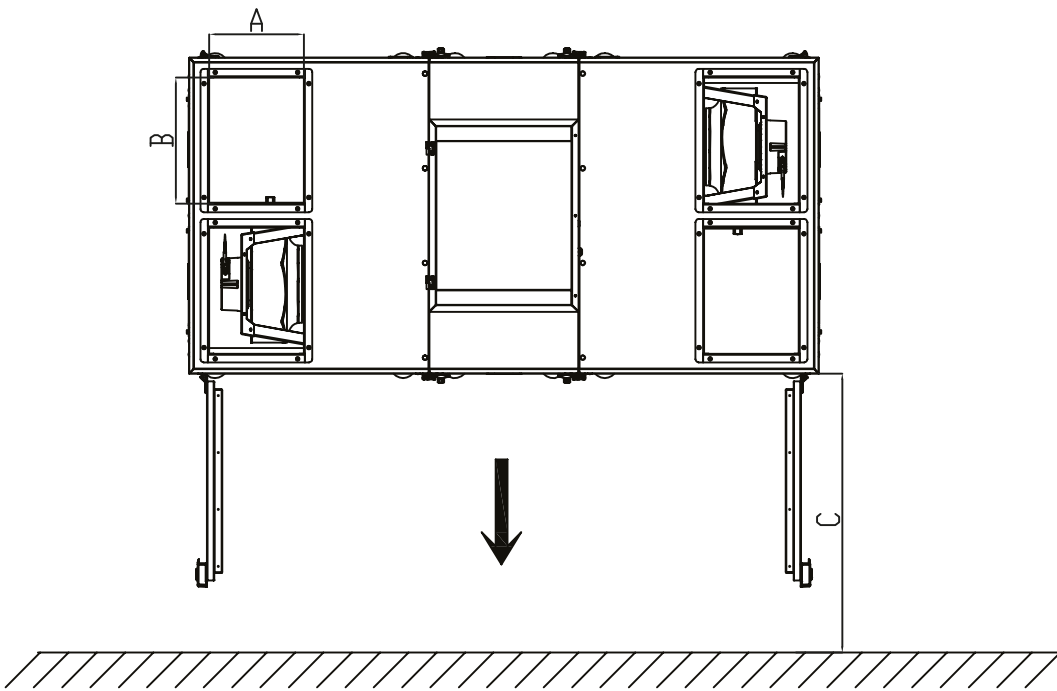
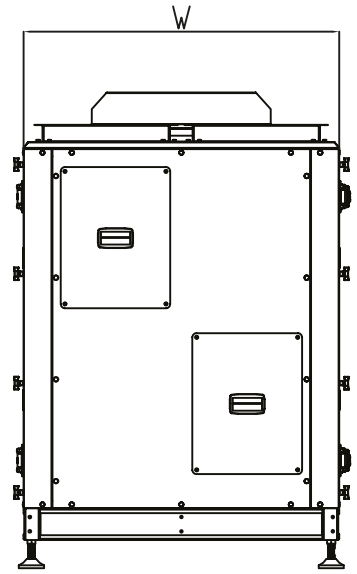
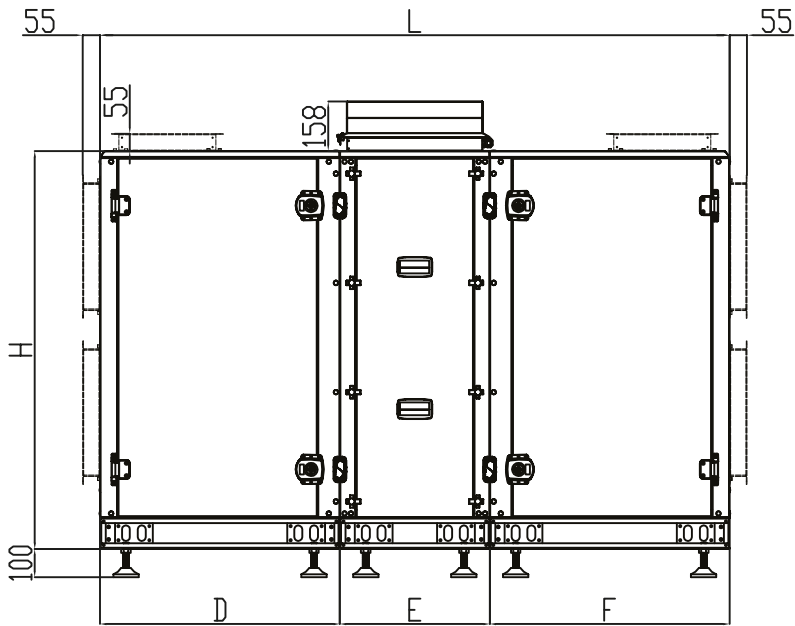
RTER-3 DIMENSIONS



CAPACITY	L	W	H	A	B	C	KG
RTER-010-3	1450	700	1010	200	225	800	190
RTER-018-3	1550	750	1060	300	250	850	196
RTER-025-3	1650	850	1160	300	310	950	243

*All units are in mm.

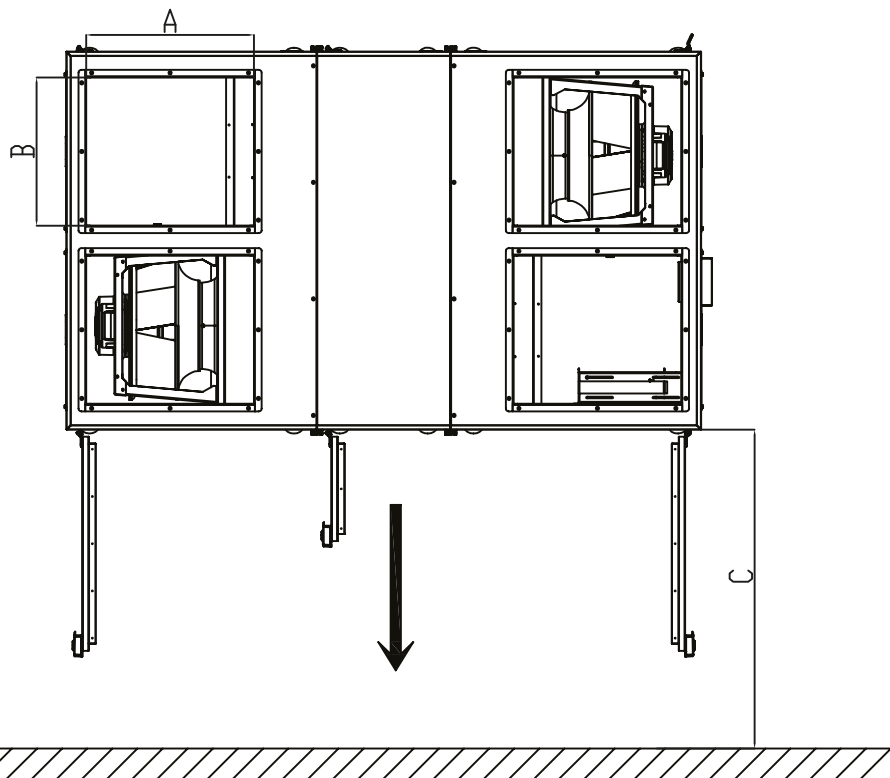
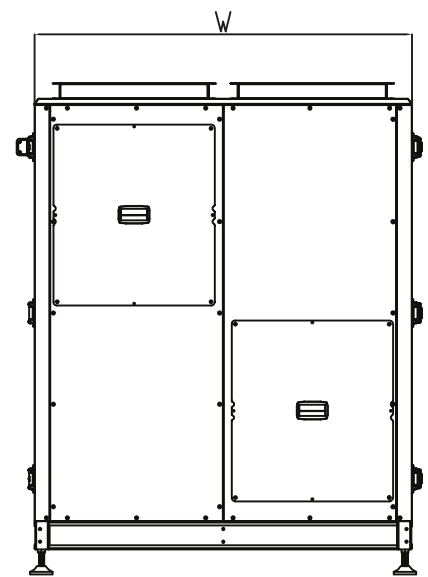
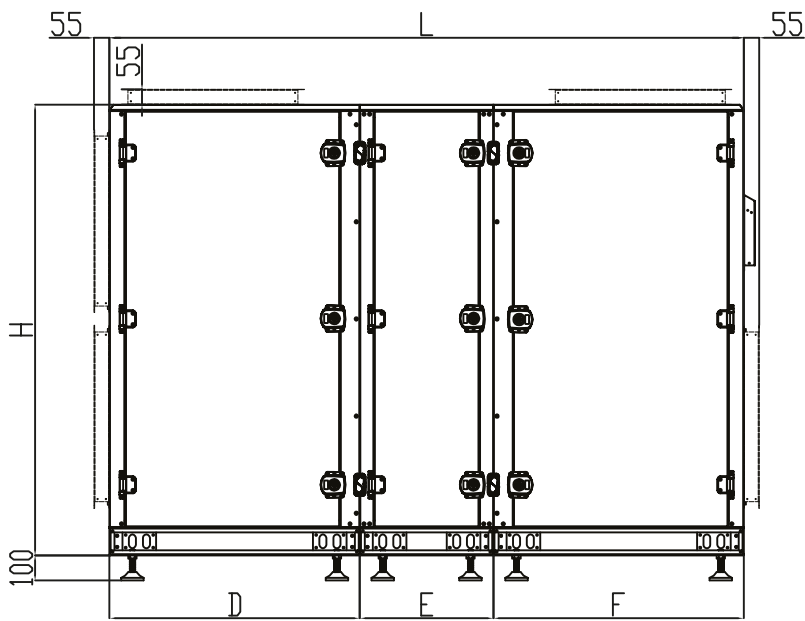
RTER-3 DIMENSIONS



CAPACITY	L	W	H	A	B	C	D	E	F	KG
RTER035-3	1950	1000	1260	300	400	1100	760	475	760	406
RTER050-3	2195	1120	1380	400	400	1220	810	475	810	600
RTER070-3	2265	1230	1490	460	500	1330	895	475	895	823

*All units are in mm.

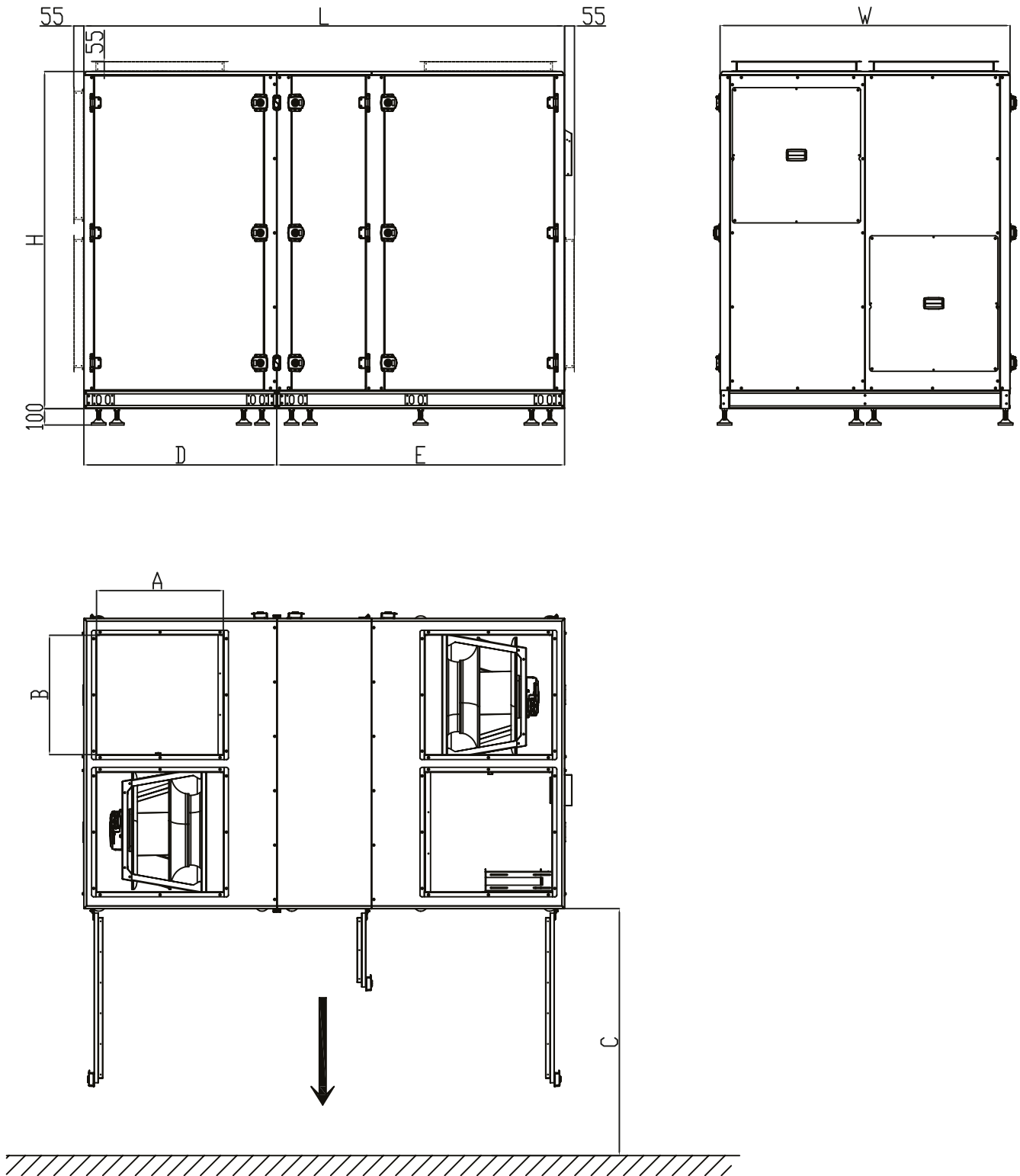
RTER-3 DIMENSIONS



CAPACITY	L	W	H	A	B	C	D	E	F	KG
RTER090-3	2268	1350	1610	600	530	1450	895	478	895	966
RTER110-3	2268	1475	1735	600	595	1575	895	478	895	1030

*All units are in mm.

RTER-3 DIMENSIONS



CAPACITY	L	W	H	A	B	C	D	E	KG
RTER140-3	2652	1600	1860	700	660	1700	1065	1587	1435
RTER200-3	2973	2025	2285	800	850	2125	1273	1700	2150

*All units are in mm.

Operation	Description	Standart
On / Off	Control panel or external start stop function is available.	Standard
Display	Digital control panel is available.	Standard
Rotor Control	On/Off Control	Standard
Fan Speed Control	Constant air flow or constant pressure.	Optional
Fan Speed Control	Airflow control based on the air quality sensor is available.	Optional
Frost Protection Function	When outdoor temperature is low, this function will become active by receiving information from humidity and temperature sensors.	Standard
ModBus	It controls all functions of unit via PC or central control system board.	Standard
Filter Function	There are 2 alternatives to control filters: 1: It records run time of the unit and when set time expires, control panel gives an alert for filter change. 2: Filter change time can be controlled with pressure switch mechanically. By this way, control panel gives an alert when filter needs to be changed.	Standard
Safety	It automatically stops operating in case of interfering to the unit while it is working.	Standard
Fire Alarm Function	It will be active in case of fire.	Standard
Heating Coil	Heating coil valves on the device which include optional heating coil, are controlled by proportional valve motors with PID logic and sensitivity.	Optional
Frost Control	Optional heating coils also include frost thermostat to prevent the coil to freeze.	Optional

ACCESSORIES

Attenuator



	RTER 010	RTER 018	RTER 025	RTER 035	RTER 050	RTER 070	RTER 090	RTER 110	RTER 140	RTER 200
Width (mm)	710	770	820	760	1310	1300	1210	1960	2130	2420
Height (mm)	250	250	300	315	375	490	550	610	700	880
Lenght (mm)	600	600	600	600	600	600	600	600	600	600
De 63 Hz	3	3	2	2	2	2	2	2	2	2
De 125 Hz	6	5	4	3	4	4	2	4	4	4
De 250 Hz	11	9	8	6	8	8	6	8	8	8
De 500 Hz	20	16	15	12	15	15	11	15	15	15
De 1 kHz	24	19	17	14	17	18	13	17	17	18
De 2 kHz	19	16	16	14	16	16	12	16	16	16
De 4 kHz	16	13	12	10	12	12	8	12	12	13
De 8 KHz	13	10	9	7	9	9	7	9	9	10
Press [Pa]	19	19	18	17	18	19	17	19	19	19

	RTER 010	RTER 018	RTER 025	RTER 035	RTER 050	RTER 070	RTER 090	RTER 110	RTER 140	RTER 200
Width (mm)	720	770	820	980	1310	1300	1780	1960	2130	2424
Height (mm)	250	250	300	315	375	490	550	610	700	880
Lenght (mm)	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
De 63 Hz	5	4	4	4	4	4	4	4	4	4
De 125 Hz	10	7	6	7	6	7	7	7	6	7
De 250 Hz	19	15	14	4	14	14	14	14	14	14
De 500 Hz	30	25	23	23	23	23	23	23	23	23
De 1 kHz	34	29	27	27	27	27	27	27	27	27
De 2 kHz	29	26	25	25	25	25	25	25	25	25
De 4 kHz	24	20	19	19	19	20	20	19	19	20
De 8 KHz	20	16	15	15	15	15	15	15	15	15
Press [Pa]	20	20	19	20	19	19	20	20	20	20

DX / Heating / Cooling Coil



- ☞ Coils are Eurovent certified.
- ☞ Coils are made of copper pipes and aluminum fins.
- ☞ The cassette material is galvanized or stainless steel.
- ☞ The coils were tested at a pressure of at least 20 bar. On request, 30 bars can be tested under pressure.
- ☞ The collectors used in the coils are copper pipes.
- ☞ In hot and cold water coils, the water inlet is from the bottom and the water outlet is at the top.
- ☞ Air and water flows are counter-flowing to increase the heat transfer between them.
- ☞ Under the cooling coil, a condensate pan with a double slope is placed and the accumulated water is discharged through the drain pipe. In the case of a Drip Holder, a high-performance drip holder made of PVC material that can withstand up to 90° C is used.

Electrical Heater



Rectangular electric heaters have two thermostats as standard.

The first thermostat is set to 70° C, the air in the electric heater cuts off the electric current when it reaches 70° C, allowing the device to restart automatically when the temperature drops.

The second thermostat used for safety purposes is activated at 110° C and cuts off the electric current.

The thermostat must be reset manually from the red button in order for the appliance to operate again.

		ΔT:5	ΔT:10	ΔT:15
	AIR FLOW [m³/h]	kW	kW	kW
RTER 10	1000	2	4	5,5
RTER 18	1500	3	6	8
RTER 25	2200	4	8	12
RTER 35	2800	5	10	15
RTER 50	3900	7	14	21
RTER 70	5200	10	19	28
RTER 90	5900	11	21	32
RTER 110	7800	14	28	42
RTER 140	9500	17	34	51
RTER 200	15400	28	56	83



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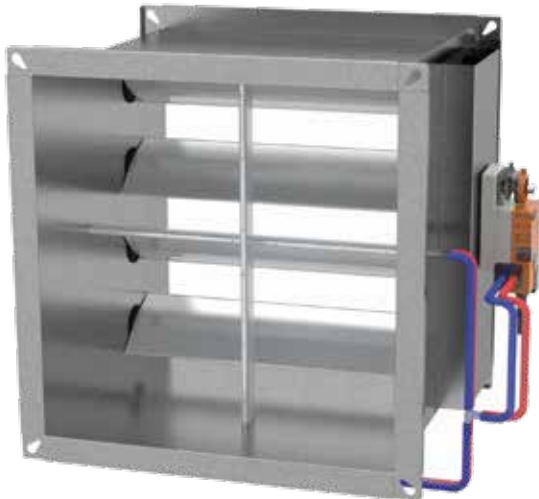
Barbaros Mah. Ciğdem Sk. No: 1 Ağaoğlu My Office
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 **DOĞU**
İKLİMLENDİRME | HVAC SYSTEMS





ACA
Rectangular Variable Air Volume Device

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 4 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 2 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 4 sales offices located in İstanbul, Ankara, Antalya and Adana 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.

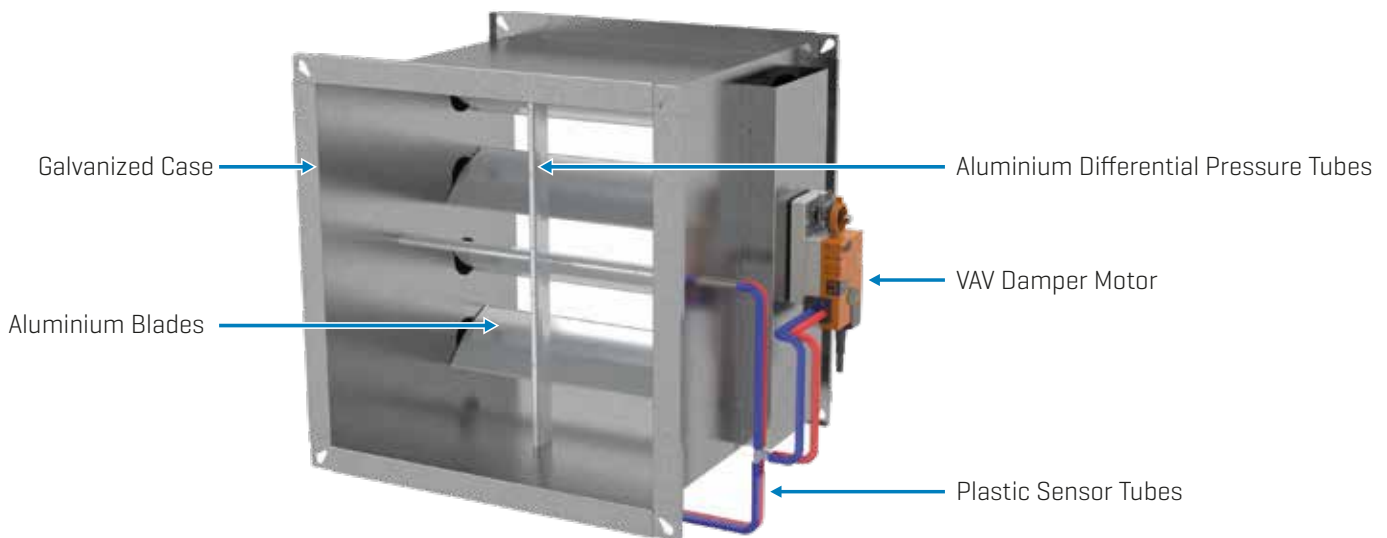
Thanks to our "Customer Satisfaction", "Zero-Defect Policy" motto and reinforced by complete certified products, more than 250 employees. DOGU HVAC R&D center developed exclusive products, such as Double Skin Make-Up Kitchen Hood, Recirculated Laminar Airflow Unit, Single Piece Square Ceiling Diffuser 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 TSEK, CE and GOST-R quality certifications.



- ☞ ACA Prismatic Variable Air Volume Unit, operating room, clean room, special processes etc. It is used in prismatic ducts to control air flow in projects with special requirements such as comfort and hygiene. With variable air flow VAV systems, it provides energy savings of up to 50% in the energy consumed by the fan motor.
- ☞ Air flow control is used in ventilation applications, variable air flow systems for each space and duct pressure control applications.
- ☞ Operates at flow rates between 216 - 17000 m³ / h.
- ☞ All VAV units produced are calibrated in the VAV laboratory according to the flow rates specified in the order and their leakage is tested according to DIN EN 1751. In this laboratory, calibration is completed by testing one-to-one field conditions with 7 measuring stations, each with different diameter and nominal flow.
- ☞ Casing leakage is Class B according to DIN EN 1751 standard.
- ☞ ACA has DIN EN 1946/4 and VDI 6022 hygiene standards.
- ☞ ACA has a compact structure. It works efficiently with low pressure loss thanks to its blades working opposite to each other.

MATERIAL

- ☞ The casing is manufactured from galvanized steel sheet as standard. AISI 304 quality stainless case option is available.
- ☞ Blades and differential pressure tubes are made of aluminum profile.
- ☞ Belimo damper motor is fixed on the case.



ACCESSORIES

- ⚙️ **Acoustic Insulation:** In order to fulfill the acoustic comfort conditions in the selected product, it is insulated with an optional 19 mm thick foamed rubber. Rubber insulation is covered with galvanized sheet.
- ⚙️ **ACQ - Electric Heater:** When an additional heater power is needed for the supply air, an Electric Heater can be added to the output of the ACA.
- ⚙️ **GSX - Prismatic Silencer:** Duct type silencer option is available to meet comfort conditions.



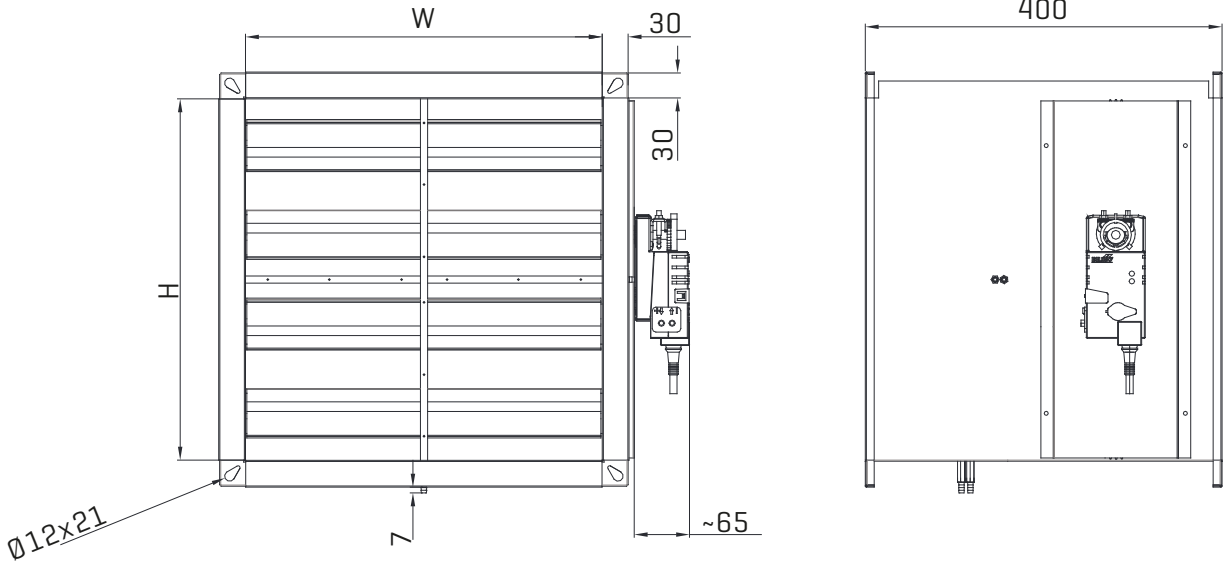
ACE - Electric Heater



GSX - Duct Type Silencer

STANDARD DIMENSIONS

NON-INSULATED



INSULATED

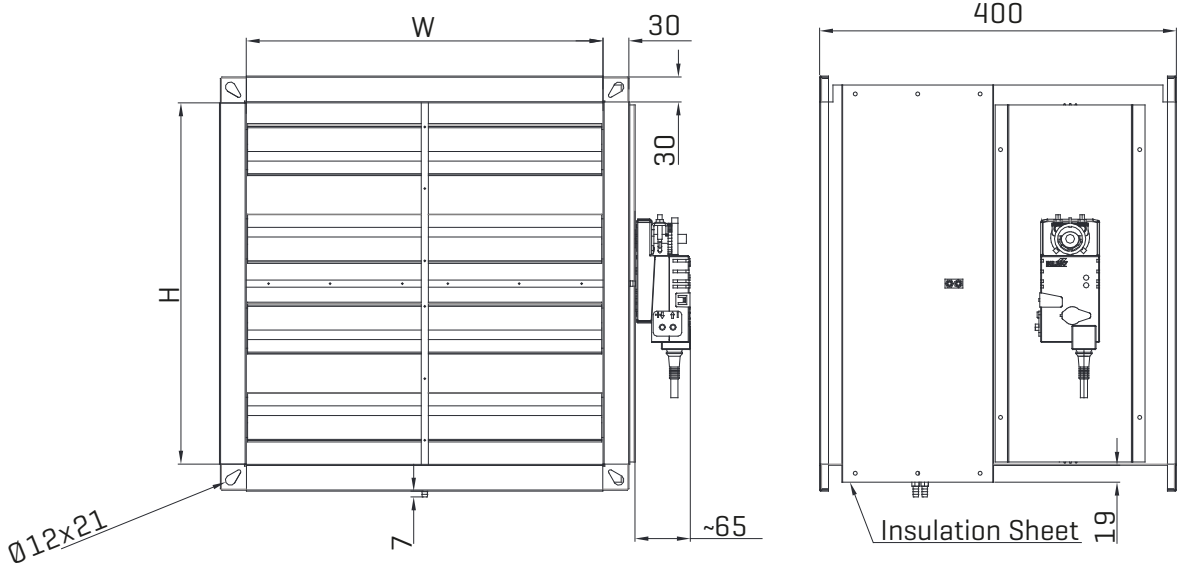


Table 1. Standard Dimensions

W [mm] (Width)	Dimensions between 150 mm and 1000 mm
H [mm] (Fixed Height Dimensions)	150 - 200 - 300 - 405 - 505 - 605 - 705 - 805

FLOW - SIZE RANGE

Table 2. Flow - Size Ranges

Flow Rate [m ³ /h]		H Height (mm)								
		150	200	300	405	505	605	705	805	
W Width (mm)	150	Vmin	162	360	540	720	900	1080	1260	1440
		Vnom	972	2160	3240	4320	5400	6480	7560	8640
	200	Vmin	216	288	432	583	727	871	1015	1159
		Vnom	1296	1730	2600	3460	4320	5190	6050	6920
	250	Vmin	270	360	540	720	900	1080	1260	1440
		Vnom	1620	2160	3240	4320	5400	6480	7560	8640
	300	Vmin	324	440	650	870	1080	1300	1520	1730
		Vnom	1944	2600	3890	5190	6480	7780	9080	10370
	350	Vmin	378	510	760	1010	1260	1520	1770	2020
		Vnom	2268	3030	4540	6050	7560	9080	10590	12100
	400	Vmin	432	580	870	1160	1440	1730	2020	2310
		Vnom	2592	3460	5190	6920	8640	10370	12100	13830
	450	Vmin	486	650	980	1300	1620	1950	2270	2600
		Vnom	2916	3890	5840	7780	9720	11670	13610	15560
	500	Vmin	540	720	1080	1440	1800	2160	2520	2880
		Vnom	3240	4320	6480	8640	10800	12960	15120	17000
	550	Vmin	594	800	1190	1590	1980	2380	2780	3170
		Vnom	3564	4760	7130	9510	11880	14260	16640	19010
	600	Vmin	648	870	1300	1730	2160	2600	3030	3460
		Vnom	3888	5190	7780	10370	12960	15560	17000	17000
650	Vmin	702	940	1410	1880	2340	2810	3280	3750	
	Vnom	4212	5620	8430	11240	14040	16850	19660	22470	
700	Vmin	756	1010	1520	2020	2520	3030	3530	4040	
	Vnom	4536	6050	9080	12100	15120	17000	17000	17000	
750	Vmin	810	1080	1620	2160	2700	3240	3780	4320	
	Vnom	4860	6480	9720	12960	16200	17000	17000	17000	
800	Vmin	864	1160	1730	2310	2880	3460	4040	4610	
	Vnom	5184	6920	10370	13830	17000	17000	17000	17000	
900	Vmin	972	1300	1950	2600	3240	3890	4540	5190	
	Vnom	5832	7780	11670	15560	17000	17000	17000	17000	
1000	Vmin	1080	1440	2160	2880	3600	4320	5040	5760	
	Vnom	6480	8640	12960	17000	17000	17000	17000	17000	

Note: Vmin air speed of 2 m / s, 12 V nom values of air velocity m / s refers to the nominal flow is to pass through a channel according to product size.

Vmax and Vmin values should be determined in the flow rate selection. The Vmin value can be selected between 0% and 100% of the Vnom value. The Vmax value can be chosen between 40% and 80% of the Vnom value. When Vmin and Vmax values are selected the same, the product will operate in constant flow [CAV] mode.

VELOCITY & MINIMUM PRESSURE DROP

The minimum pressure loss is given in Table 3 when the VAV fully open.

Table 3. Velocity & Minimum Static Pressure Drop Data

Air Velocity [m/s]	Pressure Drop [Pa]
2	5
4	9
6	14
8	23
10	38
12	61

Example: 400X405 ACA, minimum pressure loss at 1200 m³ / h flow rate:

Flow area = 0.162 m²

Flow rate = 3.53 m / s

Minimum pressure drop at the desired flow = 8 Pa

FLOW AREA

Table 4. Flow Area by Product Dimensions

Flow Area [m ²]		H Height (mm)							
		150	200	300	405	505	605	705	805
W Width (mm)	150	0,023	0,030	0,045	0,061	0,076	0,091	0,106	0,121
	200	0,030	0,040	0,060	0,081	0,101	0,121	0,141	0,161
	250	0,038	0,050	0,075	0,101	0,126	0,151	0,176	0,201
	300	0,045	0,060	0,090	0,122	0,152	0,182	0,212	0,242
	350	0,053	0,070	0,105	0,142	0,177	0,212	0,247	0,282
	400	0,060	0,080	0,120	0,162	0,202	0,242	0,282	0,322
	450	0,068	0,090	0,135	0,182	0,277	0,272	0,317	0,362
	500	0,075	0,100	0,150	0,203	0,253	0,303	0,353	0,403
	550	0,083	0,110	0,165	0,223	0,278	0,333	0,388	0,443
	600	0,090	0,120	0,180	0,243	0,303	0,363	0,423	0,483
	650	0,098	0,130	0,195	0,263	0,328	0,393	0,458	0,523
	700	0,105	0,140	0,210	0,284	0,354	0,424	0,494	0,564
	750	0,113	0,150	0,225	0,304	0,379	0,454	0,529	0,604
	800	0,120	0,160	0,240	0,324	0,404	0,484	0,564	0,644
900	0,135	0,180	0,270	0,365	0,455	0,545	0,635	0,725	
1000	0,150	0,200	0,300	0,405	0,505	0,605	0,705	0,805	

SOUND LEVEL DATA

Table 5. Sound Level Data

150 Pa Static Pressure difference Air Velocity [m/s]	Flow Sound Level [dB(A)]	Noise Emitted from the Case [dB(A)]	
		Uninsulated	Insulated
2	46	35	22
4	46	39	29
6	47	42	33
8	47	44	36
10	47	46	39

INSTALLATION

It is installed by considering the air flow direction arrow on the ACA. For the differential pressure sensors to function correctly, the following distance rules must be observed. For duct connections such as elbows, branches, tee connections and reductions must conform to EN 1505 design.

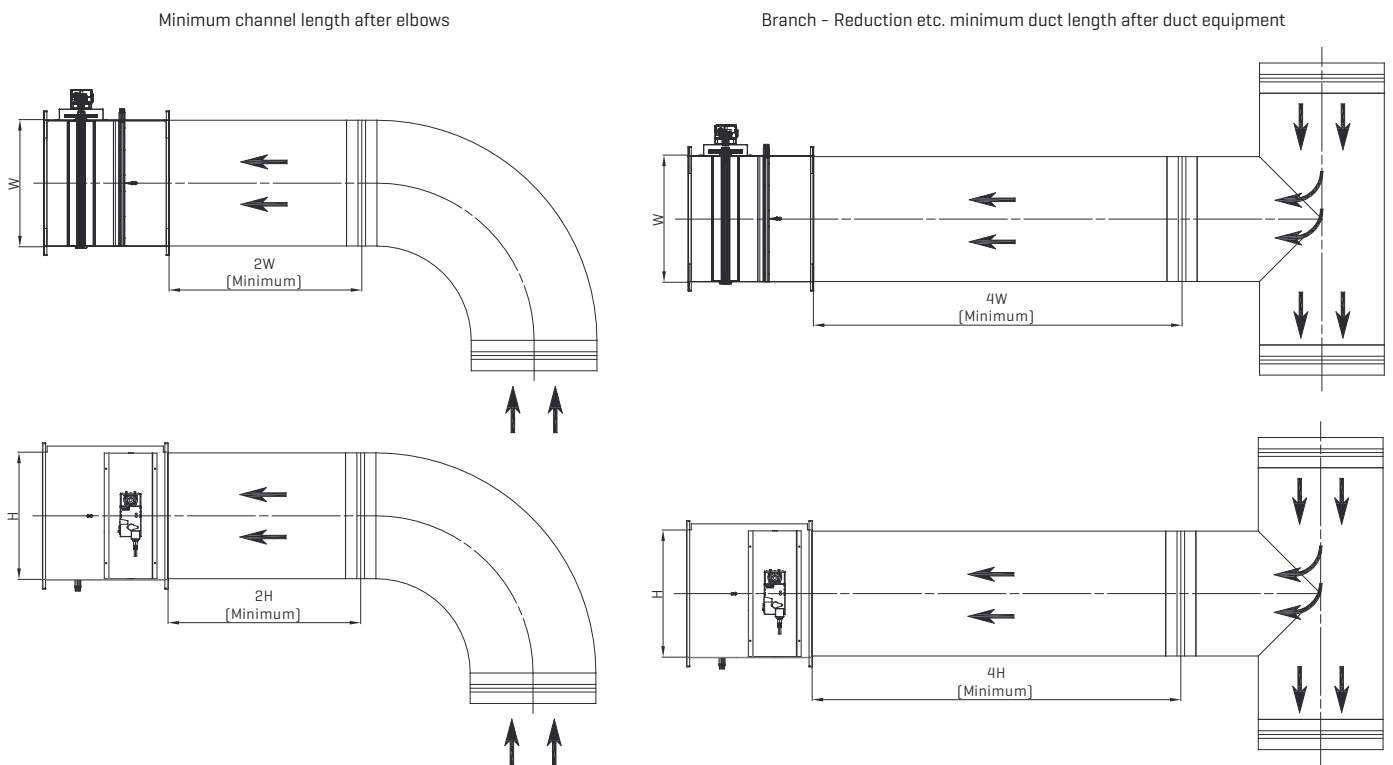


Table 6. Minimum Duct Length Table

Connection	Minimum Duct Length
Elbow	$2 \times W/H$
Other duct equipment [T connection, reduction etc. duct equipment]	$4 \times W/H$
Fire Damper	$4 \times W/H$
Silencer	$4 \times W/H$

VAV COMPACT CONTROLLERS

VAV controllers are equipped as standard with actuators with analog setpoint and feedback signals in DC 2 V... 10 V or DC 0 V... 10 V mode.

MP-BUS, MODBUS and BACnet communication options are available in the control devices.

Control devices are calibrated and adjusted at the factory to the desired flow rate and Vmin Vmax value with ZTH-EU and Belimo PC Tool.

Table 7. VAV Controller Information Table

Order Code	Belimo Motor Code	Flow Volume Adjustment Analog Input	Flow Volume Adjustment via BUS Com.	Controller ^[3] Parameters Setup	Hard Wired Override	Feedback Signal Type	Feedback Values ^[2]	BUS Communicated Variables	Power Supply	Operating Temperature [°C]
S71 S70	LMV-D3-MP (5 Nm) NMV-D3-MP (10 Nm)	DC 0...10 V, DC 2...10 V	MP-BUS	ZTH-EU, PC TOOL, NFC (Android), MP-BUS	Open ^[1] Close Vmin, Vmax	DC 0...10 V, DC 2...10 V, MP-BUS	Actual volume. Damper angle, Actual pressure	Read/Write: Setpoint, Vmin, Vmax, Open, Close Read: Actual volume, Damper angle, Actual pressure, Serial number, Fault/Alarm messages	AC 24 V, DC 24 V	0...+50 °C
S72	LMV-D3-MF (5 Nm)		—	ZTH-EU, PC TOOL		DC 0...10 V, DC 2...10 V		—		
S71 S86	LMV-D3-MOD (5 Nm) NMV-D3-MOD (10 Nm)		MODBUS, BACnet, MP-BUS	ZTH-EU, PC TOOL, MODBUS, MP-BUS		DC 0...10 V, DC 2...10 V, MODBUS, MP-BUS		Read/Write: Setpoint, Vmin, Vmax, Open, Close Read: Actual volume, Damper angle, Actual pressure, Serial number, Fault/Alarm messages		

Note:

- 1) Available on AC 24 supply only.
- 2) Output is analog. Therefore, only one feedback value can be selected.
- 3) Control units are not provided as accessories.

VAV COMPACT CONTROL DEVICE ELECTRIC CONNECTION

S72: LMV-D3-MF (STANDART PRDUCTION)



No.	Wire Colour	Designation	Function
1	Black	⊥-	AC/DC 24 V Supply
2	Red	~+	
3	White	◀Y	Reference Signal
5	Orange	▶U	-Actual Value Signal -Tool Communication

S71: LMV-D3-MP & S70: NMV-03-MP



No.	Wire Colour	Designation	Function
1	Black	⊥-	AC/DC 24 V Supply
2	Red	~+	
3	White	◀Y	Reference Signal
5	Orange	▶U	-Actual Value Signal -Tool Communication

S73: LMV-D3-MOD & S86: NMV-D3-MOD



No.	Wire Colour	Designation	Function
1	Black	⊥-	AC/DC 24 V Supply
2	Red	~+	
3			
5	Orange	▶MFT	MP Connection
6	Pink	D-	BACnet / Modbus [RS485]
7	Gray	D+	

OPTIONAL ADAPTIVE VAV CONTROL SYSTEM

If desired, a product option is available with a fast response VAV servomotor, static pressure sensor and control platform. It provides the adaptive control of the ambient air flow by providing an on-off speed control independent of the duct pressure in 2.5 seconds.

Table 8. VRP-M Regulator Information Table

VRP-M Controller	
Nominal Voltage	24 V AC, 50/60 Hz 24 V DC
Power Supply	1,1 W (Without Servomotor, with VFP-300)
Transmission Signal	Input impedance > 200 kΩ 0...10 / 2...10 V DC or 0...20 / 4...20 mA (with 500 Ω resistance)
Actual Value	0...10 / 2...10 DC, maximum 5 mA
Case Insulation Class	IP 42
Operating Ambient Temperature	0...+50°C
Electromagnetic Compatibility	CE 2004/108/EC
Operating Humidity	5...95% Relative Humidity



VRP-M Regulator

Table 9. VFP-300 Static Differential Pressure Transducer Information Table

VFP-300 Static Differential Pressure Sensor	
Rated Voltage	15 V DC (with VRP-M Regulator)
Measuring Range	0...300 Pa
Output Signal	0...10 V DC
Pressure Connection	Inner Diameter 4...6 mm
Electrical Insulation Class	III [Safe Voltage]
Case Insulation Class	IP42
Operating Ambient Temperature	0...+50°C
Electromagnetic Compatibility	CE 2004/108/EC



VRP-300 Static Differential Pressure Transducer

Table 10. LMQ24A-SRV-ST Servomotor Information Table

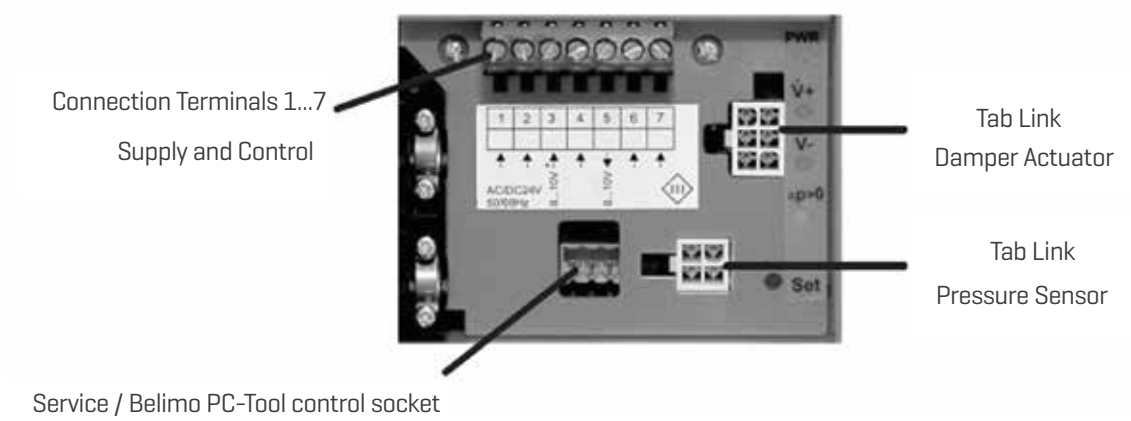
LMQ24A-SRV-ST Servo Motor	
Rated Voltage (with VRP-M Regulator)	24 V AC, 50/60 Hz 24 V DC
Power Consumption	12 W
Electrical Insulation Class	III [Safe Voltage]
Torque	4 Nm
Velocity	2,5 s / 90°
Case Insulation Class	IP54
Operating Ambient Temperature	0...+50°C
Electromagnetic Compatibility	CE 89/336/EEC
Operating Humidity	5...95% RH
Maintenance	Maintenance Free



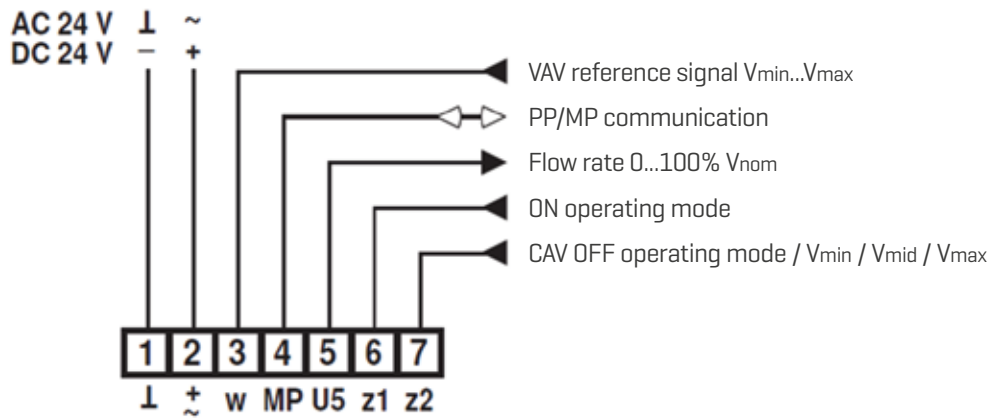
LMQ24A-SRV-ST Servo Motor
NMQ24A-SRV-ST Servo Motor

ADAPTIVE VAV CONTROL SYSTEM COMMISSIONING

PANEL



PANEL CONNECTION TERMINAL FUNCTIONS



PRODUCT SELECTION

The maximum air flow rate of the space is known as V_{max} . V_{max} volume flow rate can be selected between maximum 80% and 40% of the nominal volume flow rate of the damper. V_{min} flow rate can be selected as 30% of the nominal air flow rate of the damper. In 2-10V controller selection, the damper operates at a flow rate of V_{min} at 2V and below. Between 0-10V, the damper has the feature of completely closing. If V_{max} and V_{min} are selected at the same value, the damper will operate in CAV [constant flow rate setting] mode.

Example: The total air flow of a building is determined as $25000 \text{ m}^3 / \text{h}$. 5 VAV devices for the room will be installed in the supply channel. Select your product.

The maximum supply flow rate for each VAV to be used is calculated as $25000/5 = 5000 \text{ m}^3 / \text{h}$. Since $V_{max} = 80\% V_{nom}$ and $V_{max} = 5000 \text{ m}^3 / \text{h}$, it is calculated as $V_{nom} = 6250 \text{ m}^3 / \text{h}$ from the formula. According to the values of V_{min} and V_{max} , the appropriate size is selected from the Table 2. Quick Selection table as $V_{nom} = 6480 \text{ m}^3 / \text{h}$ and duct dimensions $500 \text{ mm} \times 300 \text{ mm}$.

Flow area according to the selected throat size is found as 0.15 m^2 according to Table 4. Flow Area by Product Dimensions table.

Minimum pressure losses from the flow area in the selected V_{min} and V_{max} ranges:

$V_{max} = 5000 \text{ m}^3/\text{h}$, Air velocity is $5000/0.15 / 3600 = 9.26 \text{ m/s}$

If $V_{min} = 30\% V_{nom} = 1875 \text{ m}^3 / \text{h}$ then minimum air velocity = $1875 / 0.15 / 3600 = 3.47 \text{ m / s}$

Approximately the minimum pressure loss is 31 Pa for 9.26 m / s .

Sound values are checked from Table 5. Sound Data Table. Accordingly, the flow noise that will occur in the device at 150 Pa static pressure difference value is 46 dB [A], and the case radiated noise is 36 dB [A]. If additional sound insulation is required in the VAV device, then the case radiated noise is 23 dB [A].

Motor Selection

For commissioning connection information, see the "Vav Compact Controllers Commissioning" section. If the system is required to be fast reactive under special conditions, the adaptive vav control system is preferred.

PRODUCT ORDER CODES

ACA. A > . < B > . < C > . 30 . < D > . < E > . < F >

A	Material	
	GAL	Galvanized
	PAS	AISI 304 Stainless Steel
B	Flow Type	
	E	Exhaust Side
	U	Supply Side
C	Controller	
	S70	NMV-D3-MP
	S71	LMV-D3-MP
	S72	LMV-D3-MF
	S73	LMV-D3-MOD
	S86	NMV-D3-MOD
	S97	Adaptive VAV Control System
D	Insulation	
	00	Uninsulated
	04	Acoustic Insulation
E	Width (W) [mm]	
	0000	You can look at the standard sizes.
F	Height (H) [mm]	
	0000	You can look at the standard sizes.

Example; ACA.GAL.E.S72.30.00.0400.0300



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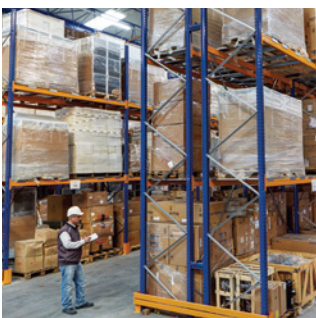


OSA
Adjustable Blade
Swirl Diffuser - Type 1

Venues Breathe with DOGU HVAC Systems!

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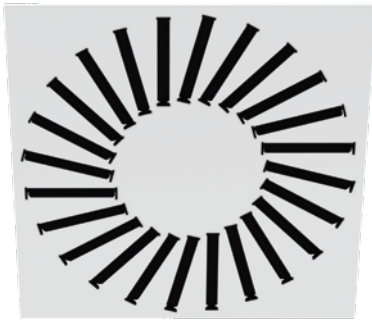


- ☞ OSA – Adjustable Blade Swirl Diffuser Type 1 effectively keeps the comfort of the room at the ideal level with the swirl effect it brings to the air. They can be used in distributor and collector systems.
- ☞ There are air supply options between 50 and 4000 m³/h air flow rates depending on the product dimensions..
- ☞ In applications with a temperature difference of $\pm 14^{\circ}\text{C}$ in heating and cooling, blade positions can be adjusted in accordance with ambient conditions..
- ☞ The throw geometry remains stable regardless of the desired air flow and temperature difference in space ventilation..
- ☞ The air passage pattern is designed to create low pressure drop, low sound level and effective throw geometry. There are blades on the patterns that allow to adjust the throw directions.
- ☞ Compatible with ready-made aluminum suspended ceiling systems and metal suspended ceiling systems.
- ☞ It can be produced in square or circular form according to architectural requirements and has a decorative structure.
- ☞ It has TSE ISO EN 14644, DIN 1946/4, DIN 24194 and DIN 25414 hygiene quality standards.

PRODUCT OPTIONS

Two product options are available. In both options, the blades are arranged in a circular form on the case.

OSA_P



OSA_D



MATERIAL

- ☞ Standard Galvanized manufacturing, optional stainless manufacturing.
- ☞ There are ABS plastic blades that provide air direction inside the case.

SURFACE COATING

- ☞ RAL 9010 or RAL 9016 electrostatic powder paint as standard.
- ☞ Optional
 - Different RAL color code
 - Paintless production

INSTALLATION

Standard Installation Types

- ☞ Screwed [OSA_P]
- ☞ Tile [OSA_P]
- ☞ With Clip-in [OSA_P]
- ☞ Center Bolted [OSA_P ve OSA_D]

STANDARD SIZES

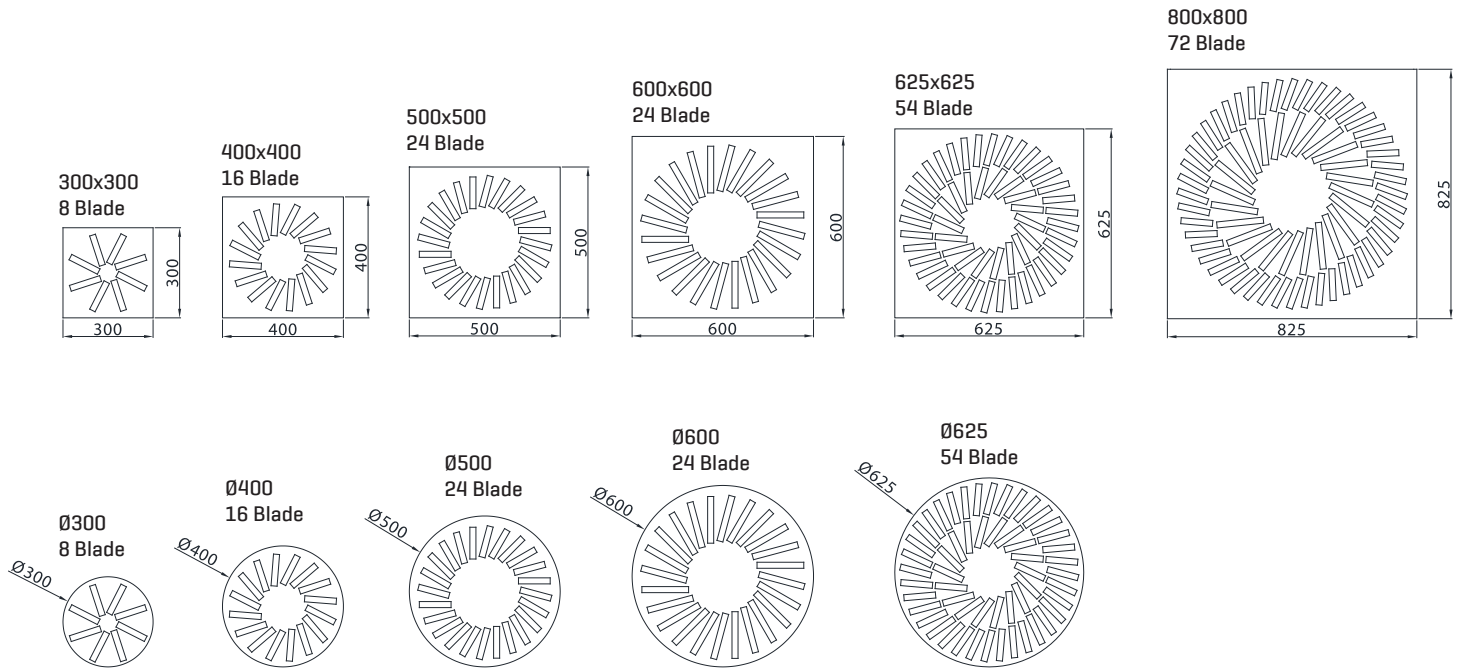
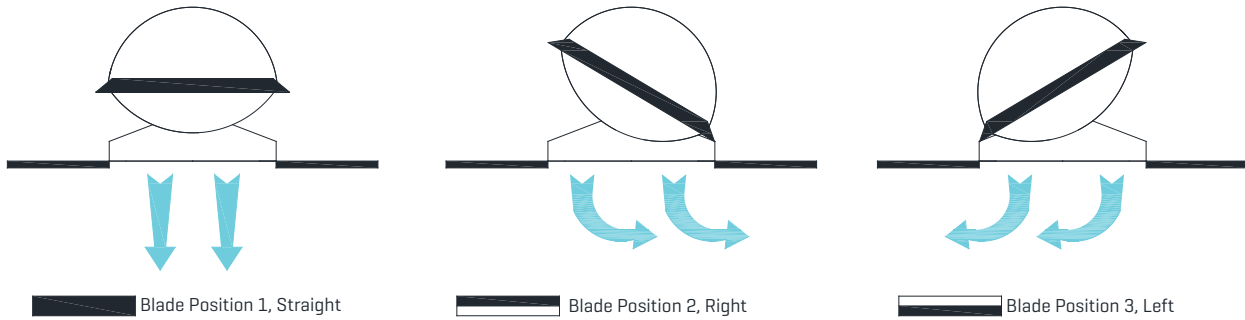


Table 1. Standard Sizes

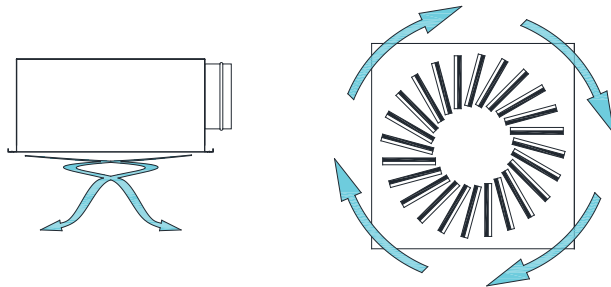
Product Series	Product Dimension [mm]	Number of Wings
OSA_P Square OSA Swirl Diffuser	300x300	8
	400x400	16
	500x500	24
	600x600	24
	625x625	54
	825x825	72
OSA_D Circular OSA Swirl Diffuser	Ø300	8
	Ø400	16
	Ø500	24
	Ø600	24
	Ø625	54

BLADE ADJUSTMENTS FOR SPECIAL AIR THROW

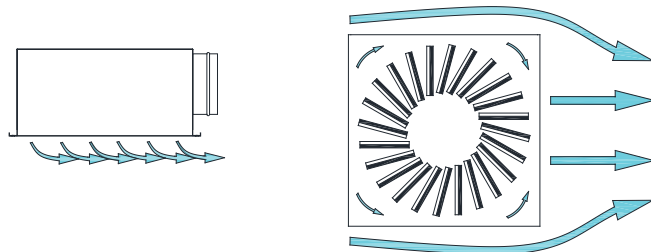
OSA Swirl diffuser has the ability to throw air that will meet the desired comfort conditions. Each blade can be adjusted separately.



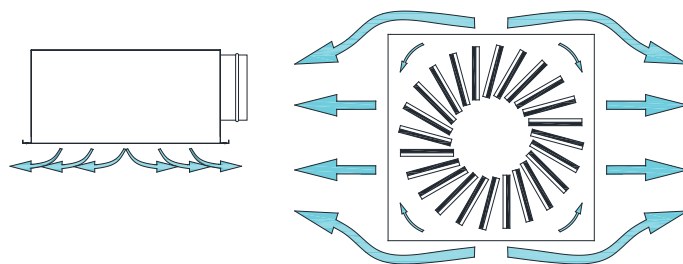
Recommended blade position for areas where high performance spreading and penetration properties are required:



Suggested blade position to ensure one-way air supply from the ceiling in the room:



Suggested blade position to provide air supply from ceiling in the room in two directions:



PERFORMANCE DATA

Table 2. Performance Data

		Sizes [mm]					
		Ø300 / 300x300	Ø400 / 400x400	Ø500 / 500x500	Ø600 / 600x600	Ø625 / 625x625	Ø25x825
		8 Blade	16 Blade	24 Blade	24 Blade	54 Blade	72 Blade
50	Pressure Drop [Pa]	<1	<1	<1	<1	<1	<1
	Sound Pressure Level [db(A)]	<15	<15	<15	<15	<15	<15
	Throw Distance [m]	1	1	<1	<1	<1	<1
150	Pressure Drop [Pa]	20	3	1	1	<1	<1
	Sound Pressure Level [db(A)]	28	<15	<15	<15	<15	<15
	Throw Distance [m]	2	2	1	1	<1	<1
200	Pressure Drop [Pa]	33	5	2	2	<1	<1
	Sound Pressure Level [db(A)]	35	<15	<15	<15	<15	<15
	Throw Distance [m]	3	3	1	1	<1	<1
250	Pressure Drop [Pa]	49	8	4	4	<1	<1
	Sound Pressure Level [db(A)]	42	18	<15	<15	<15	<15
	Throw Distance [m]	4	3	1	1	<1	<1
300	Pressure Drop [Pa]	75	11	6	6	<1	<1
	Sound Pressure Level [db(A)]	48	23	<15	<15	<15	<15
	Throw Distance [m]	5	4	2	2	<1	<1
400	Pressure Drop [Pa]		20	10	10	2	<1
	Sound Pressure Level [db(A)]		32	23	23	<15	<15
	Throw Distance [m]		5	2	2	<1	<1
500	Pressure Drop [Pa]		32	16	16	3	1
	Sound Pressure Level [db(A)]		39	30	30	<15	<15
	Throw Distance [m]		6	3	3	1	<1
750	Pressure Drop [Pa]		72	35	35	6	3
	Sound Pressure Level [db(A)]		51	42	42	18	<15
	Throw Distance [m]		8	4	4	2	1
1000	Pressure Drop [Pa]			63	63	10	6
	Sound Pressure Level [db(A)]			51	51	27	20
	Throw Distance [m]			5	5	2	2
1250	Pressure Drop [Pa]			98	98	16	9
	Sound Pressure Level [db(A)]			58	58	34	26
	Throw Distance [m]			7	7	3	2
1500	Pressure Drop [Pa]					23	13
	Sound Pressure Level [db(A)]					40	32
	Throw Distance [m]					3	2
1750	Pressure Drop [Pa]					31	17
	Sound Pressure Level [db(A)]					44	37
	Throw Distance [m]					4	3
2000	Pressure Drop [Pa]					41	23
	Sound Pressure Level [db(A)]					48	41
	Throw Distance [m]					4	3
2250	Pressure Drop [Pa]					51	29
	Sound Pressure Level [db(A)]					52	44
	Throw Distance [m]					5	3
2500	Pressure Drop [Pa]					64	36
	Sound Pressure Level [db(A)]					55	48
	Throw Distance [m]					5	4
2750	Pressure Drop [Pa]					77	43
	Sound Pressure Level [db(A)]					58	50
	Throw Distance [m]					6	4
3000	Pressure Drop [Pa]					92	51
	Sound Pressure Level [db(A)]					61	53
	Throw Distance [m]					6	5
3250	Pressure Drop [Pa]						60
	Sound Pressure Level [db(A)]						56
	Throw Distance [m]						5
3500	Pressure Drop [Pa]						70
	Sound Pressure Level [db(A)]						58
	Throw Distance [m]						5
4000	Pressure Drop [Pa]						92
	Sound Pressure Level [db(A)]						62
	Throw Distance [m]						6

- ☞ The data is obtained when the blades are in the flat position, the heating mode temperature difference is 8K.
- ☞ Throw distance: It is the vertical distance of the air in the comfort zone leaving the air diffuser equipment at a speed of 0.25 m/s.

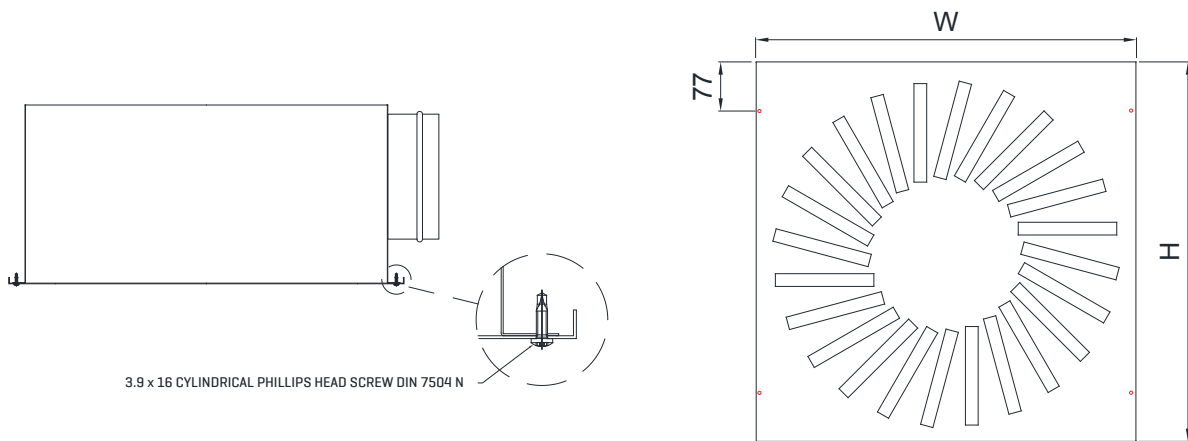
THROW DISTANCE CORRECTION TABLE

Table 3. Throw Distance Correction Table

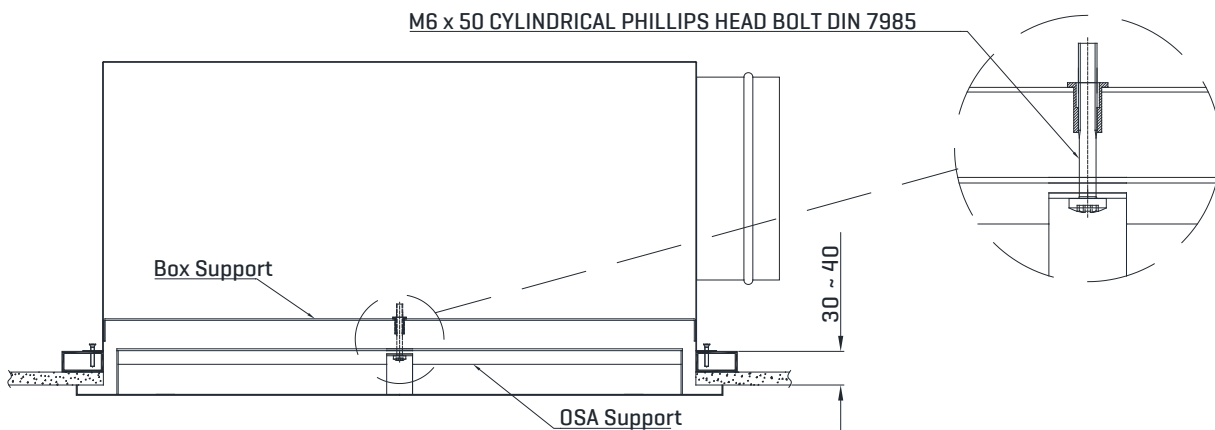
Heating Mode [ΔT]	4	6	8	10	12
Throw Range Multiplier	1.07	1.02	1	0.90	0.83
Cooling Mode [ΔT]	4	6	8	10	12
Throw Range Multiplier	1.31	1.36	1.42	1.48	1.54

INSTALLATION TYPES

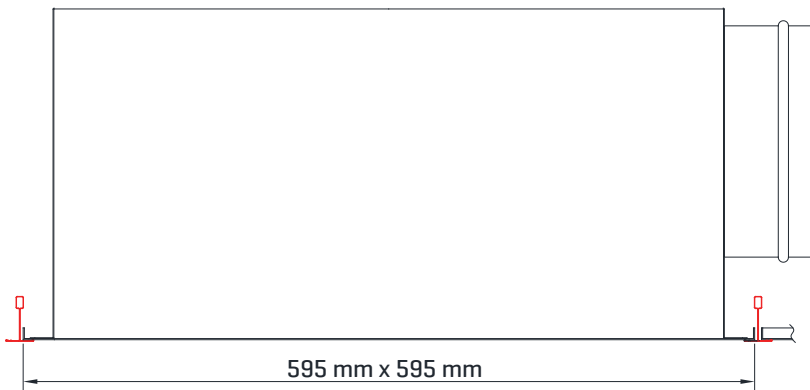
OSA_P SCREW INSTALLATION



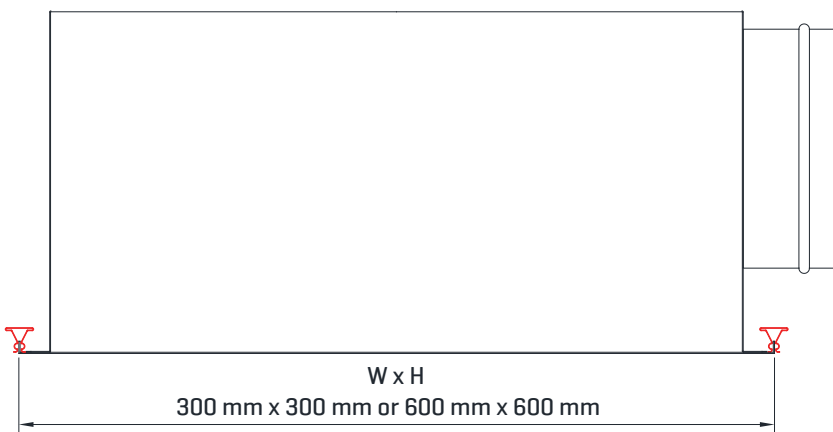
OSA_P MIDDLE BOLT INSTALLATION



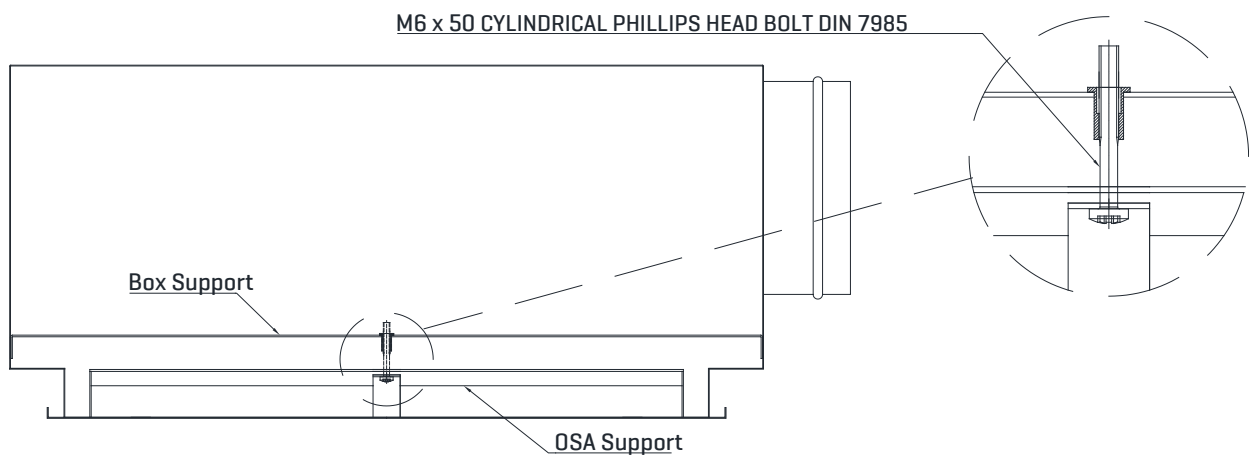
OSA_P TILE INSTALLATION



OSA_P CLIP-IN INSTALLATION



OSA_D MIDDLE BOLT INSTALLATION



BOX SIZES

Standard box dimensions for OSA_P are given below.

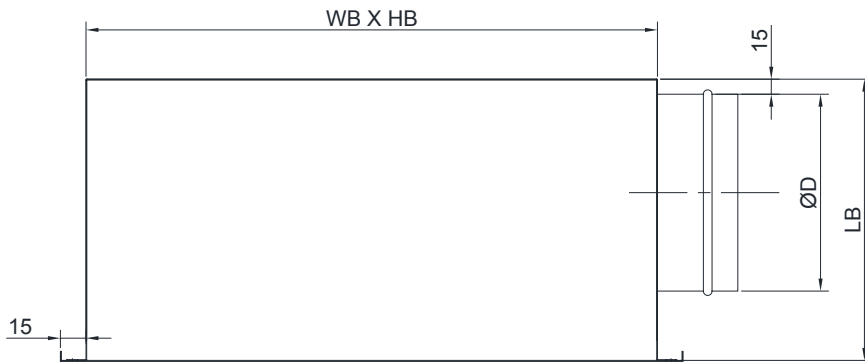


Table 4. Standard Box Sizes for OSA_P

OSA_P	Box Throat Diameter (ØD) [mm]	Box Height [LB] [mm]	Box Width [WB] [mm]	Box Length [HB] [mm]
300	200	280	270	270
400	200	280	370	370
500	250	330	470	470
600	300	380	570	570
625	300	380	595	595
825	350	430	795	795

Standard box dimensions for OSA_D are given below.

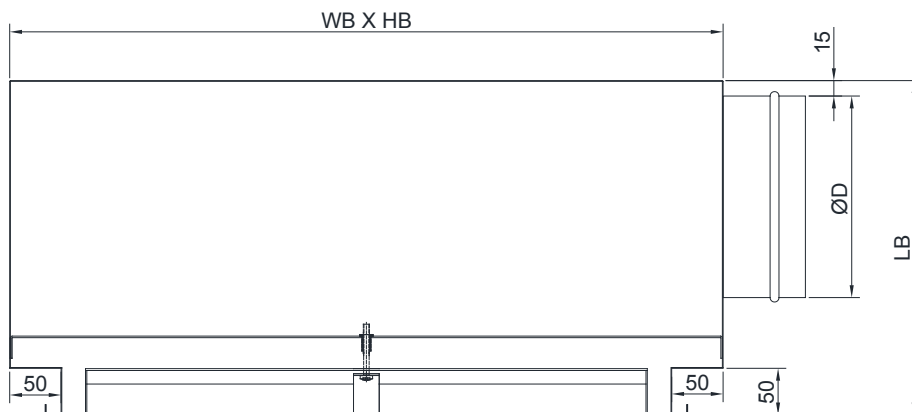


Table 5. Standard Box Sizes for OSA_D

OSA_D	Box Throat Diameter (ØD) [mm]	Box Height [LB] [mm]	Box Width [WB] [mm]	Box Length [HB] [mm]
300	200	330	400	400
400	200	330	500	500
500	250	380	600	600
600	300	430	700	700
625	300	430	725	725

PRODUCT SELECTION

Example: The air flow rate distributed in the space is 4000 m³/h and the cooling temperature difference is determined as -8 K. 10 prismatic swirl diffusers will be used. Make your product selection.

Solution: Supply flow rate for a diffuser $4000/10 = 400 \text{ m}^3/\text{h}$

From the performance data table [Table 2], the product corresponding to the appropriate pressure loss, sound pressure level and throw distance at 400m³/h air flow is selected.

For example, the pressure loss that will occur in a 400 mm x 400 mm product will be 20 Pa, the sound pressure level will be 32 dB(A) and the throw distance will be 5 m.

Throw Distance Correction Chart

In the previous example, the throw distance was found to be 5 m for the heating mode 8K. For cooling mode -8 K, refer to the Throw Distance Correction Table [Table 3]. The multiplier is 1.42.

Corrected throw distance = 5 m x 1,42 = 7.1 m

OSA_P ORDER CODE

You can place your prismatic swirl diffuser orders according to the coding format below.

OSA_P . <A> . . <C> . <D>

A	Raw Material Type	
	GAL	Galvanized
	PAS	Stainless Steel
B	Installation Type	
	VD	Screwed
	GC	Center Bolted
	KR	Tile
	KL	Clip-in
C	Size [mm]	
	300-08	300 x 300 - 8 blade
	400-16	400 x 400 - 16 blade
	500-24	500 x 500 - 24 blade
	600-24	600 x 600 - 24 blade
	625-54	625 x 625 - 54 blade
	825-72	825 x 825 - 72 blade
D	Paint	
	00	Unpainted
	S1	Standard Painted - RAL 9010
	S2	Standard Painted - RAL 9016
	XX	Special Painted

Sample Coding: OSA_P.GAL.GC.600-24.XX

OSA_D ORDER CODE

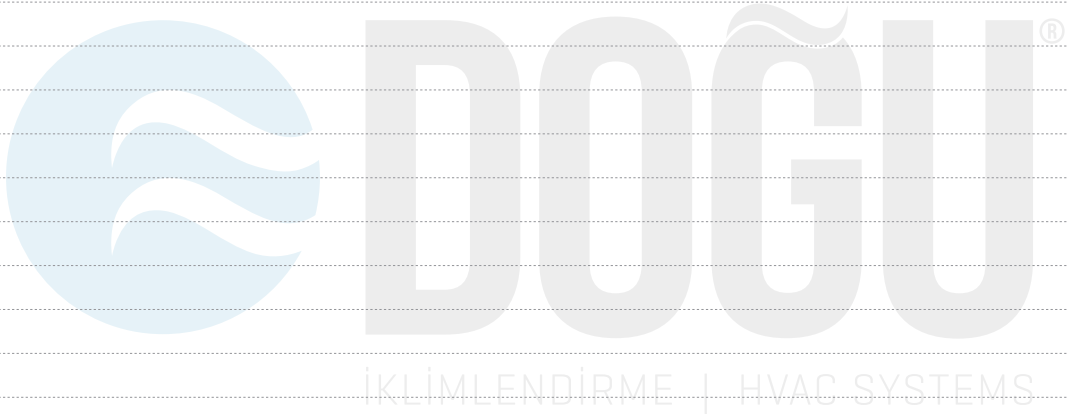
You can place your circular swirl diffuser orders according to the coding format below.

OSA_D . <A> . . <C> . <D>

A	Raw Material Type	
	GAL	Galvanized
	PAS	Stainless Steel
B	Installation Type	
	GC	Center Bolted
C	Size [mm]	
	300-08	300 mm - 8 blade
	400-16	400 mm - 16 blade
	500-24	500 mm - 24 blade
	600-24	600 mm - 24 blade
	625-54	625 mm - 54 blade
D	Paint	
	00	Unpainted
	S1	Standard Painted - RAL 9010
	S2	Standard Painted - RAL 9016
	XX	Special Painted

Sample Coding: OSA_D.GAL.GC.600-24.S1

NOTES





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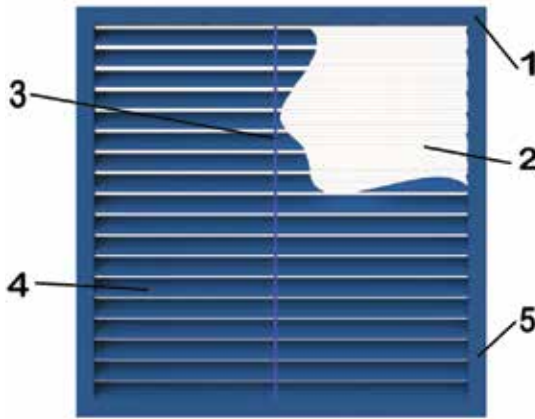


DPE - EXTERNAL LOUVRE

- DPE - External Air Louvre is used to provide fresh air intake in ventilation systems and to prevent rain, snow, foreign matter and living creatures from entering the system at exhaust air discharge points.
- It can be produced in one piece from 100 mm x 100 mm to 2300 mm x 2100 mm. Group assembly is made in higher sizes.
- Casing and blades are produced from aluminum profile.
- There is a standard 10 mm x 10 mm bird wire in the louver throat.
- Painted with RAL 9010 electrostatic powder paint as standard. It can also be painted in different RAL codes or coated with matte aluminum eloxal upon the request of the customer. It has high corrosion resistance.

MATERIAL

DPE – The casing and blades of the **External Air Louvre** are produced from aluminum profile. There is 10 mm x 10 mm bird wire made of galvanized steel as standard in the shutter throat. Production is also made wirelessly in line with the customer preference.



- 1. Frame
- 2. 10 mm x 10 mm bird wire
- 3. W>1000' den itibaren kullanılan dikme
- 4. Louver Blade
- 5. Mounting holes

SELECTION PARAMETERS

Table 1. Effective Area

Effective Area[m ²]	H [Height] (mm)																
	100	200	300	400	500	600	700	800	900	1000	1100	1300	1500	1700	1900	2100	
W [Width] (mm)	100	0.004	0.013	0.017	0.026	0.034	0.043	0.051	0.055	0.064	0.072	0.081	0.098	0.111	0.128	0.141	0.158
	200	0.009	0.026	0.034	0.051	0.068	0.085	0.102	0.111	0.128	0.145	0.162	0.196	0.222	0.256	0.281	0.315
	300	0.013	0.038	0.051	0.077	0.102	0.128	0.153	0.166	0.192	0.217	0.243	0.294	0.332	0.383	0.422	0.473
	400	0.017	0.051	0.068	0.102	0.136	0.170	0.204	0.222	0.256	0.290	0.324	0.392	0.443	0.511	0.562	0.630
	500	0.021	0.064	0.085	0.128	0.170	0.213	0.256	0.277	0.320	0.362	0.405	0.490	0.554	0.639	0.703	0.788
	600	0.026	0.077	0.102	0.153	0.204	0.256	0.307	0.332	0.383	0.435	0.486	0.588	0.665	0.767	0.843	0.946
	700	0.030	0.089	0.119	0.179	0.239	0.298	0.358	0.388	0.447	0.507	0.567	0.686	0.775	0.895	0.984	1.103
	800	0.034	0.102	0.136	0.204	0.273	0.341	0.409	0.443	0.511	0.579	0.648	0.784	0.886	1.022	1.125	1.261
	900	0.038	0.115	0.153	0.230	0.307	0.383	0.460	0.498	0.575	0.652	0.728	0.882	0.997	1.150	1.265	1.419
	1000	0.043	0.128	0.170	0.256	0.341	0.426	0.511	0.554	0.639	0.724	0.809	0.980	1.108	1.278	1.406	1.576
	1100	0.047	0.141	0.187	0.281	0.375	0.469	0.562	0.609	0.703	0.797	0.890	1.078	1.218	1.406	1.546	1.734
	1200	0.051	0.153	0.204	0.307	0.409	0.511	0.613	0.665	0.767	0.869	0.971	1.176	1.329	1.534	1.687	1.891
	1300	0.055	0.166	0.222	0.332	0.443	0.554	0.665	0.720	0.831	0.941	1.052	1.274	1.440	1.661	1.828	2.049
	1400	0.060	0.179	0.239	0.358	0.477	0.596	0.716	0.775	0.895	1.014	1.133	1.372	1.551	1.789	1.968	2.207
	1500	0.064	0.192	0.256	0.383	0.511	0.639	0.767	0.831	0.959	1.086	1.214	1.470	1.661	1.917	2.109	2.364
	1600	0.068	0.204	0.273	0.409	0.545	0.682	0.818	0.886	1.022	1.159	1.295	1.568	1.772	2.045	2.249	2.522
	1700	0.072	0.217	0.290	0.435	0.579	0.724	0.869	0.941	1.086	1.231	1.376	1.666	1.883	2.173	2.390	2.680
	1800	0.077	0.230	0.307	0.460	0.613	0.767	0.920	0.997	1.150	1.304	1.457	1.764	1.994	2.300	2.530	2.837
	1900	0.081	0.243	0.324	0.486	0.648	0.809	0.971	1.052	1.214	1.376	1.538	1.862	2.104	2.428	2.671	2.995
	2000	0.085	0.256	0.341	0.511	0.682	0.852	1.022	1.108	1.278	1.448	1.619	1.960	2.215	2.556	2.812	3.152
2100	0.089	0.268	0.358	0.537	0.716	0.895	1.074	1.163	1.342	1.521	1.700	2.058	2.326	2.684	2.952	3.310	
2200	0.094	0.281	0.375	0.562	0.750	0.937	1.125	1.218	1.406	1.593	1.781	2.156	2.437	2.812	3.093	3.468	
2300	0.098	0.294	0.392	0.588	0.784	0.980	1.176	1.274	1.470	1.666	1.862	2.254	2.547	2.939	3.233	3.625	

Table 2. Quick Selection According to 3 m/s Air Velocity

m ³ /h		H (Height) (mm)															
		100	200	300	400	500	600	700	800	900	1000	1100	1300	1500	1700	1900	2100
W (Width) (mm)	100	46	138	184	276	368	460	552	598	690	782	874	1058	1196	1380	1518	1702
	200	92	276	368	552	736	920	1104	1196	1380	1564	1748	2116	2392	2760	3037	3405
	300	138	414	552	828	1104	1380	1656	1794	2070	2346	2622	3175	3589	4141	4555	5107
	400	184	552	736	1104	1472	1840	2208	2392	2760	3129	3497	4233	4785	5521	6073	6809
	500	230	690	920	1380	1840	2300	2760	2991	3451	3911	4371	5291	5981	6901	7591	8511
	600	276	828	1104	1656	2208	2760	3313	3589	4141	4693	5245	6349	7177	8281	9110	10214
	700	322	966	1288	1932	2576	3221	3865	4187	4831	5475	6119	7407	8373	9662	10628	11916
	800	368	1104	1472	2208	2945	3681	4417	4785	5521	6257	6993	8465	9570	11042	12146	13618
	900	414	1242	1656	2484	3313	4141	4969	5383	6211	7039	7867	9524	10766	12422	13664	15321
	1000	460	1380	1840	2760	3681	4601	5521	5981	6901	7821	8742	10582	11962	13802	15183	17023
	1100	506	1518	2024	3037	4049	5061	6073	6579	7591	8603	9616	11640	13158	15183	16701	18725
	1200	552	1656	2208	3313	4417	5521	6625	7177	8281	9386	10490	12698	14354	16563	18219	20428
	1300	598	1794	2392	3589	4785	5981	7177	7775	8972	10168	11364	13756	15551	17943	19737	22130
	1400	644	1932	2576	3865	5153	6441	7729	8373	9662	10950	12238	14815	16747	19323	21256	23832
	1500	690	2070	2760	4141	5521	6901	8281	8972	10352	11732	13112	15873	17943	20704	22774	25534
	1600	736	2208	2945	4417	5889	7361	8834	9570	11042	12514	13986	16931	19139	22084	24292	27237
	1700	782	2346	3129	4693	6257	7821	9386	10168	11732	13296	14861	17989	20336	23464	25810	28939
	1800	828	2484	3313	4969	6625	8281	9938	10766	12422	14078	15735	19047	21532	24844	27329	30641
	1900	874	2622	3497	5245	6993	8742	10490	11364	13112	14861	16609	20105	22728	26225	28847	32344
	2000	920	2760	3681	5521	7361	9202	11042	11962	13802	15643	17483	21164	23924	27605	30365	34046
2100	966	2899	3865	5797	7729	9662	11594	12560	14493	16425	18357	22222	25120	28985	31884	35748	
2200	1012	3037	4049	6073	8097	10122	12146	13158	15183	17207	19231	23280	26317	30365	33402	37451	
2300	1058	3175	4233	6349	8465	10582	12698	13756	15873	17989	20105	24338	27513	31746	34920	39153	

Table 3. Weight Table

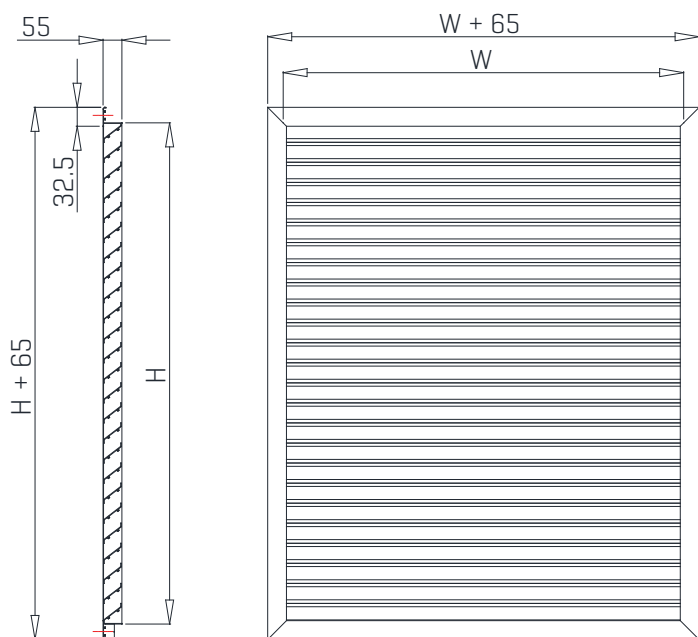
kg		H (Height) [mm]															
		100	200	300	400	500	600	700	800	900	1000	1100	1300	1500	1700	1900	2100
W (Width) [mm]	100	0.26	0.42	0.55	0.72	0.88	1.05	1.21	1.34	1.50	1.67	1.83	2.16	2.45	2.78	3.07	3.40
	200	0.42	0.66	0.82	1.05	1.28	1.51	1.74	1.91	2.14	2.37	2.60	3.06	3.46	3.92	4.31	4.78
	300	0.59	0.89	1.08	1.38	1.68	1.98	2.28	2.47	2.77	3.07	3.37	3.96	4.46	5.06	5.55	6.15
	400	0.75	1.12	1.35	1.71	2.08	2.44	2.81	3.04	3.41	3.77	4.14	4.87	5.46	6.19	6.79	7.52
	500	0.92	1.35	1.61	2.05	2.48	2.91	3.34	3.61	4.04	4.47	4.91	5.77	6.47	7.33	8.03	8.89
	600	1.08	1.58	1.88	2.38	2.88	3.38	3.88	4.17	4.67	5.17	5.67	6.67	7.47	8.47	9.27	10.27
	700	1.24	1.81	2.14	2.71	3.28	3.84	4.41	4.74	5.31	5.88	6.44	7.58	8.47	9.61	10.51	11.64
	800	1.41	2.04	2.41	3.04	3.67	4.31	4.94	5.31	5.94	6.58	7.21	8.48	9.48	10.75	11.75	13.01
	900	1.57	2.27	2.67	3.37	4.07	4.78	5.48	5.88	6.58	7.28	7.98	9.38	10.48	11.88	12.98	14.39
	1000	1.73	2.50	2.94	3.70	4.47	5.24	6.01	6.44	7.21	7.98	8.75	10.28	11.49	13.02	14.22	15.76
	1100	1.90	2.73	3.20	4.04	4.87	5.71	6.54	7.01	7.84	8.68	9.52	11.19	12.49	14.16	15.46	17.13
	1200	2.06	2.97	3.47	4.37	5.27	6.17	7.08	7.58	8.48	9.38	10.28	12.09	13.49	15.30	16.70	18.51
	1300	2.23	3.20	3.73	4.70	5.67	6.64	7.61	8.14	9.11	10.08	11.05	12.99	14.50	16.44	17.94	19.88
	1400	2.39	3.43	3.99	5.03	6.07	7.11	8.14	8.71	9.75	10.78	11.82	13.90	15.50	17.57	19.18	21.25
	1500	2.55	3.66	4.26	5.36	6.47	7.57	8.68	9.28	10.38	11.49	12.59	14.80	16.50	18.71	20.42	22.63
	1600	2.72	3.89	4.52	5.70	6.87	8.04	9.21	9.84	11.02	12.19	13.36	15.70	17.51	19.85	21.66	24.00
	1700	2.88	4.12	4.79	6.03	7.27	8.50	9.74	10.41	11.65	12.89	14.13	16.60	18.51	20.99	22.89	25.37
	1800	3.05	4.35	5.05	6.36	7.66	8.97	10.28	10.98	12.28	13.59	14.90	17.51	19.51	22.13	24.13	26.75
	1900	3.21	4.58	5.32	6.69	8.06	9.44	10.81	11.54	12.92	14.29	15.66	18.41	20.52	23.26	25.37	28.12
	2000	3.37	4.81	5.58	7.02	8.46	9.90	11.34	12.11	13.55	14.99	16.43	19.31	21.52	24.40	26.61	29.49
2100	3.54	5.04	5.85	7.35	8.86	10.37	11.88	12.68	14.19	15.69	17.20	20.22	22.53	25.54	27.85	30.86	
2200	3.70	5.28	6.11	7.69	9.26	10.83	12.41	13.25	14.82	16.39	17.97	21.12	23.53	26.68	29.09	32.24	
2300	3.86	5.51	6.38	8.02	9.66	11.30	12.94	13.81	15.45	17.10	18.74	22.02	24.53	27.82	30.33	33.61	

Note: The weight values given are ± 10%.

Table 4. Pressure Loss and Noise Intensity

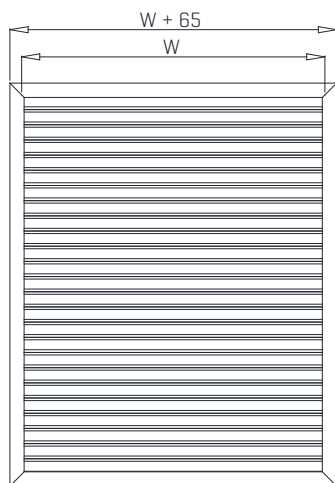
		Air Velocity [m/s]							
		1.5	2	3	4	5	6	7	8
Fresh Air	Pressure Drop [Pa]	17	28	54	96	148	208	264	349
	Sound Level [dB]	34	43	56	65	>70	>70	>70	>70
Exhaust Air	Pressure Drop [Pa]	10	20	45	80	125	180	245	320
	Sound Level [dB]	30	40	51	60	70	>70	>70	>70

MEASUREMENT

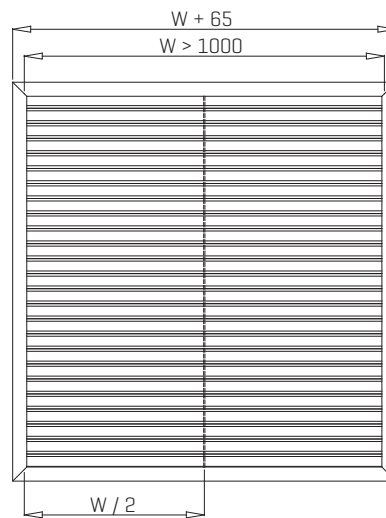


W (mm)	H (mm)
100	100
200	200
300	300
400	400
500	500
600	600
700	700
800	800
900	900
1000	1000
1100	1100
1300	1300
1500	1500
1700	1700
1900	1900
2100	2100
2300	

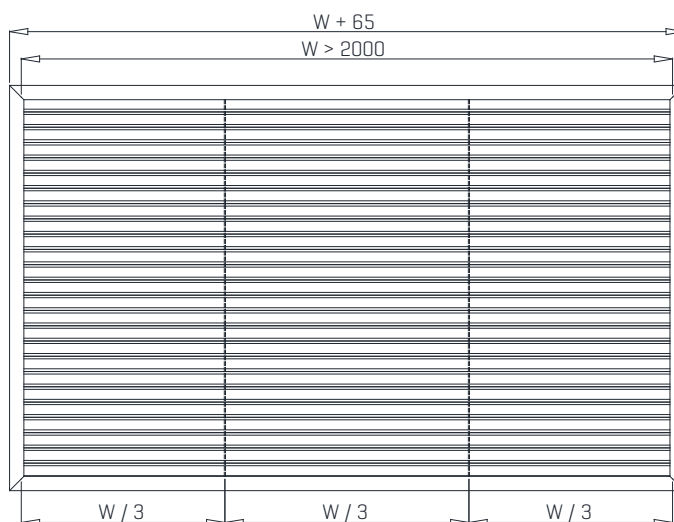
Support details are described in the drawings below.



$W \leq 1000$ Unsupported



Single Support Between $1000 < W \leq 2000$



Double Support Between $2000 < W \leq 2300$

TYPES OF MOUNTING

DPE – The assembly of the **External Weather Louvre** is done by screwing it to the wall or the blind casing with mounting screws from the curb surface. **[Figure 1]**

The assembled surface must be smooth and flat.

Note: Mounting screws are painted and shipped in the color of the shutter.

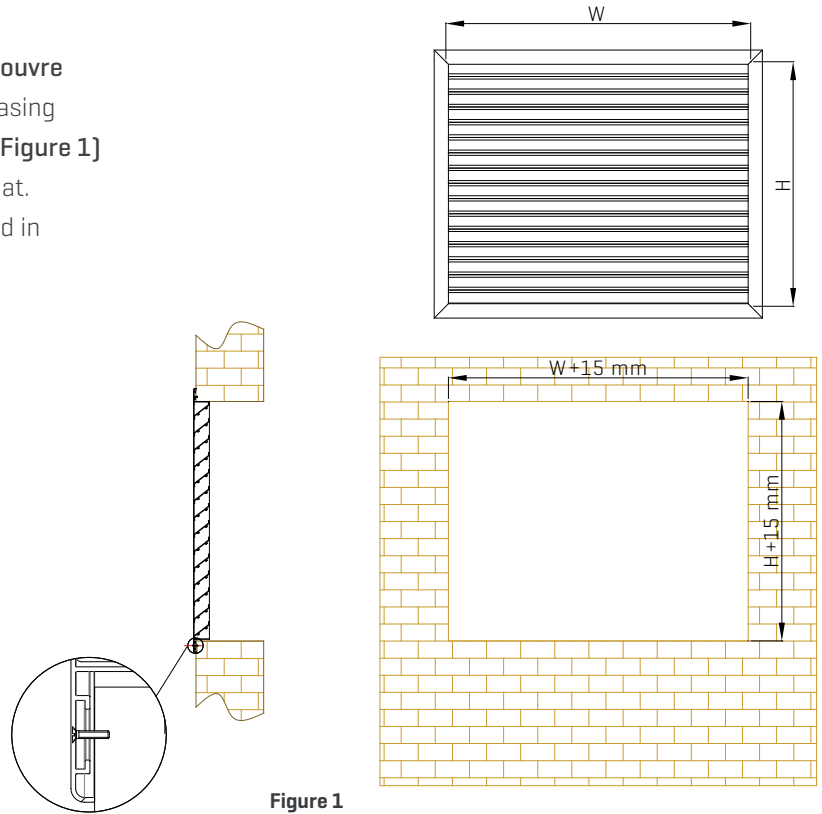


Figure 1

In the case of $W \leq 2300$ – $H \geq 2100$, the louvers are divided from the H dimension and produced as modules. During the installation, a profile should be placed at the module junction as shown in **Figure 2**. You can use 30 mm x 60 mm profile in module assemblies.

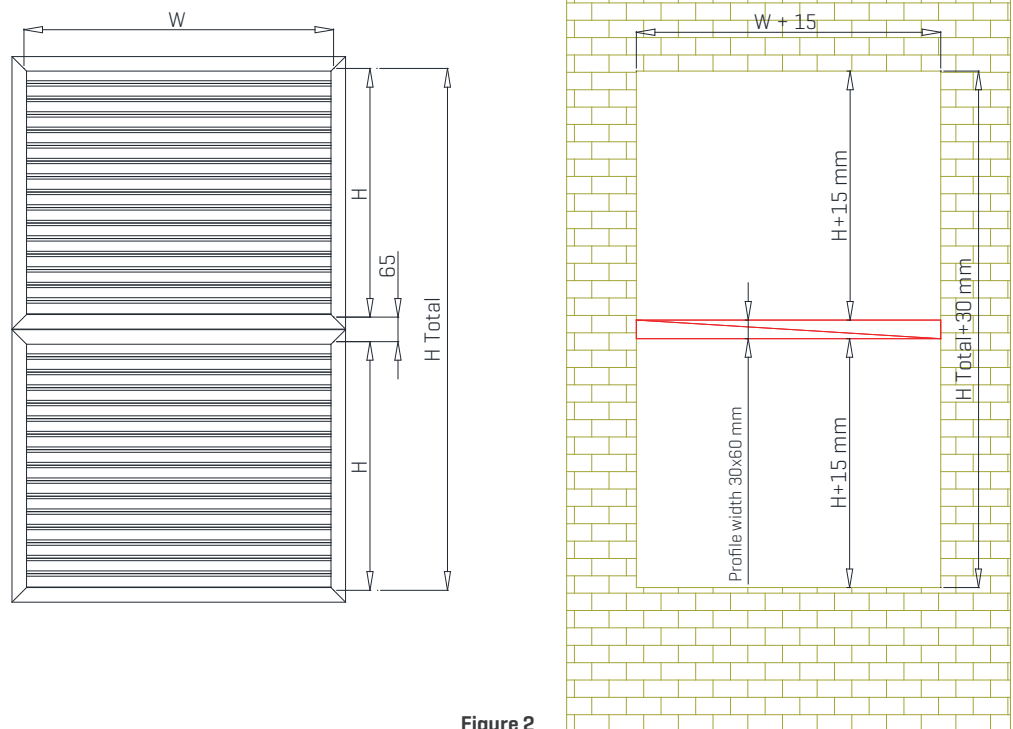


Figure 2

In case of $W \geq 2300 - H \leq 2100$, the louvers are divided in W dimensions and produced as modules.

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.

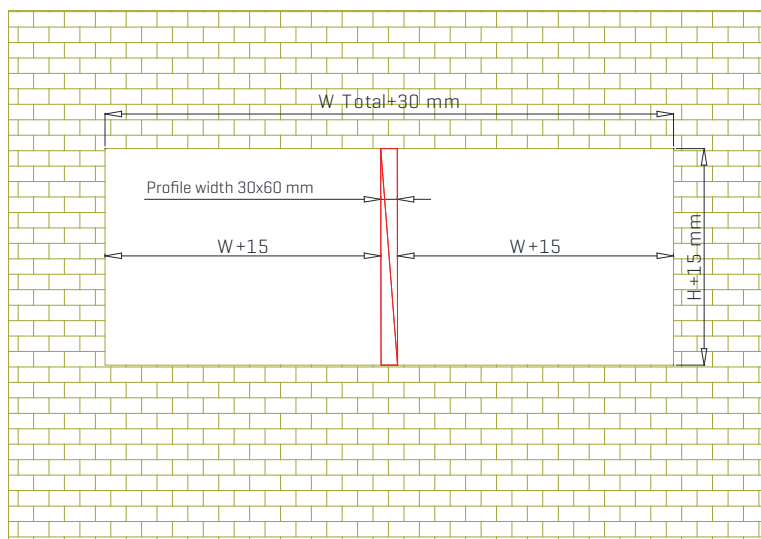
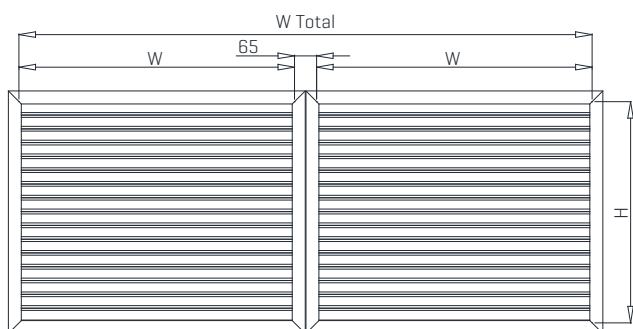


Figure 3

In the case of $W \geq 2300 - H \geq 2100$, the louvers are divided in both W and H dimensions and produced as modules.

During the assembly, a profile must be placed at the module junction as shown in **Figure 4**.

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

Note: $W \text{ Total} = W \times n + (n-1) \times 65 \text{ mm}$

W Total: Module louver throat size

W: Horizontal size for 1 module [specified in the offer.]

n: Number of modules [specified in the offer.]

Example:

What is the module size and mounting hole size of the 3600 mm x 3000 mm louver?

$W \text{ Total} = 3600 \text{ mm}$

$3600 \text{ mm} = W \times n + (n-1) \times 65 \text{ mm}$

$n = 2$ [Will be specified in the offer.]

It is found as $W = 1768 \text{ mm}$.

$H \text{ Total} = 3000 \text{ mm}$

$3000 \text{ mm} = H \times n + (n-1) \times 65 \text{ mm}$

$n = 2$ [Will be specified in the offer.]

It is found as $H = 1468 \text{ mm}$.

1 Module Size = $1768 \text{ mm} \times 1468 \text{ mm}$ [W x H]

Hole Size = $3615 \text{ mm} \times 3015 \text{ mm}$ [W total + 15 mm x H total + 15 mm]

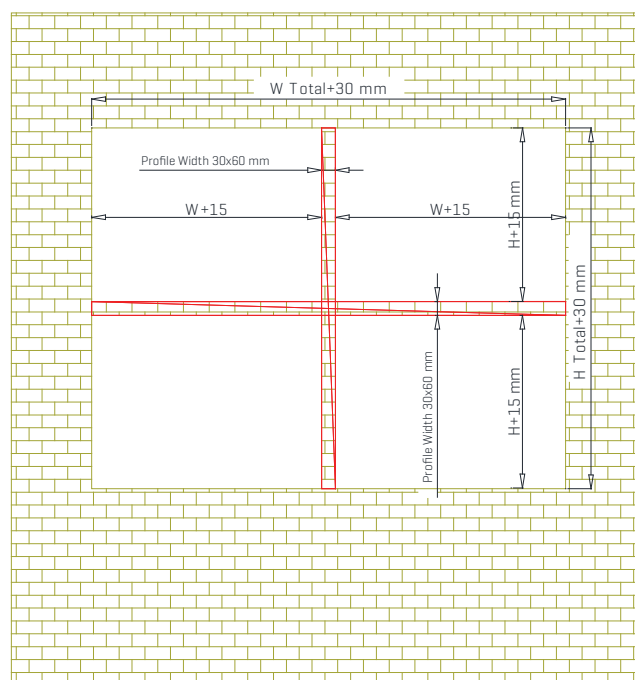
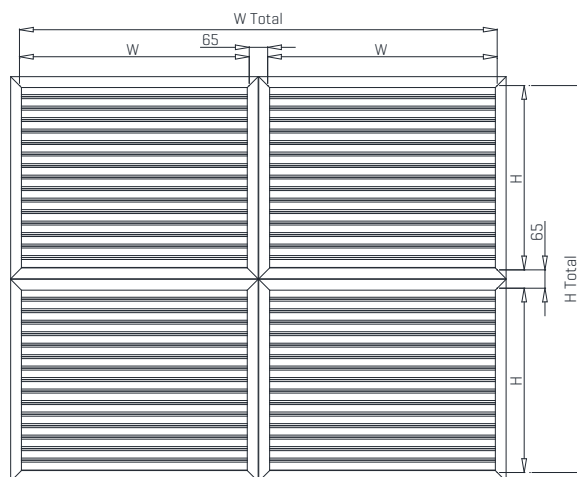


Figure 4

NOTES



NOTES



NOTES



NOTES





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İKLİMLENDİRME | HVAC SYSTEMS





VKM
Control Cap

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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 6 major groups as Air Handling Units, Rooftop Units, Heat/Energy Recovery Units, Air Purifiers, Air Distribution & Management Products and Kitchen Ventilation Equipments 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 2 factories, in total area of 32.000 sqm in which 17.500 sqm indoor space that enables DOGU HVAC manufactures 180 various type of products. Additionally, DOGU HVAC has a powerful sales network with 4 sales offices located in İstanbul, Ankara, Antalya and Adana 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 55 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 TSEK, CE and GOST-R quality certifications.



- ☞ VKM - Control Cap provides easy access to places that need maintenance, control or intervention in various ventilation system applications.

MATERIAL

- ☞ Frame options from aluminum 6063 extrusion profile.
- ☞ Cap made of galvanized sheet.

SURFACE COATING

- ☞ RAL 9010 or RAL 9016 electrostatic powder paint as standard
- ☞ Optional
 - Different RAL Codes
 - Unpainted

INSTALLATION OPTIONS

- ☞ Screw
- ☞ Tile
- ☞ Clip-in
- ☞ Internal Installation

LOCK OPTIONS

- ☞ With snap fastener
- ☞ Butterfly key
- ☞ With latch
- ☞ Allen wrench

STANDARD DIMENSIONS

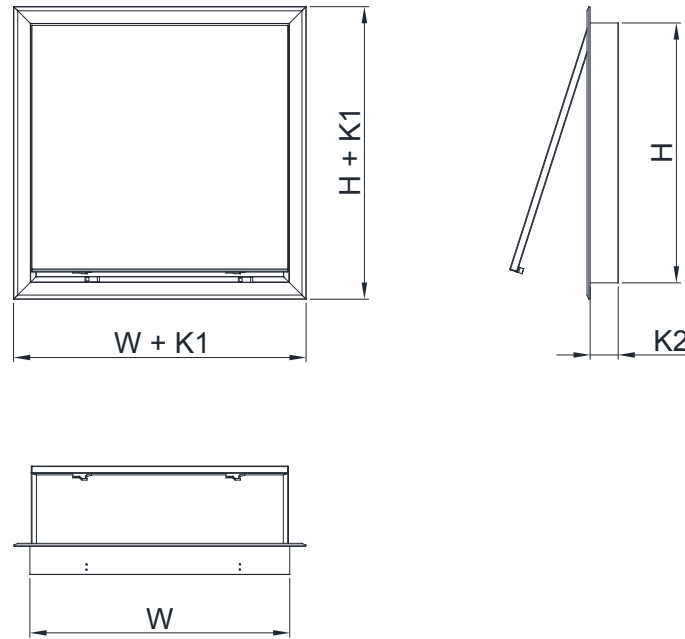
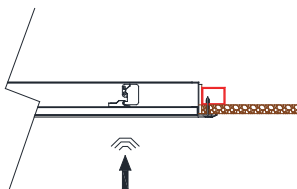
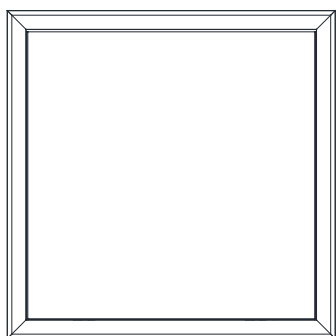


Table 1. Standard Dimensions

W [mm] (Width)	200 - 400 - 500 - 600 - 700 - 800 - 900 - 1000 - 1100 - 1200
H [mm] (Height)	100 - 200 - 300 - 400 - 500 - 600 - 700 - 800 - 900

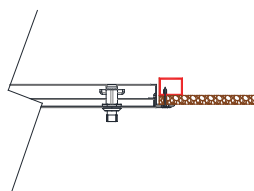
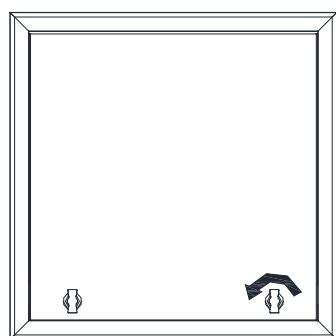
LOCK OPTIONS

With Snap Fastener



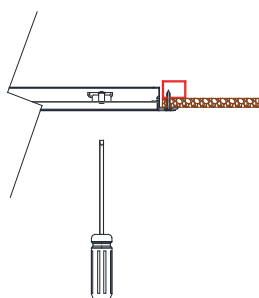
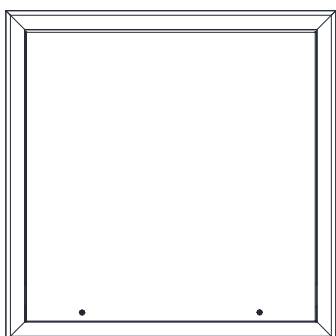
Opens with force applied to the cover

ButterflyKey



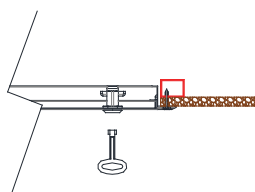
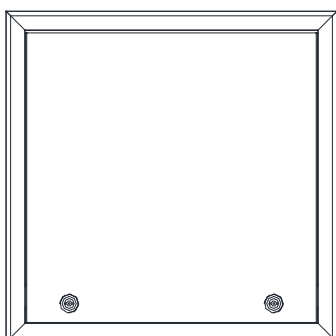
The butterfly key is unlocked or locked by hand

With Latch



Phillips screwdriver is used

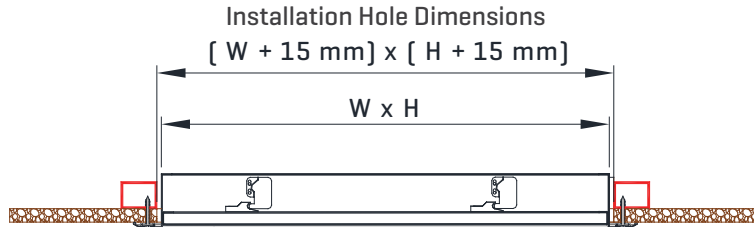
Allen Wrench



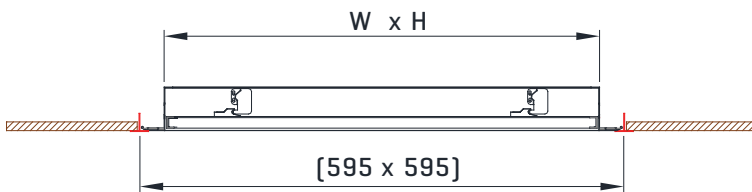
14 mm allen wrench is used

INSTALLATION OPTIONS

SCREW



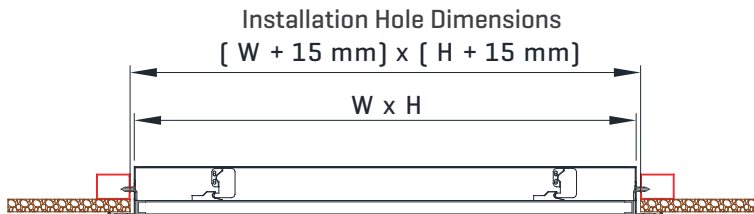
TILE CEILING



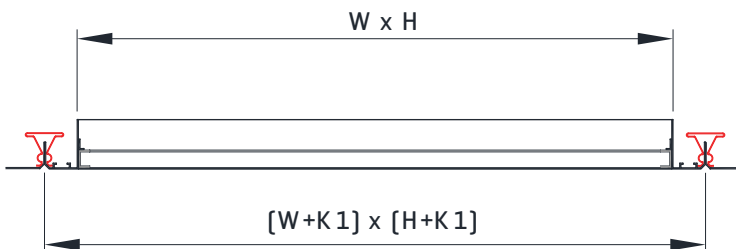
	W [mm]	H [mm]
Snap Fastener	529	529
With latch	529	529
22 mm Frame	553	553

W and H dimensions that can be selected according to the frame dimensions specified in the product selection are shown in the table above.

INTERNAL INSTALLATION



WITH CLIP-IN



Frame with Clip-in K1 = 59.2 mm	W [mm]	H [mm]
600x600	541	541
300x300	241	241

W and H dimensions that can be selected according to the frame dimensions specified in the product selection are shown in the table above.

PRODUCT ORDER CODE

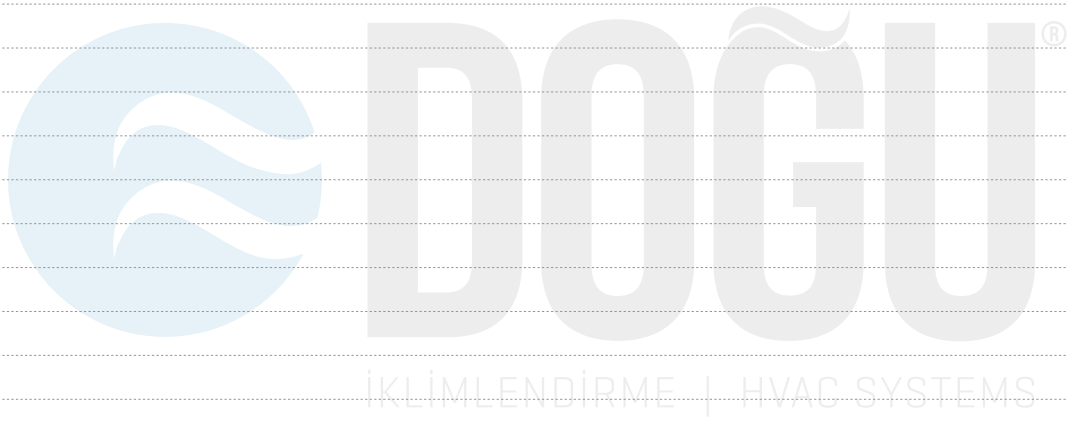
You can place your orders according to the coding format below.

VKM.ALM.<A>..<C>.<D>.<E>.<F>

A	Frame Options	
	08	With Latch
	07	With Snap Fastener
	03	22 mm Frame
	09	Frame with Clip-in
B	Installation Options	
	VD	Screw
	KR	Tile
	KL	Clip-in
	IC	Internal Installation
C	Lock Options	
	CT	With Snap Fastener
	KA	Butterfly Key
	MA	With Latch
	AH	Allen Wrench
D	Width [W] [mm]	
	0000	You can see the standard dimensions
E	Height [H] [mm]	
	0000	You can see the standard dimensions
F	Paint	
	00	Unpainted
	S1	Standard Painted - RAL 9010
	S2	Standard Painted - RAL 9016
	XX	Special Painted

Sample Coding: VKM.ALM.VD.CT.0400.0400.S1

NOTES





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OSH
High Effective Adjustable
Blade Swirl Diffuser

Venues Breathe with DOGU HVAC Systems!

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- ☞ OSH is designed to reduce the air homogeneously to the comfort zone in spaces with high ceilings.
- ☞ It can be used in high ceiling spaces such as conference rooms, gymnasiums, atriums, hypermarkets and factory production areas..
- ☞ With the adjustable blade mechanism, the most suitable throw characteristic for heating and cooling can be created.
- ☞ Their appearance is decorative.
- ☞ Suitable for areas with ceilings of 3.80 m and higher.

OPERATION

OSH High Effective Adjustable Blade Swirl Diffuser; Due to the variable thermal loads in the spaces, it is necessary to direct the supply air and change the throw movement in heating and cooling. OSH's blade positions can be changed to throw air vertically and horizontally. In this way, it is ensured that the supply air enters the space in a way that provides the appropriate movement in the comfort zone when heating or cooling is performed, and at the same time, it can meet the comfort criteria in the best way.

MATERIAL AND SURFACE COATING

OSH – High Effective Adjustable Blade Swirl Diffuser consists of three main parts. These are the outer flange, the blade group and the spigot. Out of these sections, the outer flange is shaped from aluminum sheet. Other parts are made of galvanized sheet. The product is painted in RAL9010 color with the "Electrostatic Powder Coating" process as standard. It can be painted in other RAL codes in line with the customer's request, or it can be shipped unpainted when a metallic appearance is desired.

OPTIONAL

Duct Connection Apparatus: It is used to connect the Swirl Diffuser to circular ducts.

Column Flap: Used to adjust the air volume of the Swirl Diffuser.

Servo Motor: Sit enables the position of the blades of the Swirl Diffuser to be adjusted by electrical control. The motor can be 24 V or 230 V and on-off or proportional in parallel with the automation need.

STANDARD SIZES

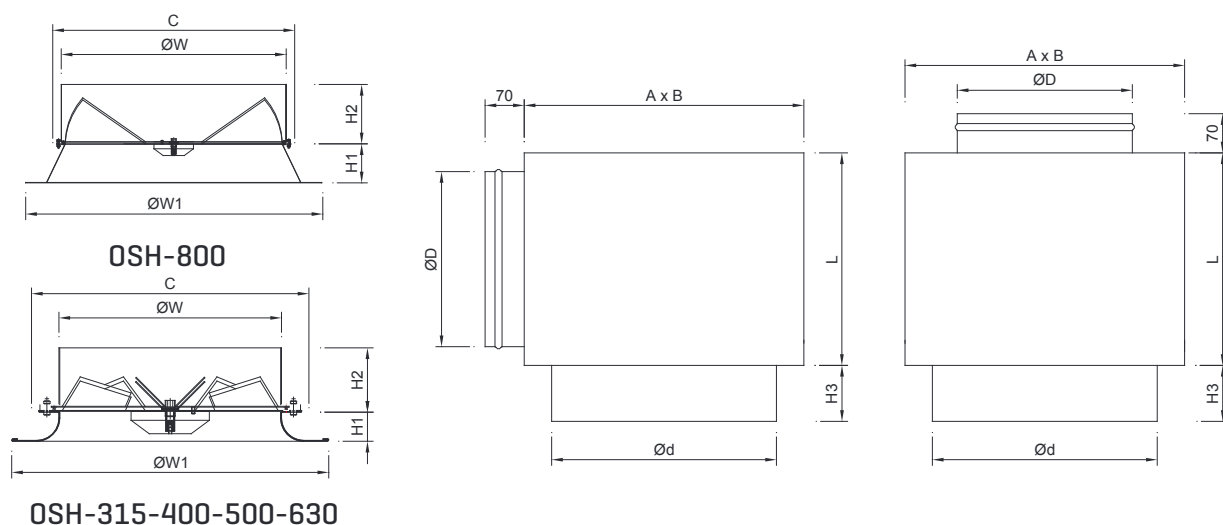
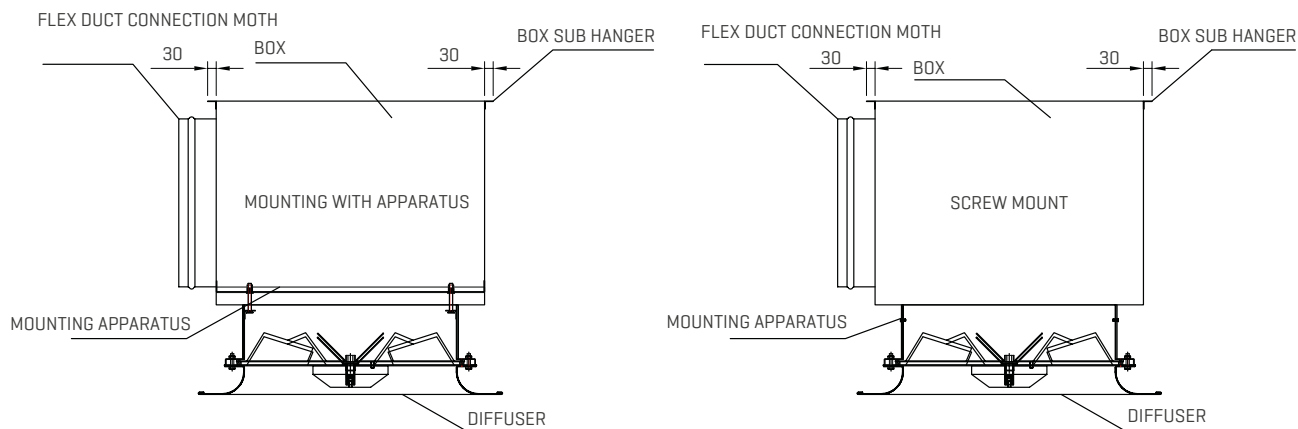


Table 1. Standard Sizes

Sizes	ØW [mm]	H1 [mm]	H2 [mm]	H3 [mm]	Ød [mm]	A [mm]	B [mm]	ØC [mm]	ØD [mm]	ØW1 [mm]	L [mm]
OSH-315	313	60	80	100	319	435	435	400	248	380	280
OSH-400	398	60	90	150	402	500	500	485	313	475	379
OSH-630	628	80	100	170	632	750	750	715	398	700	470
OSH-800	798	80	110	200	802	1000	1000	845	498	880	570

Note: C dimension is the cut-off dimension that must be left on the wall for mounting.

INSTALLATION METHOD



Note: It is produced with the product box in the weft assembly. With screw mounting, the order is also available without the box.

PERFORMANCE DATA

Table 2. Performance data

OSH	Effective Area m ²	Flow Rate [m ³ /h]	250	375	500	625	750	875	1000	1500	2000	2500	3000	3500	4000	5000		
Ø315	0,023	Pressure Loss [Pa]	10	22	39	61	88	120	156									
		Throw Distance [m]	2,6	3,8	5	6,1	7,2	8,4	9,4									
		Sound Level [dB(A)]	22	35	45	52	58	63	68									
Ø400	0,031	Pressure Loss [Pa]			15	23	34	46	60	135								
		Throw Distance [m]			2,8	3,5	4,1	4,8	5,4	7,9								
		Sound Level [dB(A)]			27	33	39	43	47	59								
Ø500	0,049	Pressure Loss [Pa]			<5	13	19	25	33	74	131							
		Throw Distance [m]			2,2	2,6	3,1	3,6	4,1	6	7,7							
		Sound Level [dB(A)]			17	23	28	32	36	48	56							
Ø630	0,078	Pressure Loss [Pa]				5	7	9	12	27	47	74	106	145				
		Throw Distance [m]				2	2,4	2,7	3,1	4,5	5,8	7,1	8,4	9,7				
		Sound Level [dB(A)]				15	20	24	28	39	47	53	58	62				
Ø800	0,111	Pressure Loss [Pa]						5	6	14	25	38	55	75	98	153		
		Throw Distance [m]						2,4	2,7	3,9	5,1	6,3	7,4	8,5	9,7	11,9		
		Sound Level [dB(A)]							15	19	31	40	47	53	62	69		

Data obtained with air •T = 0°C, blades in vertical position.

THROW DISTANCE MULTIPLIER BY BLADE POSITION



Horizontal Position
(Cooling)

45° Position
(Isothermal)

Vertical Position
(Heating)

Sample:

Ø500 OSH
Air Flow: 1000 m³/h
Pressure drop: 7 Pa
Throw Distance: 5 m
Sound Pressure Level: 30 dBA

Pressure drop

Blade Position: Horizontal [Blade Multiplier = 2]

Corrected Pressure: 7 x 2 = 14 Pa

Throw Distance

Blade Position: Horizontal [Blade Multiplier = 0.4]

Air Temperature: ΔT = +4 [Temperature Multiplier = 0.88]

Adjusted Throw Distance: 5 x 0.4 x 0.88 = 1.76 m

Sound Pressure Level

Blade Position: Horizontal [Blade Multiplier = 1.6]

Corrected Sound Pressure Level: 30 x 1.6 = 48 dBA

Table 3. Throw distance according to blade position

Blade Position	Pressure Multiplier	Sound Multiplier	Throw Distance Multiplier
Horizontal Position	1	1	1
45° Position	0,75	0,9	1,7
Vertical Position	0,5	0,6	2,5

THROW DISTANCE MULTIPLIER ACCORDING TO AIR TEMPERATURE

Table 4. Throw distance according to temperature

Heating Mode [ΔT]	4	6	8	10	12
Throw Distance Multiplier	0.88	0.82	0.81	0.71	0.64
Cooling Mode [ΔT]	4	6	8	10	12
Throw Distance Multiplier	1.11	1.17	1.23	1.29	1.35

ACTUATORS

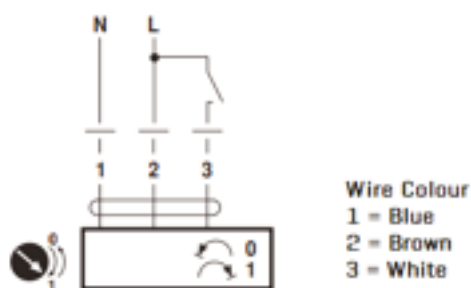
OSH is adjusted by hand adjuster as standard. Optional actuator can be used instead of adjustment with mechanical arm. Servo motor actuators have on-off and proportional control options.

Tablo 5. Actuator Table

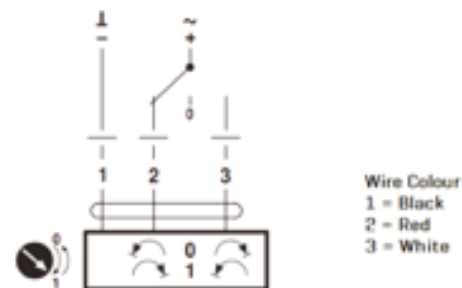
	Order Code	Name	Control	Voltaj	Torque	Switch Option
On-Off Actuators	S66	LM230A	1 wired control [On Off] 2-wire control [3-point]	100 - 240 V AC	5Nm	-
	S59	LM24A	1 wired control [On Off] 2-wire control [3-point]	24 V AC/DC	5Nm	-
	S44	LM230A	1 wired control [On Off] 2-wire control [3-point]	100 - 240 V AC	5Nm	S2A
	S20	LM24A	1 wired control [On Off] 2-wire control [3-point]	24 V AC/DC	5Nm	S2A
Proportional Actuators	S61	LM24A-SR	2 - 10 V DC	24 V AC/DC	5Nm	-
	S92	LM230A-SR	2 - 10 V DC	100 - 240 V AC	5Nm	-

ACTUATOR WIRING DIAGRAMS

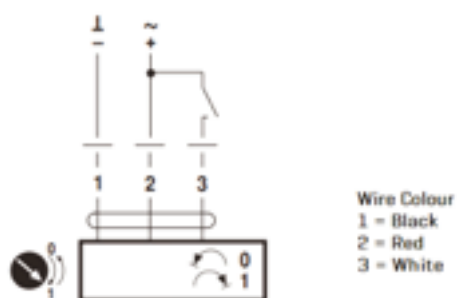
1 wired control AC 230 V [On-Off]



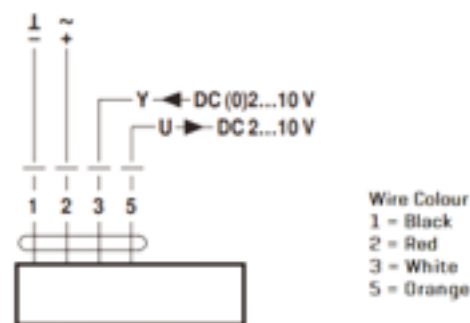
2 wired control AC/DC 24 V [3 Point]



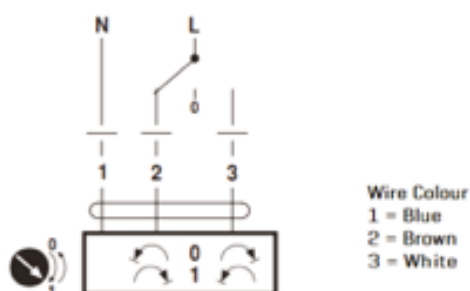
1 wired control AC/DC 24 V [On-Off]



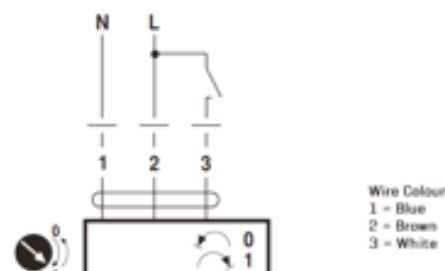
2-10 V DC Proportional [AC/DC 24 V]



2 wired control AC 230 V [3 Point]



2-10 V DC Proportional [AC/DC 230 V]
AC 230 V [On-Off]



PRODUCT ORDER CODES

You can place your orders according to the coding format given below.

PRODUCT ORDER CODE

OSH_D.ALM. <A> . .<C> .<D>

Tablo 5. Actuator Table - Order Codes

A	Installation Type	
	VD	Screwed
	KP	With Support
	MD	Without Installation Hole
B	Mechanism	
	MEK	Mechanic
	MBU	Suitable for Actuator Connection
C	Product Diameter [mm]	
	315 - 400 - 500 - 630 - 800	
D	Paint	
	00	Unpainted
	S1	Standard Painted - RAL 9010
	S2	Standard Painted - RAL 9016
	XX	Special Painted

Sample Coding: OSH_D.ALM.VD.MEK.400.S1



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İKLİMLENDİRME | HVAC SYSTEMS



DPS
Acoustic Louvre

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 6 major groups as Air Handling Units, Rooftop Units, Heat/Energy Recovery Units, Air Purifiers, Air Distribution & Management Products and Kitchen Ventilation Equipments 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 2 factories, in total area of 32.000 sqm in which 17.500 sqm indoor space that enables DOGU HVAC manufactures 180 various type of products. Additionally, DOGU HVAC has a powerful sales network with 4 sales offices located in İstanbul, Ankara, Antalya and Adana 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 55 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 TSEK, CE and GOST-R quality certifications.





DPS ACOUSTIC LOUVRE

- DPS - Acoustic Louvres are used in places where acoustic insulation is required, such as air duct ends, generator rooms, engine rooms, to reduce the spread of sound to the environment and the sounds coming from the environment.
- In order to meet different performance requirements, there are 3 different model options: DPS-150, DPS-300 and DPS-600. (Table 1)
- Thanks to its wing structure, it also provides rain protection.

It is painted with electrostatic powder paint. It has high corrosion resistance.
- It prevents foreign objects from entering the canal with mesh wire.




	DPS-150	DPS-300	DPS-600
MODEL			
Average Sound Reduction Index [Rw]	11	17	25

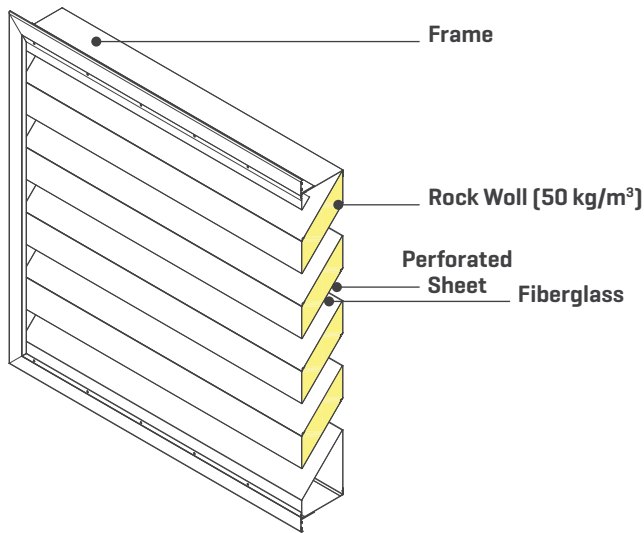
Table 1. Acoustic Louvre Models Sound Attenuation Comparison Table

MATERIAL

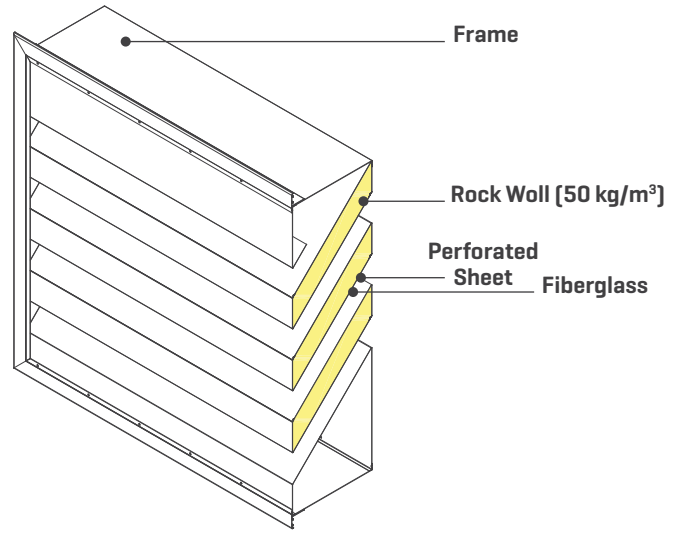
Frame and blades of all models of DPS – Acoustic Louvre are manufactured from galvanized sheet as standard. Rock wool insulation material with a density of 50 kg/m³ is used inside the blades. The surfaces of the rock wool that come into contact with the air are covered with fiber glass in order to protect them against particle abrasion. Frame and blades can also be made of stainless steel, if desired.

The product is painted in RAL9010 color with the "Electrostatic Powder Coating" process as standard. It can be painted in different RAL codes according to customer preferences. DPS is produced as standard unless specified in the order.

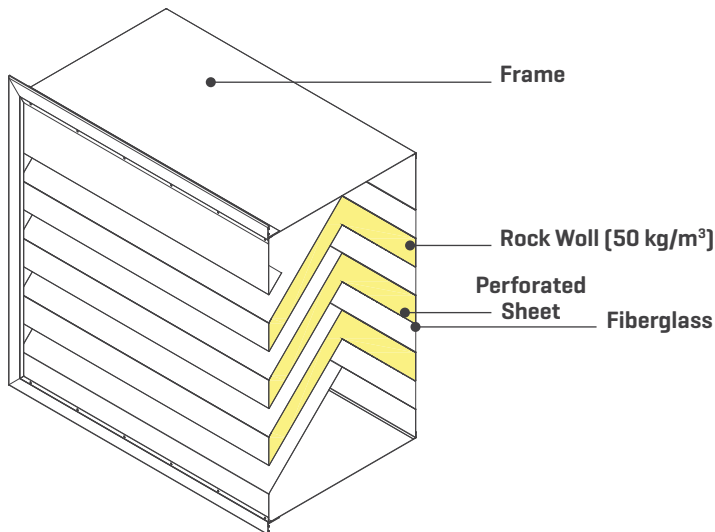
DPS-150



DPS-300



DPS-600

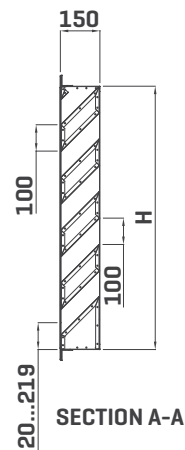
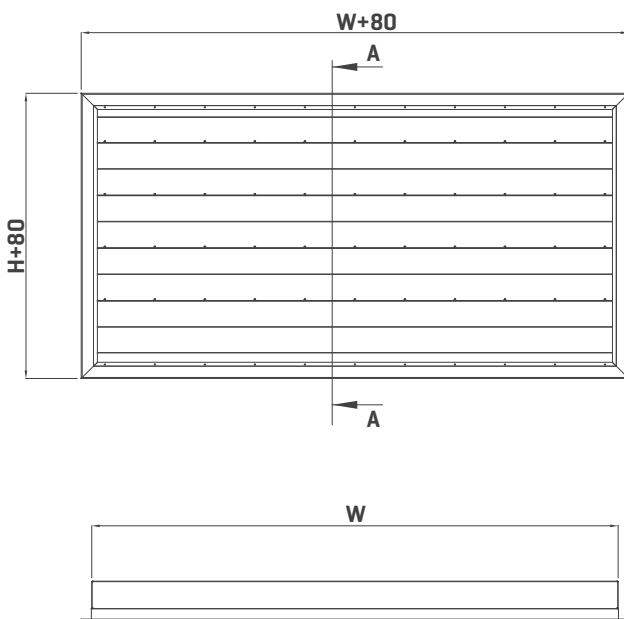


1. DPS-150



- It is possible to produce in the dimensions of Min 300 mm x 370 mm, Max 2000 mm x 1970 mm.
- It can be used in places where sound absorption is less desired.
- It is advantageous for places with narrow wall thickness.

DIMENSIONS



W (mm)	H (mm)
300	370
500	570
700	770
900	970
1100	1170
1300	1370
1500	1570
1700	1770
1900	1970
2000	

Note:

H dimension increases as the standard 200 mm. When intermediate values are requested, production is made by extending the length of the lower by-pass sheet.

Sizes larger than this range can be produced modularly.

SELECTION PARAMETERS

H (mm)	Number of Blades	Effective Area Rate [%]
370...569	1	19...12
570...769	2	25...18
770...969	3	28...22
970...1169	4	29...24
1170...1369	5	30...26
1370...1569	6	31...27
1570...1769	7	32...28
1770...1969	8	32...29
1970	9	32

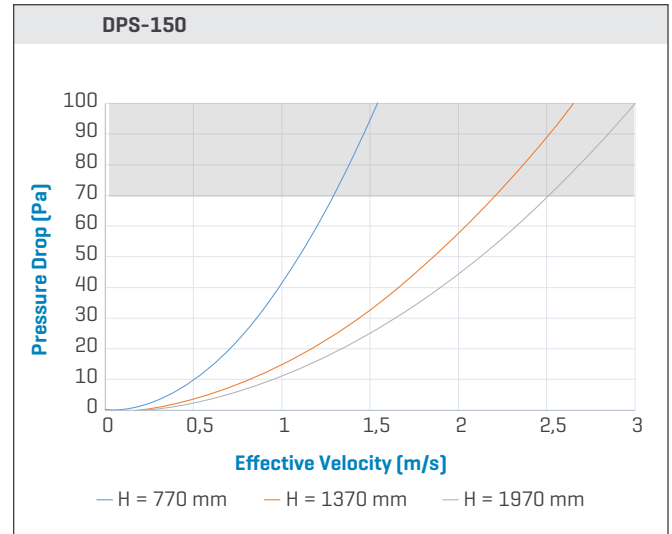


Chart 1. DPS-150 Pressure Drop Chart

Note:

It is recommended that the pressure loss be below 70 Pa in DPS - Acoustic Louvre selections. It is also recommended that the selected effective air velocity should not exceed 2 - 2.5 m/s.

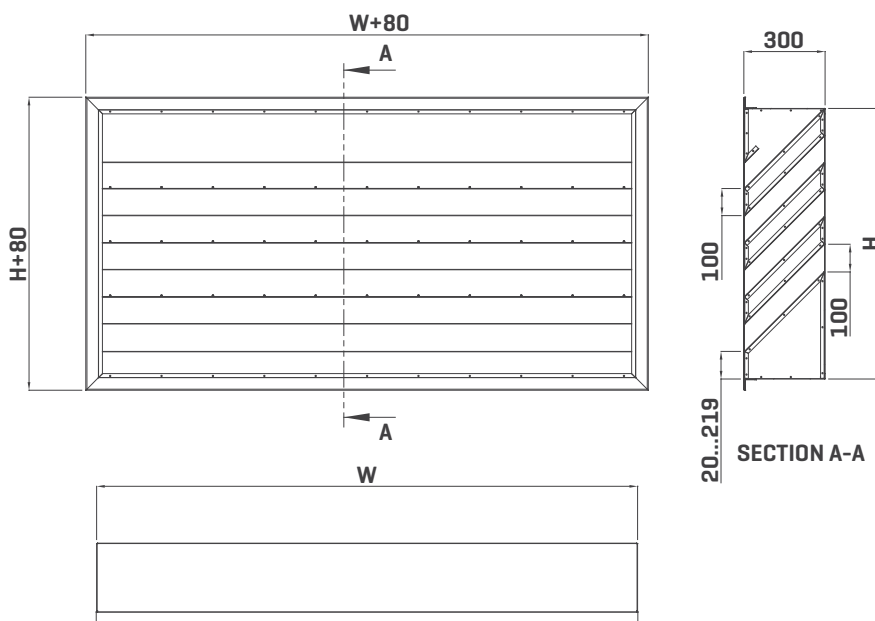
DPS - 150 Acoustic Louvre Performance Parameters								
Octave Band Center Frequencies [Hz]	63	125	250	500	1000	2000	4000	8000
Sound Level Reduction Index [dB]	4	4	6	8	11	11	11	10
Sound Power Level Produced in Acoustic Louvre when Effective Velocity is 1 m/s [dB]	48	41	34	35	30	22	13	12
Sound Power Level Produced in Acoustic Louvre when Effective Velocity is 2 m/s [dB]	66	58	51	51	50	47	41	28

2. DPS-300



- It is possible to produce in the dimensions of Min 400 mm x 520 mm, Max 2000 mm x 2120 mm.
- It can also be used as an acoustic panel.
- It has a higher sound absorption feature than DPS-150.

DIMENSIONS



W (mm)	H (mm)
400	520
600	720
800	920
1000	1120
1200	1320
1400	1520
1600	1720
1800	1920
2000	2120

Note:

H dimension increases as the standard 200 mm. When intermediate values are requested, production is made by extending the length of the lower by-pass sheet.

Sizes larger than this range can be produced modularly.

SELECTION PARAMETERS

H (mm)	Number Of Blades	Effective Area Rate [%]
520...719	1	14...10
720...919	2	20...15
920...1119	3	23...19
1120...1319	4	25...22
1320...1519	5	27...23
1520...1719	6	28...25
1720...1919	7	29...26
1920...2119	8	30...27
2120	9	30

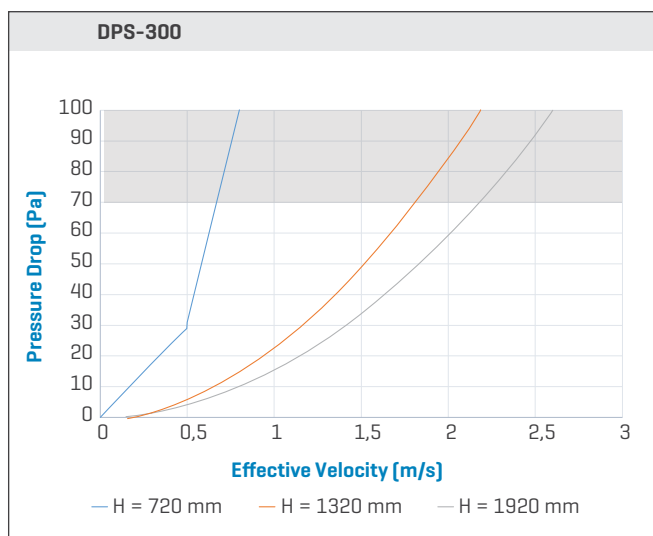


Chart 1. DPS-150 Pressure Drop Chart

Note:

It is recommended that the pressure loss be below 70 Pa in DPS - Acoustic Louvre selections. It is also recommended that the selected effective air velocity should not exceed 2 - 2.5 m/s.

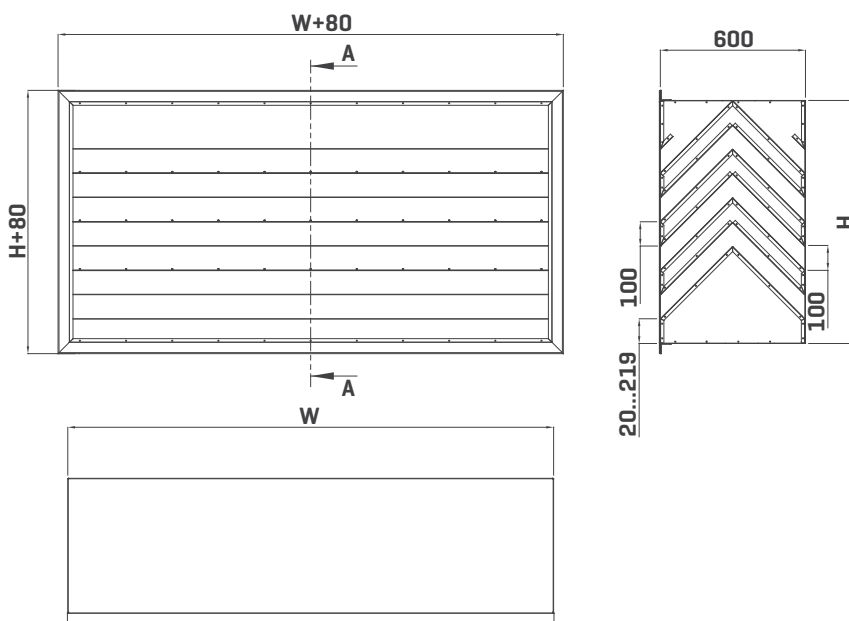
DPS - 300 Acoustic Louvre Performance Parameters								
Octave Band Center Frequencies (Hz)	63	125	250	500	1000	2000	4000	8000
Sound Level Reduction Index [dB]	6	6	9	13	21	20	16	13
Sound Power Level Produced in Acoustic Louvre when Effective Velocity is 1 m/[dB]	48	41	34	30	25	20	13	12
Sound Power Level Produced in Acoustic Louvre when Effective Velocity is 2 m/s (dB)	66	58	51	47	45	43	39	28

3. DPS-600



- It is possible to produce in the dimensions of Min 400 mm x 520 mm, Max 2000 mm x 2120 mm.
- It is the louvre with the highest sound absorption feature among the acoustic louvre models.
- It is used in places with high noise values such as generator room.

DIMENSIONS



W (mm)	H (mm)
400	520
600	720
800	920
1000	1120
1200	1320
1400	1520
1600	1720
1800	1920
2000	2120

Note:

H dimension increases as the standard 200 mm. When intermediate values are requested, production is made by extending the length of the lower by-pass sheet.

Sizes larger than this range can be produced modularly.

SELECTION PARAMETERS

H (mm)	Number of Blades	Effective Area Rate [%]
520...719	1	14...10
720...919	2	20...15
920...1119	3	23...19
1120...1319	4	25...22
1320...1519	5	27...23
1520...1719	6	28...25
1720...1919	7	29...26
1920...2119	8	30...27
2120	9	30

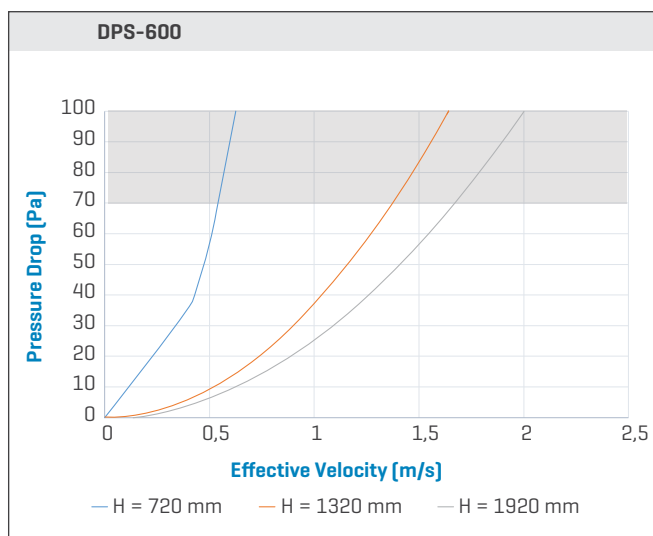


Chart 1. DPS-150 Pressure Drop Chart

Note:

It is recommended that the pressure loss be below 70 Pa in DPS - Acoustic Louvre selections. It is also recommended that the selected effective air velocity should not exceed 2 - 2.5 m/s.

DPS - 600 Acoustic Louvre Performance Parameters								
Octave Band Center Frequencies [Hz]	63	125	250	500	1000	2000	4000	8000
Sound Level Reduction Index [dB]	7	8	13	23	37	33	29	29
Sound Power Level Produced in Acoustic Louvre when Effective Velocity is 1 m/s [dB]	54	46	37	32	28	24	15	12
Sound Power Level Produced in Acoustic Louvre when Effective Velocity is 2 m/s [dB]	71	66	57	50	47	46	41	30

INSTALLATION

Installation of DPS - Acoustic Louvre is done by screwing it to the wall or blind frame with mounting screws from the sill surface. (Figure 1) The mounting surface must be smooth and flat.

In cases where the length of the overhanging part of the acoustic louver exceeds 150 mm, support profiles should be removed as seen in Figure 2.

It can also be used as an acoustic barrier around open machines or in cooling towers. (Figure 3). The products ordered for this purpose must be specified at the time of order.

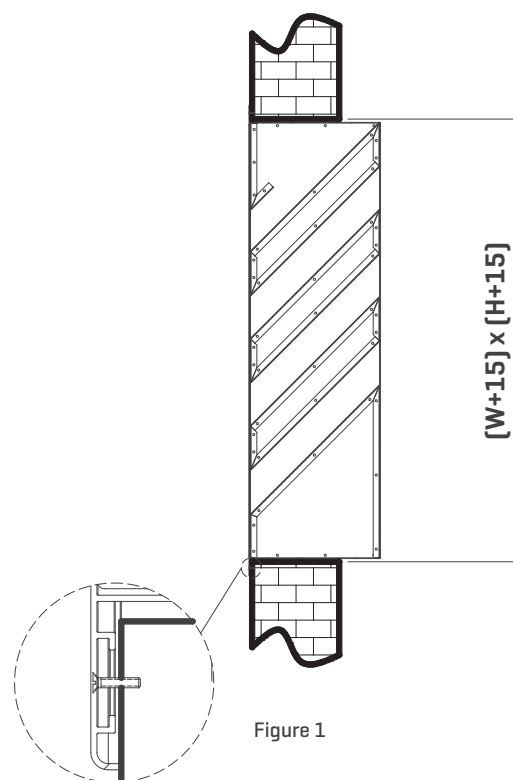


Figure 1

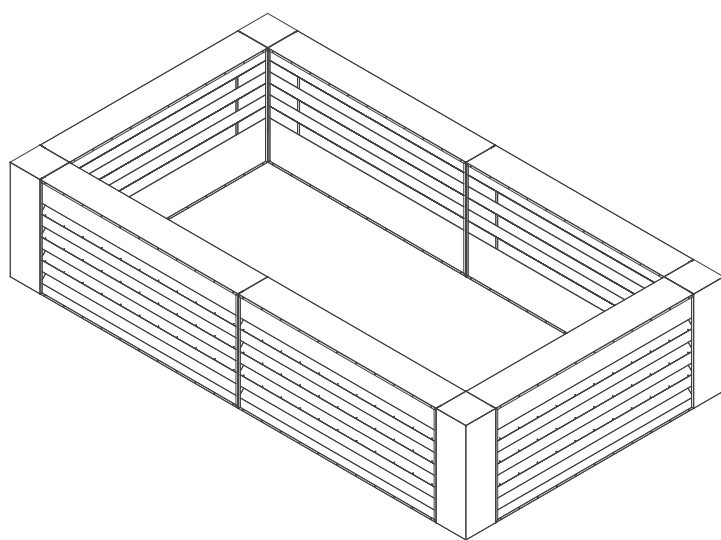


Figure 3

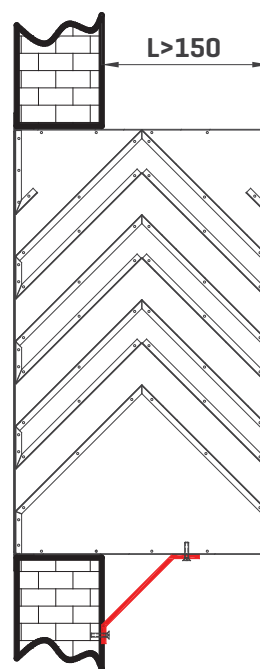
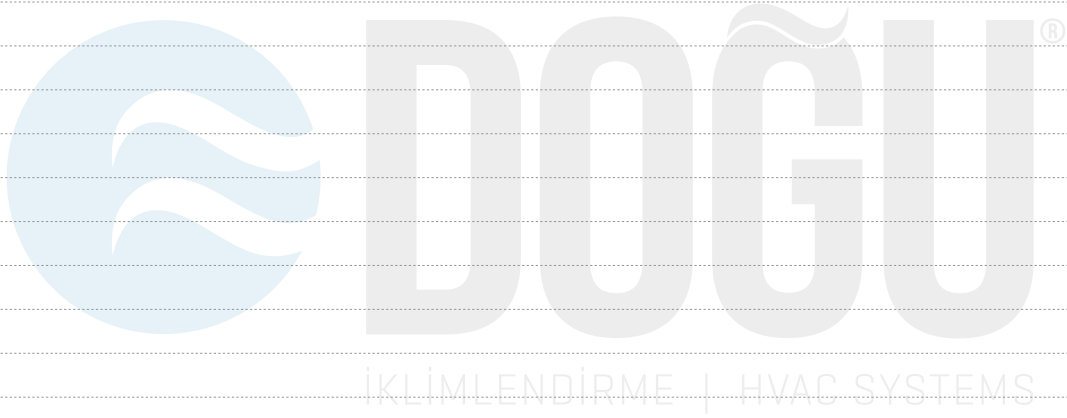


Figure 2

NOTES



NOTES





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FOUR-KITCHEN

Ecology Unit





GENERAL FEATURES

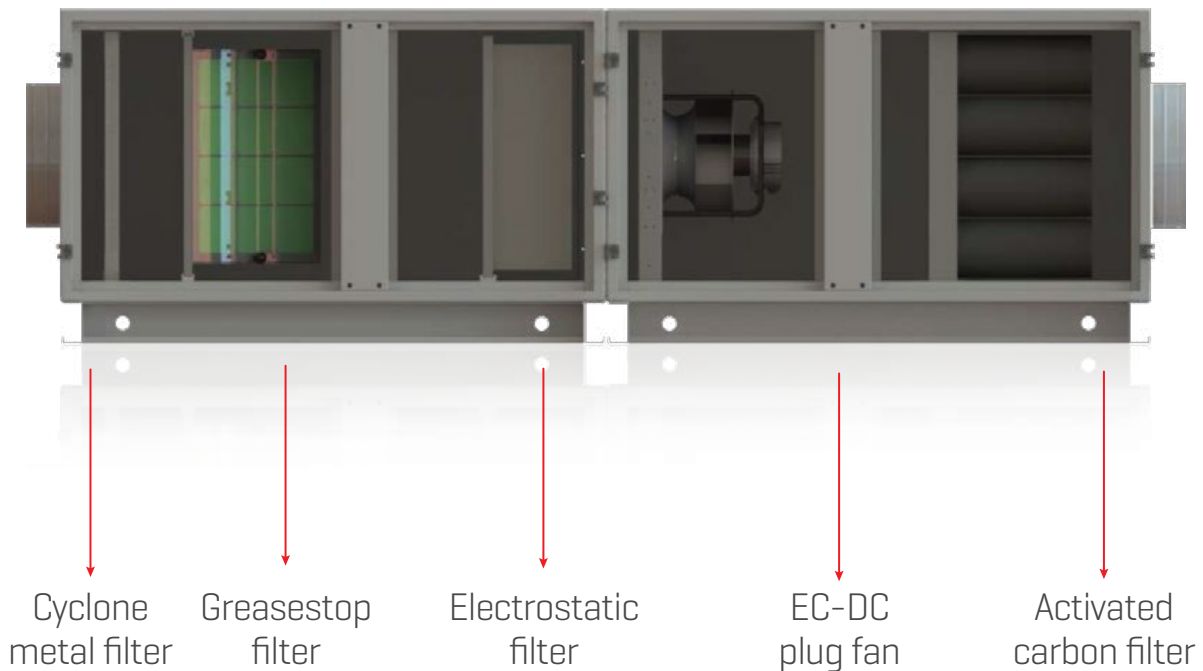
- Ideally manufactured for the kitchens with chimney problems. It is environmentally friendly.
- It is manufactured with the capacity between 2.100-10.500 m³/h depending on the exhaust flow rate and kitchen size.
- It has a double-walled, Eurovent certified panel structure in thickness of 50mm. Inner wall is manufactured from stainless steel AISI304 quality.
- It is able to filter and clean odor and smoke by 99% in exhaust air by virtue of "Electrostatic Filter" and "UV-C Filter".
- Removes possibility of performance loss due to its specially designed automatic driven EC / DC motor plug fans due to filter pollution.
- Specially manufactured in two different types as "With UV lamp [FOUR-KITCHEN UV]" and "Without UV lamp [FOUR-KITCHEN]."
- Principally it is ideally used in kitchens, hotels, hospitals, industrial facilities, business centers and offices.

1- TECHNICAL STRUCTURE

FOUR-KITCHEN, which has been developed specially for the places with chimney problem, has been manufacturing in modular structure. Thanks to its modular structure, the parts are separable thus it can be positioned at different points where it is necessary.

It consists of 50mm thickness, double-walled and Eurovent certified panels. Inner wall is manufactured from stainless steel AISI304 quality so it can be easily cleaned.

FOUR KITCHEN device is controllable through an automated system and compatible with the other equipment manufactured by Doğu HVAC Systems.



SPECIFICATIONS

- The inside walls of the device are manufactured from 304 stainless steel as standard. Taylor-made production is also available in line with the customer demand.
- Automatic control panel is supplied as standard with the device.
- Self-inverter, backward curved, EC-DC plug fan is used in device.
- Fan flow control unit is associated with the device as Standard.
- Upon request, remote-controlled fan flow control unit is supplied with the device.
- Double inclined condensation pan is available in the sections where the solid and liquid particles are caught.
- In case of request, it is able to be manufactured with mounted roofing sheet

Cyclone Filter

AG4 class cyclone flame repellent metal filter is used in device as the pre-filter. Thanks to this type of filter, the particles in size of 5 μm are able to be caught by 63% and particles of 10 μm by 95%. It has an anti-clogging design thus it can be used for longer times without the need of cleaning.

When it is filled, it can be easily removed from its place and washed thoroughly. It features a long time of use. It produces a constant and low pressure loss in the system. Cyclone filter is completely manufactured from stainless steel.



Cyclone filter

Greasestop Filter

The main objective of this filter is to catch oil and similar liquids in air current and also it serves to protect the electrostatic filter against various substances in liquid form.

Greasestop filters are able to catch the rough oil molecules by 99%.

“Greasestop filter” featuring high efficiency in oil catch is washable. In case of clogged, it can be washed by hand or in washing machine.

Following the washing process, it can be re-attached to its place after dried well then it continues to its function.

Thus it offers lower costs. To prevent any interruption in operation while the filter is getting dried, another filter set is supplied free of charge.

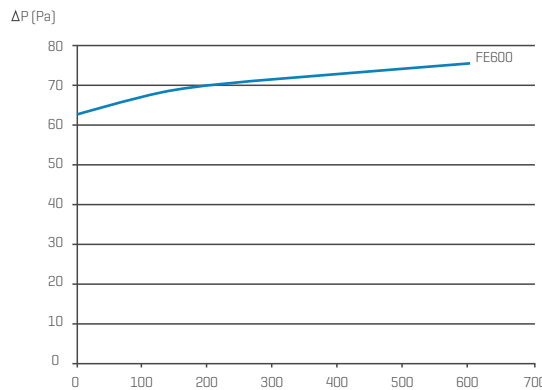


Greasestop Filter

Electrostatic Filter

Electrostatic filter, which is one of the most important parts of FOUR KITCHEN device is able to catch dust, particles, soot and other solid particles up to 0,3 μ [1 micron = 0,001mm] due to its highly efficient particle retention capability thus it offers high performance filtration solution.

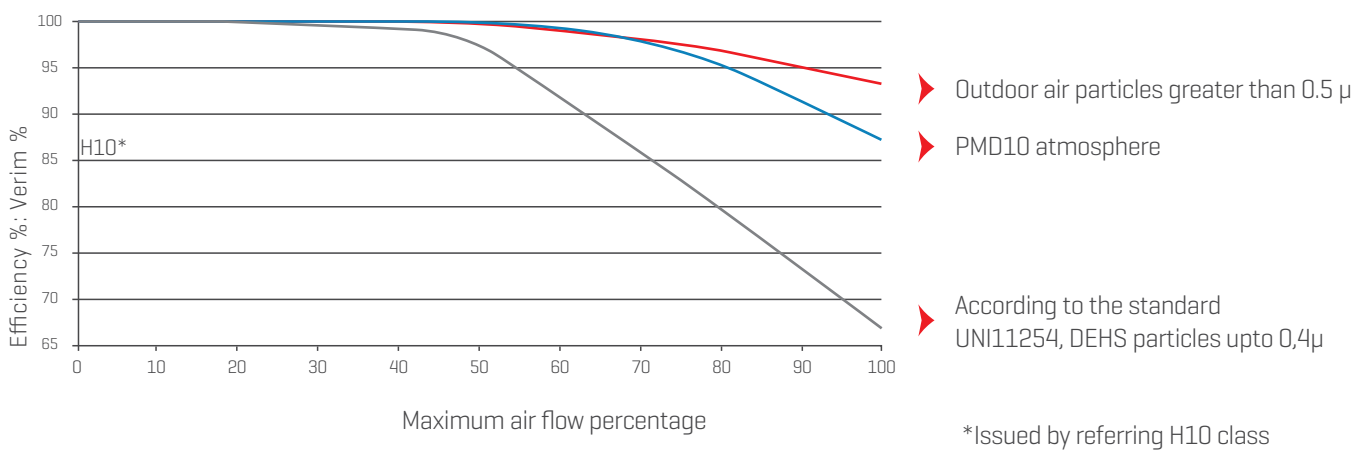
On the other side, another important feature of the filter is that it is able to work with low pressure loss. It is shown in the following graph including the relation between the particle retention amount [gr] and the pressure loss [Pa].



Clogging graph of full size electrostatic filter in gr for ISO12103-A2 dust class

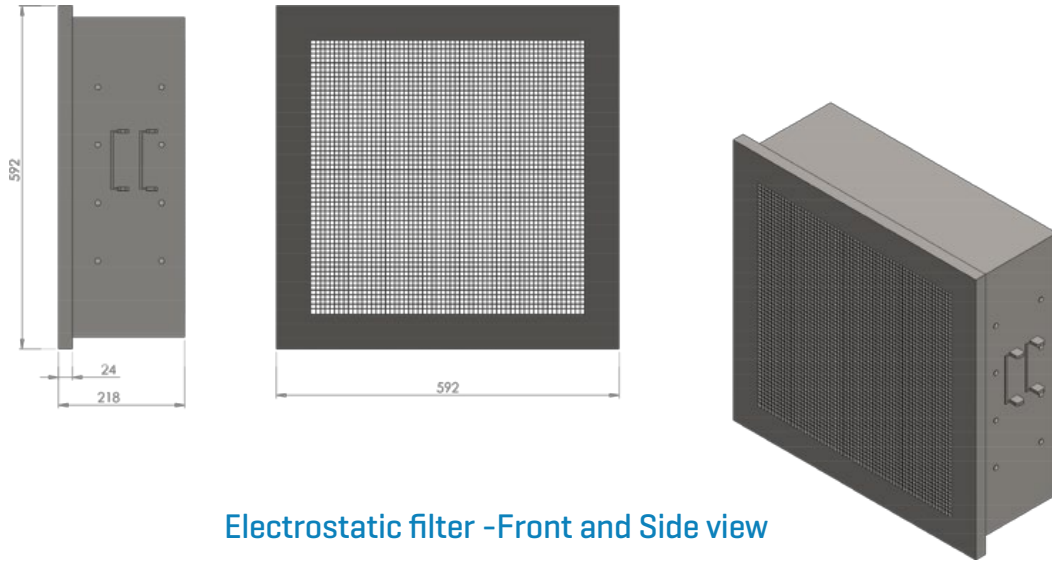
In addition, electrostatic filter efficiency is also shown in the following graph in accordance with the results of the tests done in compliance with UNI 11254 standard.

Electrostatic filters having 10 to 15 year lifespan can be used for several times by washing in into a container filled with water thanks to its waterproof structure.



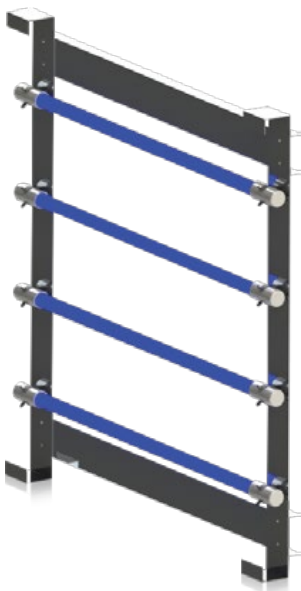
Electrostatic filters efficiency curve

The working principle of electrostatic filters is given as follows; all particles entering the filter first are electrically loaded with +/- then these particles are forced to pass through the plates electrically loaded with +/- . By magnetic force effect, the particles are directed to the plates thus filtered from the air current.



Electrostatic filter -Front and Side view

Filter efficiency	% 80-99
Performance	Full efficiency up to 600 gr particle accumulation
Input voltage	230 V - 50/60 Hz
Full Size [Width / Height] - Half-length filter	592/592 - 287/592 mm
Power consumption	9-16 Watt
Origin	Italy



UV Lamp

UV Lamp

UV lamps that are offered optionally are used just after electrostatic filter. Each type of oil molecules, odor and microorganisms are entirely destructed with short-wave electromagnetic heat-producing ultraviolet lamps (UV-C type). Maximum UV radiation can be achieved due to the lamps manufactured from the synthetic quartz glass. a

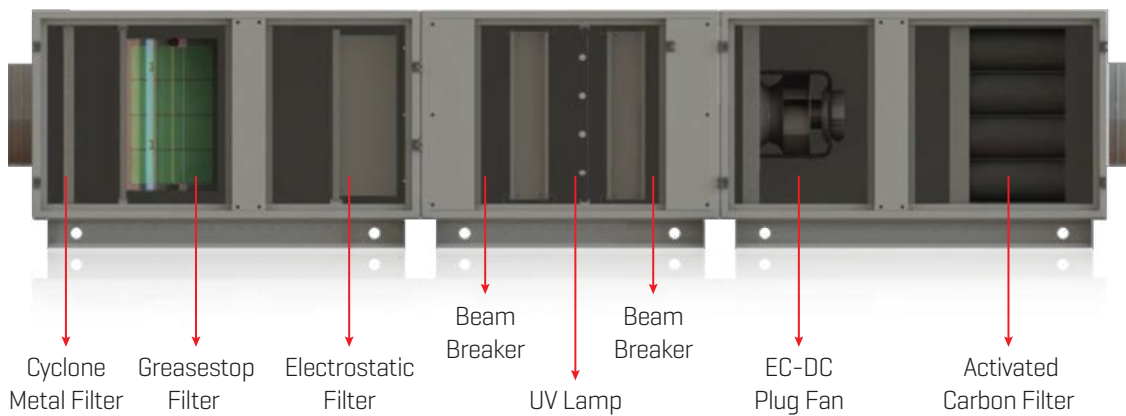
Some of the properties of UV lamps used are given as follows;

- Resistant up to 60 C.
- 4.8 [100 Watt] - 10 g / hour [220 watts] ozone production
- Thanks to its special glass coverage, lamps are prevented to have mercuric oxide layer. Thus, permanently high and fixed amount of ozone production can be achieved.
- Allows the longer life of activated carbon filter. The need of filter replacement remains at minimum level.
- No need for chemicals use, since there is no need for air duct cleaning and maintenance after use. Minimizes water and environmental pollution
- Removes any risk of fire inside the air duct
- It provides efficiency run of other ventilation units (fan, air ducts etc.) by protecting them against any dirt thus allows the air flow remains constant

On one hand, UV-C lamps are breaking all microorganisms, oil and other particles by emitting ultraviolet light and on the other hand they produce ozone gas and increase the efficiency of UV lamp. Ozone gas having the capability of high reaction reacts with all odor molecules and other organic/inorganic molecules thus provides these substances become harmless.

The inner walls of FOUR KITCHEN device is manufactured ozone protected and all other parts and cables are coated with protective layers against ozone.

Depending on usage, it has a life of over 10,000 hours.



Activated Carbon Filter



Activated Carbon Filter

Cartridge type activated carbon filters are used on the device. Ideal solution is offered by adjusting the number of cartridges according to the flow and interior size.

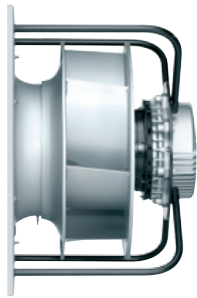
Thanks to other filters used before this activated carbon filter, this filter has lower load and longer life of use significantly.

Thus the replacement cost of activated carbon filter that forms an important item of cost in operating expenses of the device can be lowered accordingly.

The activated carbon filters used in devices are able to catch food, burn fat and meat smell, soot, nicotine, the scent of flowers and other organic compounds. In addition, use of activated carbon filter prevents ozone gas produced by UV lamp to be released to air directly.



Plug Fan



Fan

Considering low energy consumption, EC plug fans are preferred in FOUR KITCHEN devices.

These fans having high efficiency aerodynamic structure have rather low energy consumption and sound emission levels.

All fans are categorized in IP54 protection class. In view from rotor, these fans are appeared clockwise rotating backward curved aluminum fins fans. These fans that are automatically driven when the filters are clogged ensure to prevent efficiency decrease in filtration along with the time.

General characteristics of the fan are listed in the table below.

MODEL	Voltage [V]	Frequency [Hz]	Emitting noise [M]	Operating temperature °C
FOUR KITCHEN 21	380	50/60	53	-25/60
FOUR KITCHEN 42	380	50/60	56	-25/60
FOUR KITCHEN 63	380	50/60	49	-25/60
FOUR KITCHEN 84	380	50/60	48	-25/60
FOUR KITCHEN 105	380	50/60	56	-25/60

2- WORKING PRINCIPLE AND INSTALLATION

Air is first entering the device through cyclone filter and rough particles are caught. Then the oil filtration takes place with the oil holding filter. Air passing through these both filters enters electrostatic filter and here all particles up to $0,3 \mu$ are caught. UV-C lamps that are being offered optionally take part behind these filters.

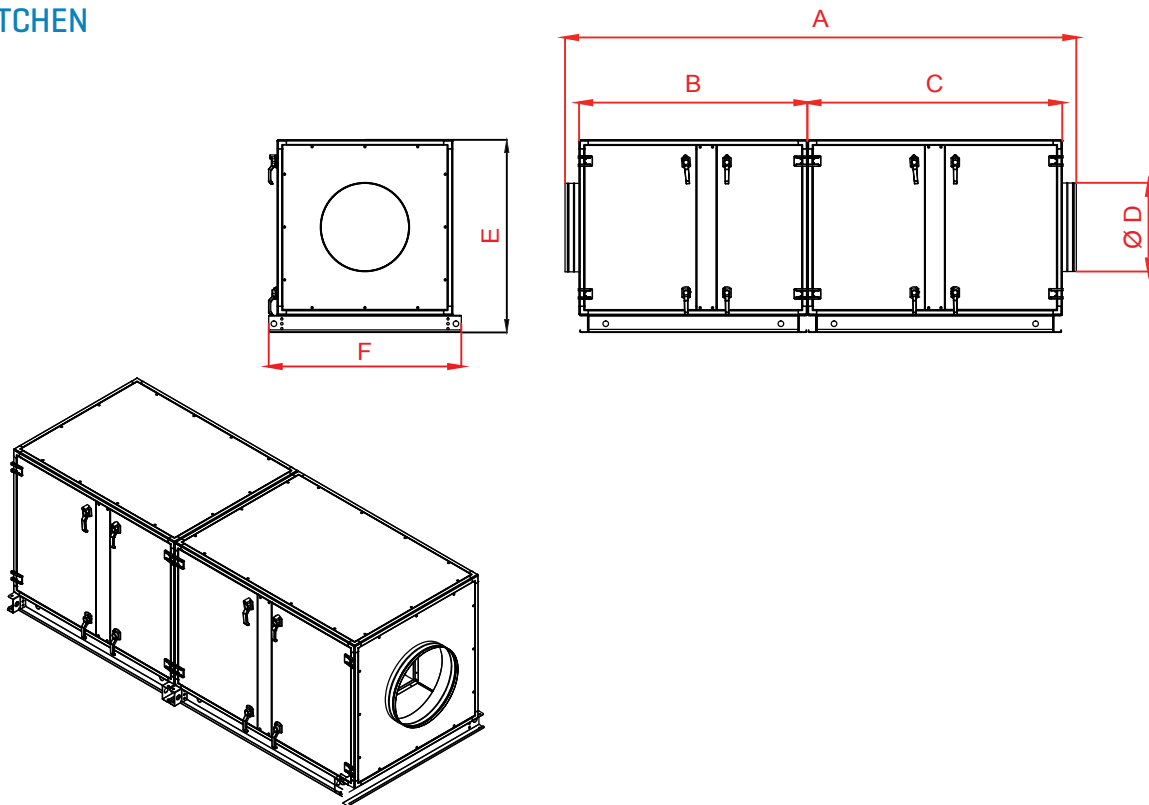
The activated carbon filters are seen as the final section.

The odor in exhausted air can be caught through these filters significantly and the cleaned air is released.

FOUR KITCHEN device manufactured in modular structure is able to be used separately or entirely. The start- up is activated by the experienced technical staff of Doğu HVAC Systems then the system is delivered to the customer after the initial tests are completed.

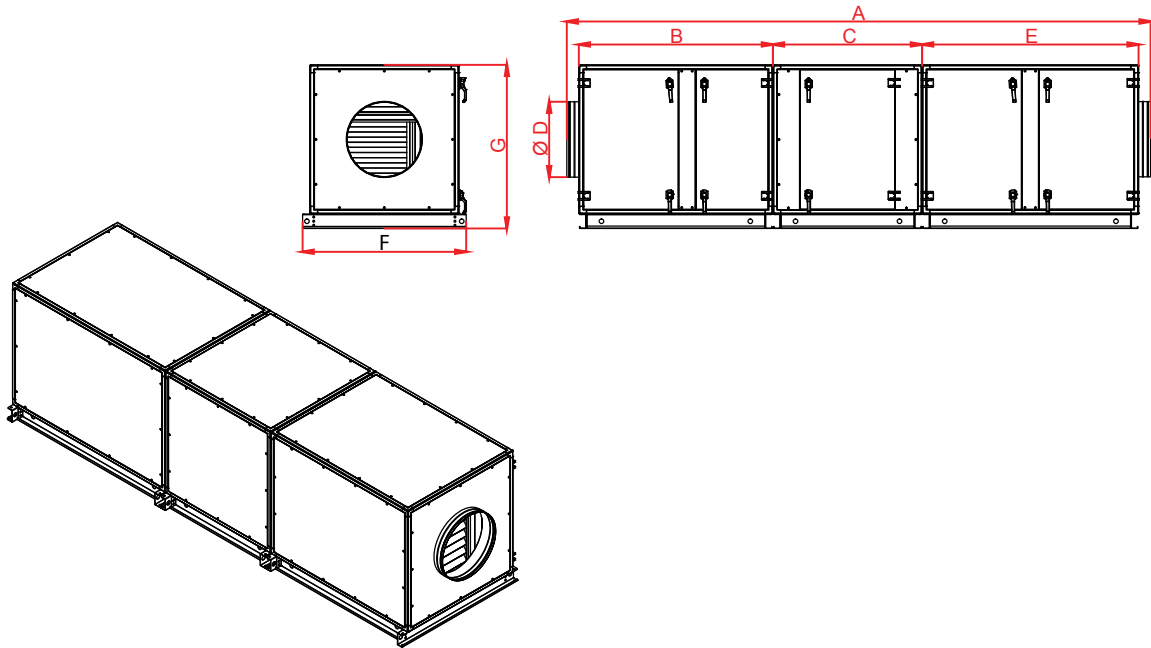
3- DIMENSIONING – SELECTION

FOUR-KITCHEN



		Flow Rate	A	B	C	Inlet Outlet [ØD]	E	F	Weight	Power
MODELS		m ³ /h	mm	mm	mm	mm	mm	mm	Kg	kW
	FOUR-KITCHEN-021	2100	2860	1340	1340	Ø395	820	820	340	1,67
	FOUR-KITCHEN-042	4200	3015	1340	1495	Ø555	820	1440	630	3,04
	FOUR-KITCHEN-063	6300	3015	1340	1495	Ø705	1440	1130	690	3,53
	FOUR-KITCHEN-084	8400	2945	1340	1495	660x1280	1440	1440	810	5,45
	FOUR-KITCHEN-105	10500	2945	1340	1495	660x1590	1440	1750	910	5,6

FOUR-KITCHEN UV



		Flow Rate	A	B	C	Inlet Outlet [ØD]	E	F	G	Weight	Power
MODELS		m³/h	mm	mm	mm	mm	mm	mm	mm	Kg	kW
	FOUR-KITCHEN-UV-021	2100	3890	1340	1030	Ø395	1340	820	820	470	2,07
	FOUR-KITCHEN-UV-042	4200	4045	1340	1030	Ø555	1495	1440	820	850	3,92
	FOUR-KITCHEN-UV-063	6300	4045	1340	1030	Ø705	1495	1130	1440	950	4,63
	FOUR-KITCHEN-UV-084	8400	3975	1340	1030	660x1280	1495	1440	1440	1080	6,77
FOUR-KITCHEN-UV-105	10500	3975	1340	1030	660x1590	1495	1750	1440	1200	7,36	

4- FILTER CAPACITIES FOUR-KITCHEN

		Particle Capture %					Odor Capture %	Grease Capture %	
		0,4 µ	≥ 99	99-95	95-90	90-80			< 80
		> 0,5 µ	99,6	99,5	98,4	97,3	93,2		
MODELS	FOUR-KITCHEN-021	Flow Rate [m³/h]	1300	1700	2100	2550	3360	90	95
	FOUR-KITCHEN-042		2600	3400	4200	5100	6720	90	95
	FOUR-KITCHEN-063		3900	5100	6300	7650	10080	90	95
	FOUR-KITCHEN-084		5200	6800	8400	10200	13440	90	95
	FOUR-KITCHEN-105		6500	8500	10500	12750	16800	90	95

- There are four distinct filter stages in the device.
- Solid and coarse particles are caught with flame repellent metal filter.
- GreaseStop filter stops rough oil particles by 99% and prevents passage of water vapor.
- Electrostatic filter catches particles with the efficiency by 99 %.
- Activated carbon filter eliminates odor by 90%.

FOUR-KITCHEN UV LAMP MODEL

		Particle Capture %					Odor Capture %	Grease Capture %	
		0,4 µ	≥ 99,5	99,5-96	96-91	91-85			< 85
		> 0,5 µ	99,8	99,6	99	97,8	94		
MODELLER	FOUR-KITCHEN-UV-021	Flow Rate [m³/h]	1300	1700	2100	2550	3360	99	99,9
	FOUR-KITCHEN-UV-042		2600	3400	4200	5100	6720	99	99,9
	FOUR-KITCHEN-UV-063		3900	5100	6300	7650	10080	99	99,9
	FOUR-KITCHEN-UV-084		5200	6800	8400	10200	13440	99	99,9
	FOUR-KITCHEN-UV-105		6500	8500	10500	12750	16800	99	99,9

- There are five distinct filter stages in the device.
- Solid and coarse particles are caught with flame repellent metal filter.
- GreaseStop filter stops rough oil particles by 99% and prevents passage of water vapor.
- Electrostatic filter catches particles with the efficiency by 99 %.
- Activated carbon filter eliminates odor by 90%.
- UV-C Lamps catch oil molecules in gas form by 99,9%.
- UV-C and activated carbon filters remove odor by 99%.
- Exhausted air through UV-C system is purified from microorganisms.

Factory

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www.doguhvac.com



KITCHEN HOOD CATALOG

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 6 major groups as Air Handling Units, Rooftop Units, Heat/Energy Recovery Units, Air Purifiers, Air Distribution & Management Products and Kitchen Ventilation Equipments 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 2 factories, in total area of 32.000 sqm in which 17.500 sqm indoor space that enables DOGU HVAC manufactures 180 various type of products. Additionally, DOGU HVAC has a powerful sales network with 4 sales offices located in İstanbul, Ankara, Antalya and Adana 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 55 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 TSEK, CE and GOST-R quality certifications.



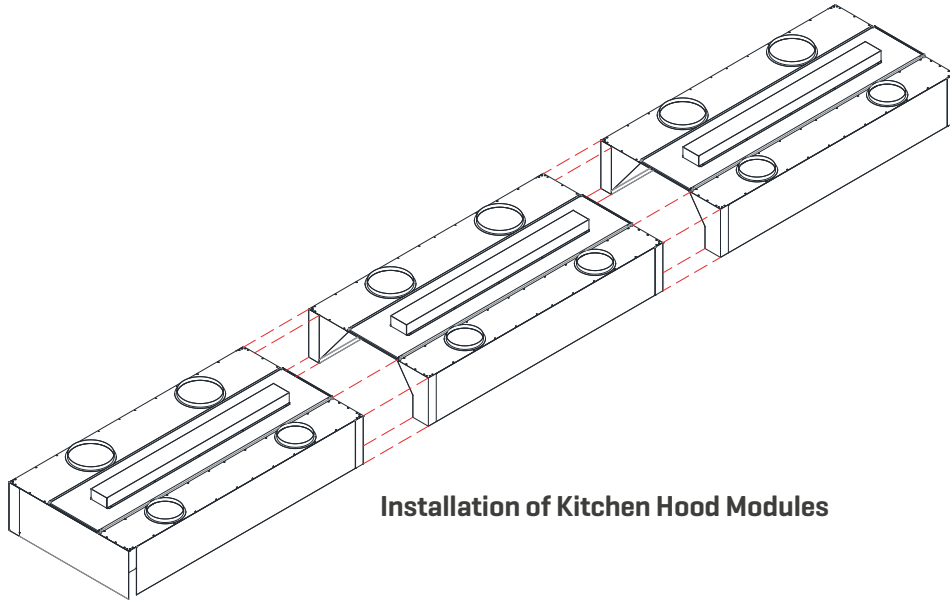
INTRODUCTION

Since 2005, DOGU HVAC has been directing the sector with its projects on industrial hoods, which are the most important part of kitchen ventilation, and new products it has developed, and exports to European, Asian, Middle Eastern and African countries. It is the first domestic company in Turkey to produce high performance kitchen hoods, which are the most preferred industrial hood types in the world, and to produce high performance kitchen hoods with water wash with the TÜBİTAK project in 2012.

1-GENERAL FEATURES

All kitchen hoods are manufactured from AISI 304 quality stainless steel as island and wall type in desired dimensions and modularly. It can also be produced from galvanized or AISI 316 stainless steel upon request. All parts are joined by TIG welding and welding traces are completely removed. Corners and all kinds of joints are felted in such a way that the joint traces will not be visible, and a uniform appearance is provided by polishing the top. IP 65 class lighting modules are used in kitchen hoods. Lighting under the hood is made with LED lamps. There is a tempered glass protector on the lamps that allows it to work between -40 and +300°C. The minimum and maximum dimensions of the hoods produced are given in the table below. Hoods that are larger than these values are produced as modular and assembled on site.

KITCHEN HOOD CODE		MODEL SIZE	
		WALL TYPE	ISLAND TYPE
		L x W	L x W
HDD	Min.	650x800	1000x1700
	Max.	2600x2000	2900x2800
HYH	Min.	1000x1000	1000x1700
	Max.	2600x2100	2900x2800
HWW	Min.	1000x1300	2900x2200
	Max.	2900x2800	2900x2800
HDS	Min.	1000x1000	-
	Max.	2950x1800	-
HDX	Min.	500x500	-
	Max.	2950x1800	-
HYH-UV	Min.	1000x1000	1000x1700
	Max.	2600x2100	2900x2800



Installation of Kitchen Hood Modules

All kitchen hoods are put into use by the expert technical personnel of DOGU HVAC after they are assembled on site and system settings are made. It is under the guarantee of our company against production faults for 2 years from its installation.

KITCHEN HOOD GENERAL FEATURES

	Standard	Option
Material	AISI 304 Quality Stainless Steel	AISI 316 Quality Stainless Steel Sheet or Galvanized
Body Sheet Thickness	0,8 mm	1 or 1,2 mm
Height	400-600 mm	-
Exhaust Outlets	Circular Section [ø 315 mm]	Square or Rectangular Section
Fresh Air Intakes	Circular Section [ø 250 mm]	Square or Rectangular Section
Lighting	LED Lamp	-

FILTERS

The filters are produced from 0.60 mm thick AISI 304 quality stainless steel material. Oil trap filters are produced as percussion and cyclone type. All filters are detachable and can be easily cleaned. The filters are flame-retardant and prevent the passage of flame into the kitchen hood.

BAFFEL TYPE FILTER

Baffle type filters are one of the most used filter types in kitchen hoods. Approximate holding efficiencies for 10 µm particles are around 30%. In these filters, the exhaust air passes through the curtains. Together with the exhaust air, the oil particle rotates due to its momentum and hits the plate and filtration is provided. They have flame retardant properties. Pollution does not change the pressure drops too much.



Baffel Type Filter

CYCLONE FILTER

It has just started to be used in kitchen hoods. It has a non-clogging design; In this way, it can be used for long periods without cleaning. When it is full, it can be easily removed and washed easily. It has a long service life. It creates a constant and low pressure loss in the system.

With the cyclone type filter, approximately 60% of 5 μm particles and 95% of 10 μm particles are captured.

In cyclone type filters, the air entering the filter starts to rotate due to the structure of the filter and the oil particles collide with the filter surface and are collected in the condensation pan under the filter. The air leaves the filter from the top and bottom of the filter.



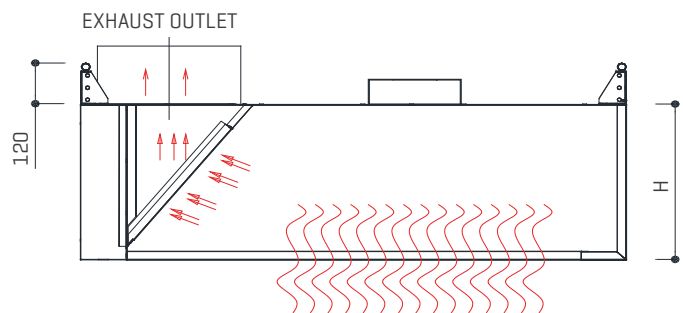
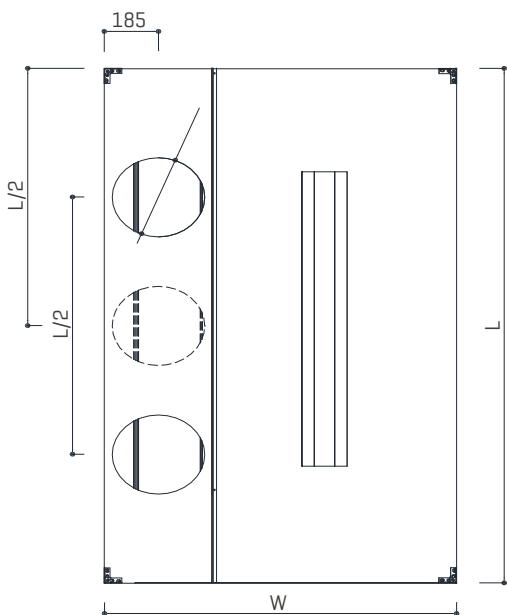
Cyclone Filter

2-HDD CLASSIC FILTER KITCHEN HOOD

- Classic type hoods are generally used in kitchens where small exhaust flow rates occur. The hood only removes the greasy fumes generated during cooking from the environment.
- Classic type hoods exhaust the air from the environment with a single aspirator with the help of the duct and give it to the outside air. It has a condensation pan that covers the hood all around.
- This type of hoods are produced with filters to be used instead of high performance hoods if high performance hoods are not used.
- All parts of the classic type hoods are made of 100% AISI 304 stainless steel. It can also be produced from galvanized or AISI 316 stainless sheet according to the customer's request.
- The body of the hood is produced from AISI 304 quality stainless sheet with brushed appearance. The main elements are assembled with easy-to-assemble sealed connections. Sealing elements or welded connections are used where necessary. The hood has a condensation pan with rounded corners, free from burrs and covering the hood all around. The lower corners are combined with leak-proof welded manufacturing to prevent harmful water from dripping.

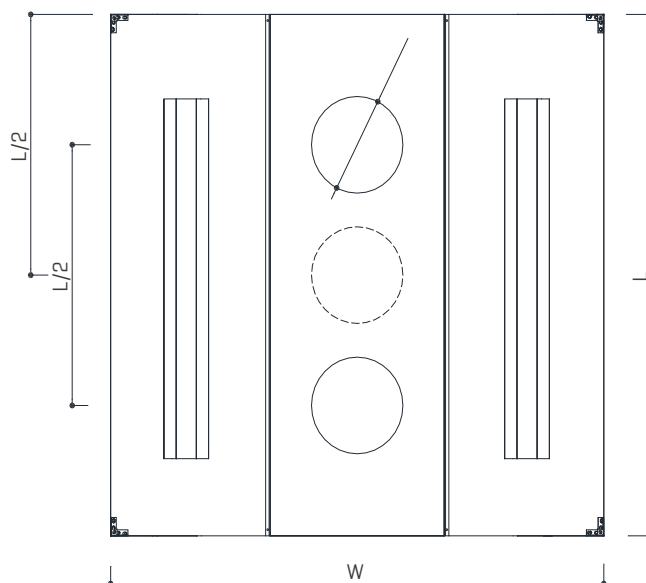
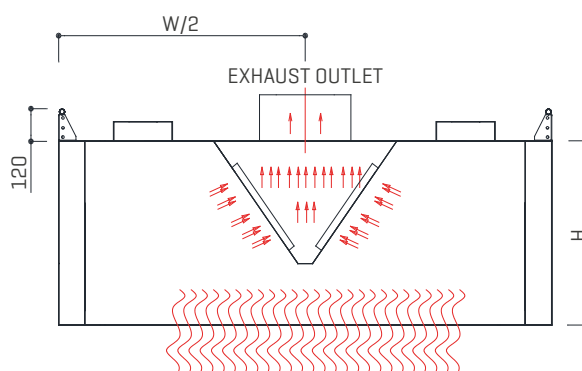


Classic Filtered Hood Selection Wall Mounted



LENGTH (L)	WIDTH (W)	HEIGHT (H)	Q	Q1	LIGHTING MODULE SIZE	NUMBER OF LIGHTING MODULES	NUMBER OF EXHAUST CONNECTIONS	NUMBER OF FRESH AIR CONNECTIONS
650...1500	800...2000	400/600	ø 315	-	750x150x85	1	1	-
1500...1700		400/600	ø 315	-	1250x150x85	1	1	-
1700...2000		400/600	ø 315	-	1250x150x85	1	2	-
2000...2600		400/600	ø 315	-	1750x150x85	1	2	-

2-HDD CLASSIC FILTER KITCHEN HOOD



LENGTH (L)	WIDTH (W)	HEIGHT (H)	Q	Q1	LIGHTING MODULE SIZE	NUMBER OF LIGHTING MODULES	NUMBER OF EXHAUST CONNECTIONS	NUMBER OF FRESH AIR CONNECTIONS
1000...1500	1700...2000	400/600	ø 315	-	750x150x85	2	2	-
1500...1700		400/600	ø 315	-	1250x150x85	2	2	-
1700...2000		400/600	ø 315	-	1250x150x85	2	4	-
2000...2600		400/600	ø 315	-	1750x150x85	2	4	-

3-HYH HIGH PERFORMANCE KITCHEN HOOD

High performance kitchen hoods, which provide energy savings of around 30-40%, pay for themselves within 1 year after the first investment in many projects. They also provide hygienic and quality environments in the cooking and show sections of kitchens and restaurants.

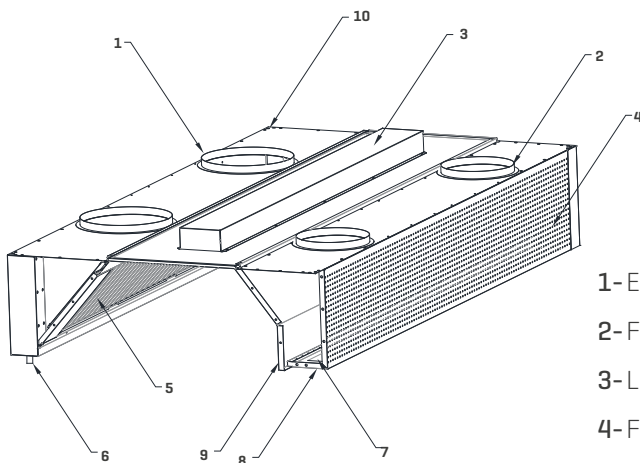


Unlike the classical type hood, the high performance hood supply fresh air over itself to the space and downwards to form an air curtain. In this way, less conditioned air is thrown out and some of the fresh air needed by the place is met.

General Features of High Performance Kitchen Hoods

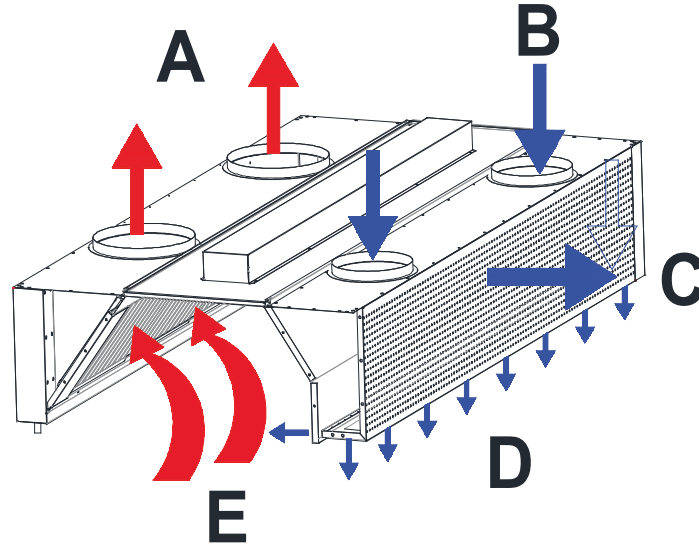
- ☞ Production as modular in every dimension
- ☞ Flame retardant cyclone type filter
- ☞ 30% 40% reduction in exhaust air flow compared to conventional hood
- ☞ The fresh air side of the hood is insulated against internal condensation

Yüksek Performanslı Davlumbaz Elemanları



- | | |
|--------------------------------------|------------------------------|
| 1- Exhaust duct connection point | 6- Drain valve |
| 2- Fresh air duct connection | 7- Air curtain supply damper |
| 3- Lighting module | 8- Bottom supply diffuser |
| 4- Fresh air supply perforated sheet | 9- Internal supply diffuser |
| 5- Exhaust filter | 10- Hanger holes |

WORKING PRINCIPLE OF HIGH PERFORMANCE KITCHEN HOOD



A-Exhaust air

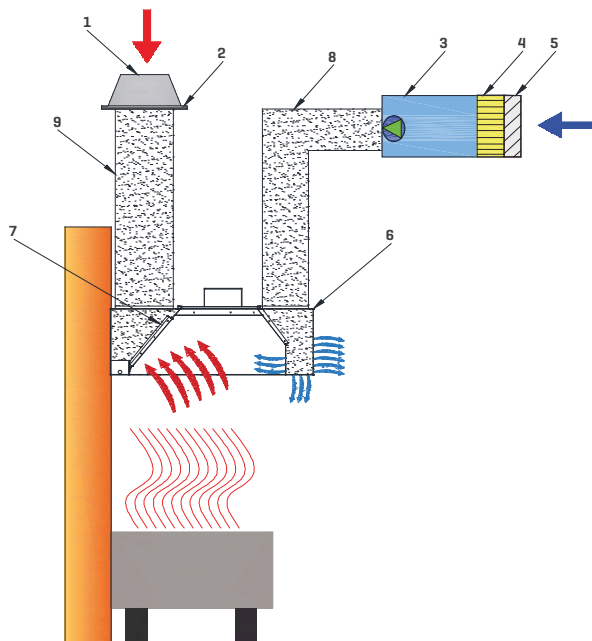
B-Fresh air

C-Fresh air is supply from the front surface towards the room with a homogeneous and low air velocity, both wrapping the hood and supporting the fresh air requirement of the space.

D- Fresh air is supply from the bottom of the hood vertically to the floor, preventing the pollutant air from the cooking units escaping into the space by forming an air curtain and directing it towards the exhaust side.

E- Fresh air is supply towards the filter, creating a pushing force on the pollutant air coming out of the cooking units and providing a better grip on the exhaust. Thanks to the fresh air, the conditioned air around the hood cannot be directed towards the hood and as a result, energy savings are achieved.

Yüksek performanslı davlumbaz uygulaması aşağıdaki şekilde gösterilmiştir.



1- Aspirator

2- Aspirator Filter

3- Ventilator

4- Dust Filter [F7]

5- Coarse Filter [G4]

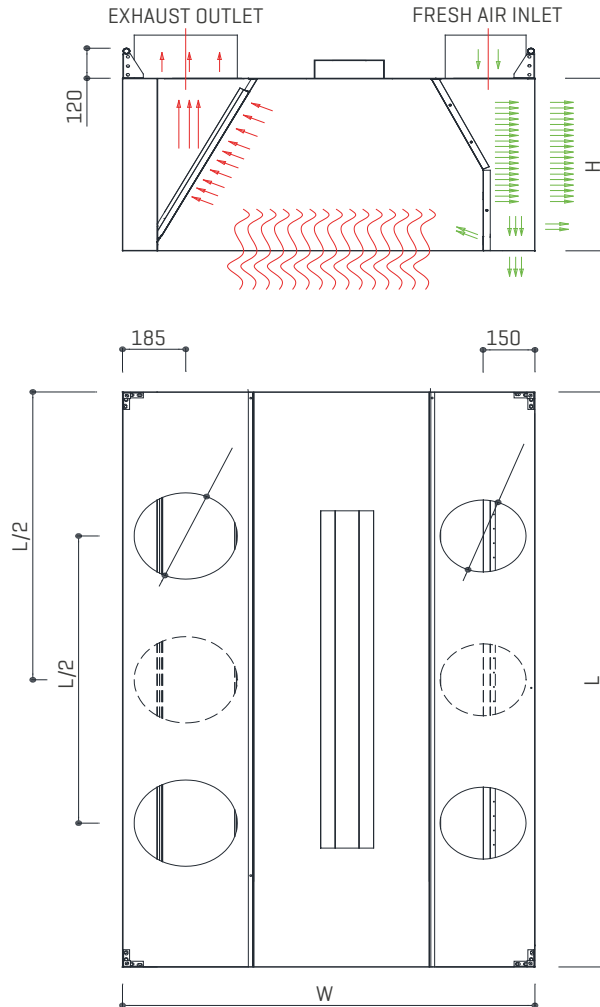
6- Kitchen Hood

7- Kitchen Hood Filter

8- Fresh Air Line

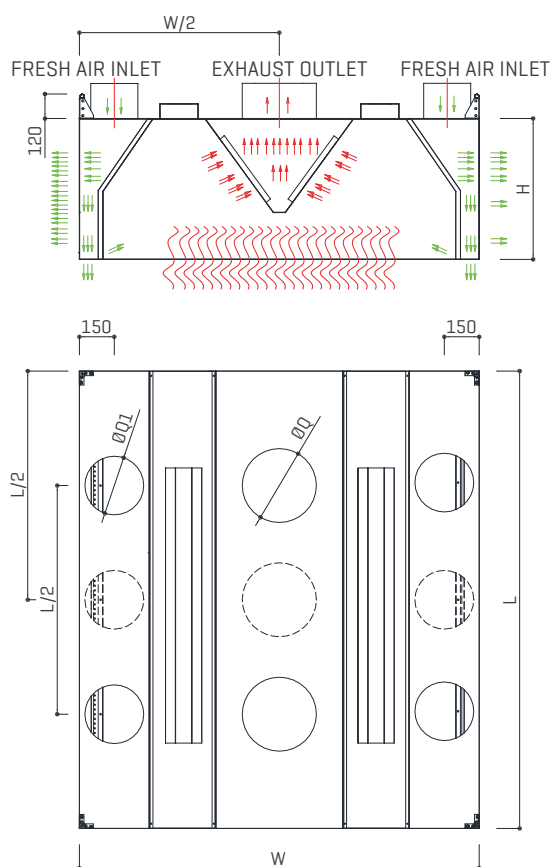
9- Egzoz Air Hattı

HIGH PERFORMANCE HOOD SELECTION [WALL MOUNTED]



LENGTH [L]	WIDTH [W]	HEIGHT [H]	Q	Q1	LIGHTING MODULE SIZE	NUMBER OF LIGHTING MODULES	NUMBER OF EXHAUST CONNECTIONS	NUMBER OF FRESH AIR CONNECTIONS
1000...1500	1000...2100	400/600	ø 315	ø 250	750x150x85	1	1	1
1500...1700		400/600	ø 315	ø 250	1250x150x85	1	1	1
1700...2000		400/600	ø 315	ø 250	1250x150x85	1	2	2
2000...2600		400/600	ø 315	ø 250	1750x150x85	1	2	2

ISLAND TYPE



LENGTH [L]	WIDTH [W]	HEIGHT [H]	Q	Q1	LIGHTING MODULE SIZE	NUMBER OF LIGHTING MODULES	NUMBER OF EXHAUST CONNECTIONS	NUMBER OF FRESH AIR CONNECTIONS
1000...1500	1700...2800	400/600	ø 315	ø 250	750x150x85	2	2	2
1500...1700		400/600	ø 315	ø 250	1250x150x85	2	2	2
1700...2000		400/600	ø 315	ø 250	1250x150x85	2	4	4
2000...2900		400/600	ø 315	ø 250	1750x150x85	2	4	4

4-HWW HIGH PERFORMANCE KITCHEN HOOD WITH WATER WASH

The high performance kitchen hood with water wash, developed with the TÜBITAK project in 2012, also includes all the features of the high performance kitchen hood.

With the washing installation in the exhaust line, filters, condensation pan and the line through which oily smoke passes are completely washed, preventing many problems such as the fire hazard that is frequently encountered in kitchens and not washing the filters.

The hood has a washing facility to wash the exhaust side and the back of the filters. All washing installation elements and connections used are leakproof. Panels and electrical components with IP55 protection class are used for the automation system.



GENERAL FEATURES OF HIGH PERFORMANCE KITCHEN HOODS WITH WATER WASH

- ☞ Realizing fresh air supply over itself with double-skin design
- ☞ 30-40% lower exhaust flow requirement compared to conventional hoods
- ☞ Uninterrupted hygiene and safety in kitchens with washable filter and condensation pan
- ☞ Automatically controlled 7 days and 24 hours programmable detergent washing function
- ☞ Flame retardant cyclone type filter
- ☞ Production as modular in every dimension

OPERATION PRINCIPLE

The hood, which is controlled by the automation system, can be programmed and can be washed for the desired time and duration. In the system with short, medium and long programs, the washing steps are as follows:

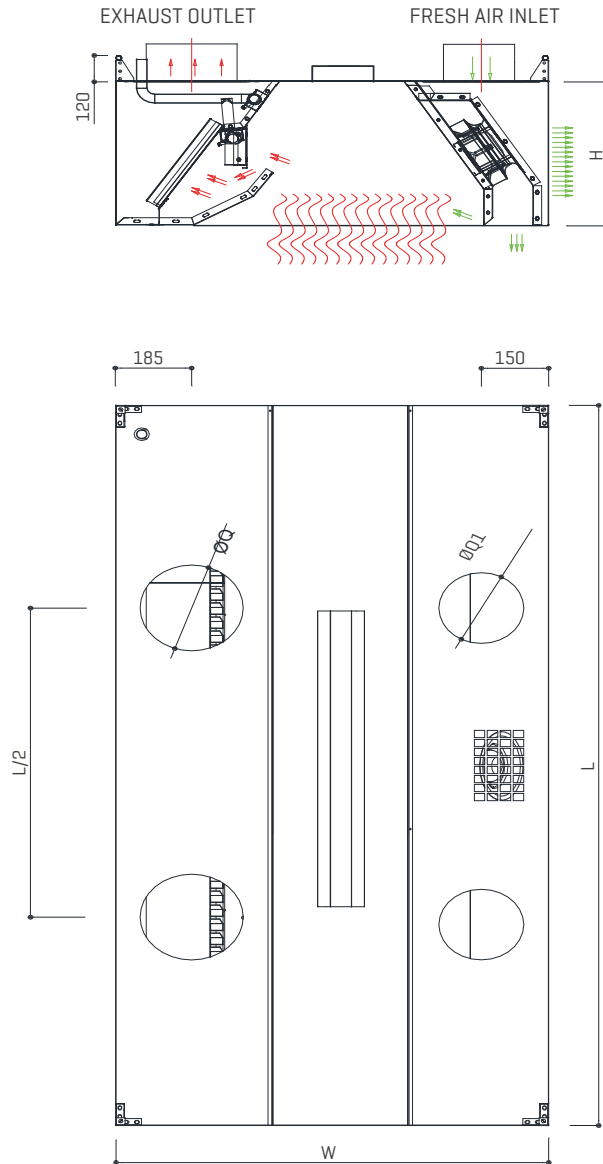
- 1-Pre-wash:** The oil accumulated on the exhaust side of the hood is softened with hot water.
- 2-Washing with detergent:** The washing liquid and water are mixed with the dosing pump and sent to the hoods and washing is carried out.
- 3-Rinsing:** After washing, the remaining detergent and dissolved oil in the hood are washed and discharged.

Note: The desired special program can also be created by the user.



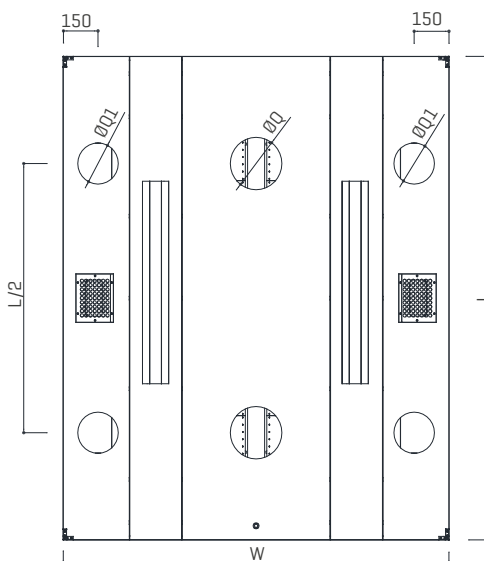
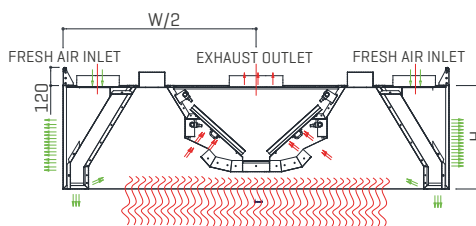
High Performance Kitchen Hood with Water Wash Top View

SELECTION OF HIGH PERFORMANCE KITCHEN HOOD WITH WATER WASH



LENGTH (L)	WIDTH (W)	HEIGHT (H)	Q	Q1	LIGHTING MODULE SIZE	NUMBER OF LIGHTING MODULES	NUMBER OF EXHAUST CONNECTIONS	NUMBER OF FRESH AIR CONNECTIONS
1000...1500	1700...2800	400/600	ø 315	ø 250	750x150x85	1	1	1
1500...1700		400/600	ø 315	ø 250	1250x150x85	1	1	1
1700...2000		400/600	ø 315	ø 250	1250x150x85	1	2	4
2000...2900		400/600	ø 315	ø 250	1750x150x85	1	2	2

ISLAND TYPE



LENGTH (L)	WIDTH (W)	HEIGHT (H)	Q	Q1	LIGHTING MODULE SIZE	NUMBER OF LIGHTING MODULES	NUMBER OF EXHAUST CONNECTIONS	NUMBER OF FRESH AIR CONNECTIONS
1000...1500	2200...2800	600	∅ 315	∅ 250	750x150x85	2	2	2
1500...1700		600	∅ 315	∅ 250	1250x150x85	2	2	2
1700...2000		600	∅ 315	∅ 250	1250x150x85	2	4	4
2000...2900		600	∅ 315	∅ 250	1750x150x85	2	4	4

HDS HIGH PERFORMANCE CONDENSING KITCHEN HOOD

High performance condensing kitchen hoods are designed to be used in places where water vapor is concentrated (laundry, dishwashing room and tea stoves). In order to capture the water vapor at the maximum level, the inner walls of the hood are covered with condensation pans. The exhaust air coming with the dense amount of steam hits the condensation pans and the water vapor turns into water particles. These particles are collected and accumulated in condensation pans. The accumulated water is discharged through the valves in the condensation pans.



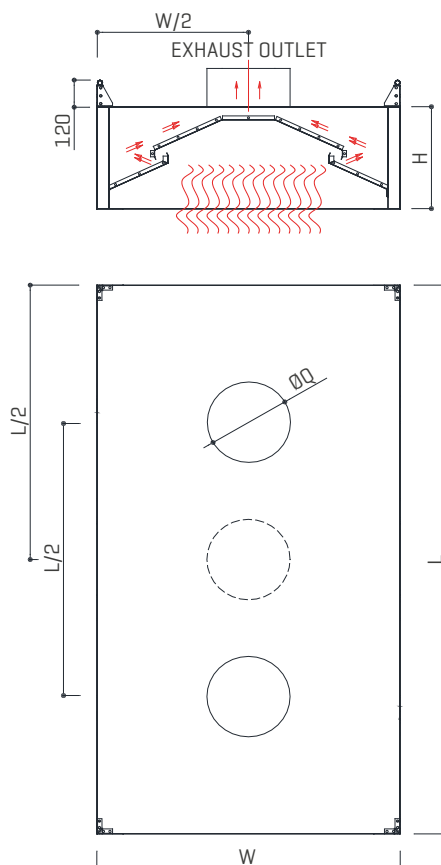
HDS High Performance Condensing Kitchen Hood

Condensing hood is produced from AISI 304 quality stainless sheet. The main elements are assembled with easy-to-assemble sealed connections. Where necessary, sealing elements and welded connections are used.

The hood has a condensation duct with rounded corners, free from burrs and covering the hood all around. There are two condensation pans in the hoods. This pan is produced as welded and sealed.

There are drainage valves on both sides to drain the collected water. The lower corners are produced as welded to prevent harmful water from dripping.

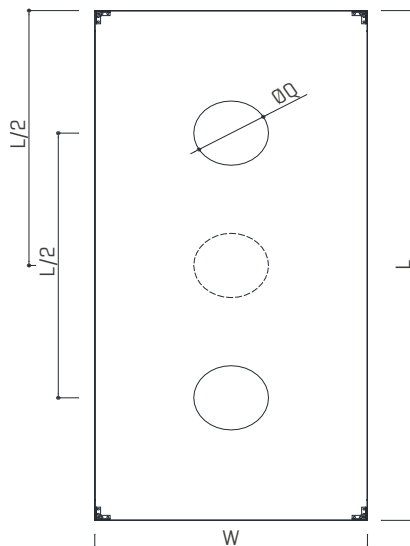
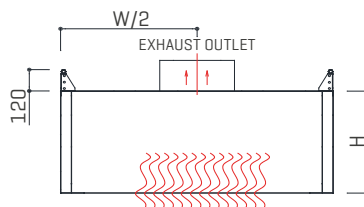
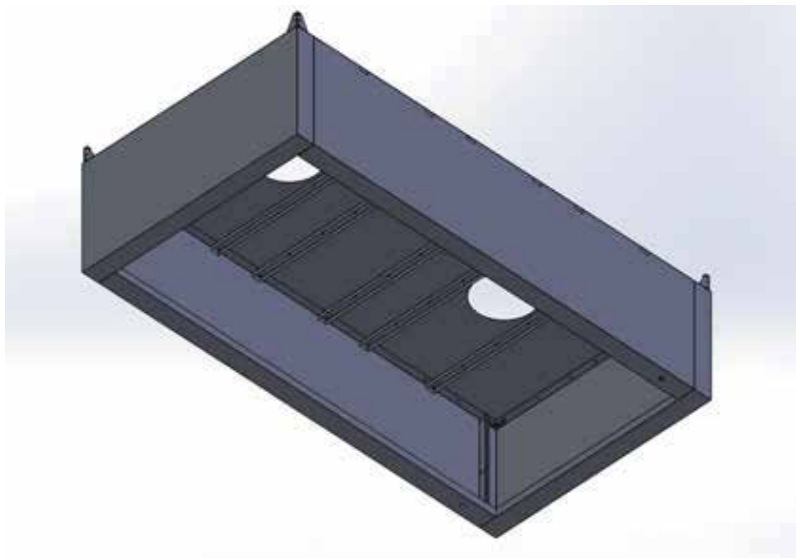
SELECTION OF HDS HIGH PERFORMANCE CONDENSING KITCHEN HOOD



LENGTH (L)	WIDTH (W)	HEIGHT (H)	Q	Q1	LIGHTING MODULE SIZE	NUMBER OF LIGHTING MODULES	NUMBER OF EXHAUST CONNECTIONS	NUMBER OF FRESH AIR CONNECTIONS
1000...1700	1000...2100	400/600	ø 315	-	-	-	1	-
1700...2950		400/600	ø 315	-	-	-	2	-

HDX CLASSIC KITCHEN HOOD WITHOUT FILTER

This type of kitchen hoods are used in places where there is no oil outlet, only for the purpose of removing the air in the environment. Absolutely no filterless hood should be used on a cooking counter. It is suitable to be used in the dishwasher, tea room or cold preparation sections. The body and duct connection elements of classical type hoods are produced from 100% AISI 304 stainless steel, as in other hoods. Classic type hoods without filter draw the exhaust air from the environment with a single aspirator with the help of a duct and give it to the outside air.



LENGTH (L)	WIDTH (W)	HEIGHT (H)	Q	Q1	LIGHTING MODULE SIZE	NUMBER OF LIGHTING MODULES	NUMBER OF EXHAUST CONNECTIONS	NUMBER OF FRESH AIR CONNECTIONS
500...1700	500...2100	400/600	ø 315	-	-	-	1	-
1700...2950		400/600	ø 315	-	-	-	2	-

High Performance Kitchen Hood With UV Lamp (HYH-UV)

Depending on the customer's request, a UV lamp can be added to the high performance kitchen hood. In this model, the filters and the section where the UV lamp is located are manufactured in a sealed structure to prevent UV rays from leaking. The hoods are delivered with the necessary electrical and automation infrastructure for the operation of the UV lamp.

HYH-UV model hoods are used in kitchens where there is intense oil and odor output, but where chimney problems are experienced. The ultraviolet rays and ozone gas created by the UV lamp break down the oil and odor molecules coming from the hood and prevent their passage to the exhaust duct. In this way, the exhaust ducts stay clean for longer and duct maintenance costs can be kept at a minimum. It also alleviates the load of filtered aspirators [air filtration units] to be used in the system.

In HYH-UV model hoods, V-UV type lamps producing rays with a wavelength of 185 nm are used. The light produced at this wavelength deforms the structure of organic molecules and neutralizes them, and also increases the filtration effect by producing ozone [O₃] gas.

HYY/Console Type Kitchen Hood

Console type kitchen hoods, also known as Köfteci hoods, are produced as double-skin and, on the one hand, they remove the exhaust fumes formed under the hood, on the other hand, they give fresh air to the space.

Console type high performance hoods are the hoods with high suction power preferred in fast food kitchens, grilling, frying and cooking areas of kitchens or narrow and small but high density kitchens. Thanks to its special design, it reduces the heat emitted in the cooking appliances. Due to this feature, it is a product that increases energy savings in air-conditioned kitchens.



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Our kitchen hood selection program, prepared by our software engineers with the support of TUBITAK in 2012, is the first product selection program in our sector written by a local company. The program calculates the hood exhaust flow rate according to the VDI 2052 standard. It prevents the exhaust flow rates calculated with wrong methods and enables the correct flow rates to be easily calculated.

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You can also contribute with your comments on our page where we share information about kitchen ventilation with our articles that we add periodically.

NOTES





We make the difference with
180 different types of products.



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İKLİMLENDİRME | HVAC SYSTEMS



KITCHEN HOOD CATALOG

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 6 major groups as Air Handling Units, Rooftop Units, Heat/Energy Recovery Units, Air Purifiers, Air Distribution & Management Products and Kitchen Ventilation Equipments 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 2 factories, in total area of 32.000 sqm in which 17.500 sqm indoor space that enables DOGU HVAC manufactures 180 various type of products. Additionally, DOGU HVAC has a powerful sales network with 4 sales offices located in İstanbul, Ankara, Antalya and Adana 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 55 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 TSEK, CE and GOST-R quality certifications.



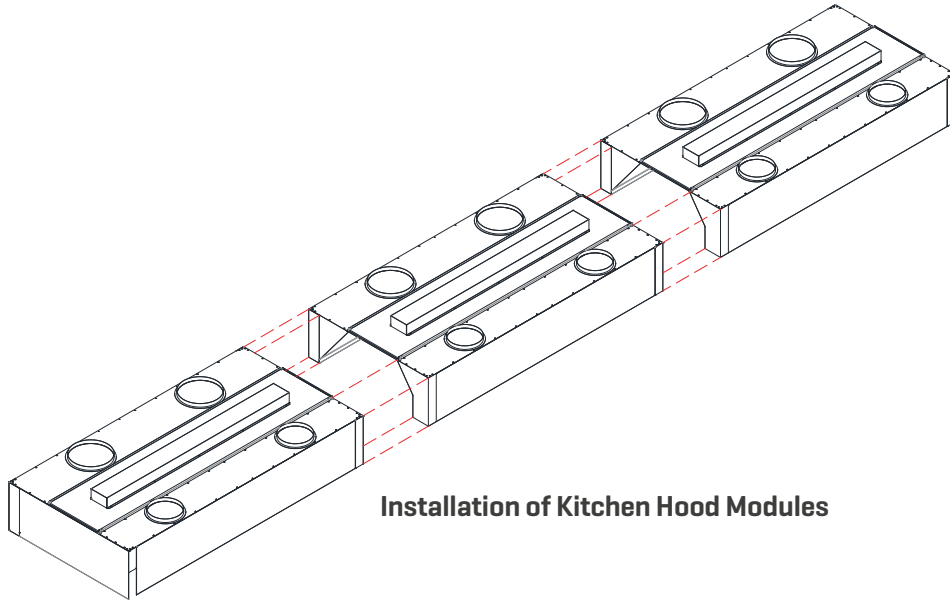
INTRODUCTION

Since 2005, DOGU HVAC has been directing the sector with its projects on industrial hoods, which are the most important part of kitchen ventilation, and new products it has developed, and exports to European, Asian, Middle Eastern and African countries. It is the first domestic company in Turkey to produce high performance kitchen hoods, which are the most preferred industrial hood types in the world, and to produce high performance kitchen hoods with water wash with the TÜBİTAK project in 2012.

1-GENERAL FEATURES

All kitchen hoods are manufactured from AISI 304 quality stainless steel as island and wall type in desired dimensions and modularly. It can also be produced from galvanized or AISI 316 stainless steel upon request. All parts are joined by TIG welding and welding traces are completely removed. Corners and all kinds of joints are felted in such a way that the joint traces will not be visible, and a uniform appearance is provided by polishing the top. IP 65 class lighting modules are used in kitchen hoods. Lighting under the hood is made with LED lamps. There is a tempered glass protector on the lamps that allows it to work between -40 and +300°C. The minimum and maximum dimensions of the hoods produced are given in the table below. Hoods that are larger than these values are produced as modular and assembled on site.

KITCHEN HOOD CODE		MODEL SIZE	
		WALL TYPE	ISLAND TYPE
		L x W	L x W
HDD	Min.	650x800	1000x1700
	Max.	2600x2000	2900x2800
HYH	Min.	1000x1000	1000x1700
	Max.	2600x2100	2900x2800
HWW	Min.	1000x1300	2900x2200
	Max.	2900x2800	2900x2800
HDS	Min.	1000x1000	-
	Max.	2950x1800	-
HDX	Min.	500x500	-
	Max.	2950x1800	-
HYH-UV	Min.	1000x1000	1000x1700
	Max.	2600x2100	2900x2800



Installation of Kitchen Hood Modules

All kitchen hoods are put into use by the expert technical personnel of DOGU HVAC after they are assembled on site and system settings are made. It is under the guarantee of our company against production faults for 2 years from its installation.

KITCHEN HOOD GENERAL FEATURES

	Standard	Option
Material	AISI 304 Quality Stainless Steel	AISI 316 Quality Stainless Steel Sheet or Galvanized
Body Sheet Thickness	0,8 mm	1 or 1,2 mm
Height	400-600 mm	-
Exhaust Outlets	Circular Section [ø 315 mm]	Square or Rectangular Section
Fresh Air Intakes	Circular Section [ø 250 mm]	Square or Rectangular Section
Lighting	LED Lamp	-

FILTERS

The filters are produced from 0.60 mm thick AISI 304 quality stainless steel material. Oil trap filters are produced as percussion and cyclone type. All filters are detachable and can be easily cleaned. The filters are flame-retardant and prevent the passage of flame into the kitchen hood.

BAFFEL TYPE FILTER

Baffle type filters are one of the most used filter types in kitchen hoods. Approximate holding efficiencies for 10 µm particles are around 30%. In these filters, the exhaust air passes through the curtains. Together with the exhaust air, the oil particle rotates due to its momentum and hits the plate and filtration is provided. They have flame retardant properties. Pollution does not change the pressure drops too much.



Baffel Type Filter

CYCLONE FILTER

It has just started to be used in kitchen hoods. It has a non-clogging design; In this way, it can be used for long periods without cleaning. When it is full, it can be easily removed and washed easily. It has a long service life. It creates a constant and low pressure loss in the system.

With the cyclone type filter, approximately 60% of 5 μm particles and 95% of 10 μm particles are captured.

In cyclone type filters, the air entering the filter starts to rotate due to the structure of the filter and the oil particles collide with the filter surface and are collected in the condensation pan under the filter. The air leaves the filter from the top and bottom of the filter.



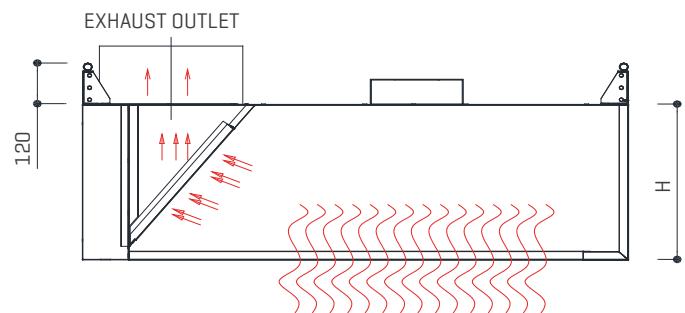
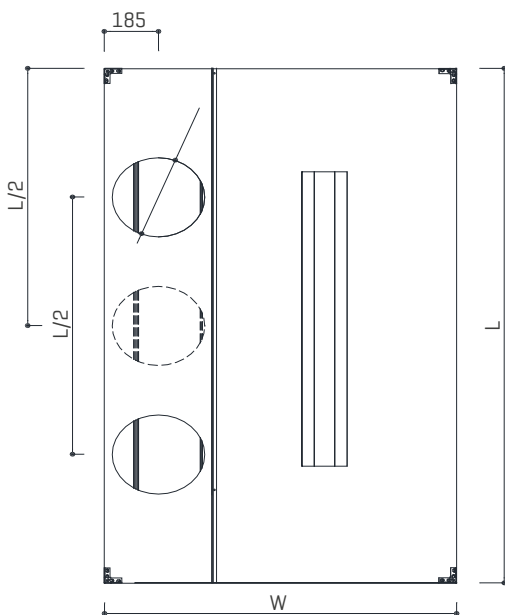
Cyclone Filter

2-HDD CLASSIC FILTER KITCHEN HOOD

- Classic type hoods are generally used in kitchens where small exhaust flow rates occur. The hood only removes the greasy fumes generated during cooking from the environment.
- Classic type hoods exhaust the air from the environment with a single aspirator with the help of the duct and give it to the outside air. It has a condensation pan that covers the hood all around.
- This type of hoods are produced with filters to be used instead of high performance hoods if high performance hoods are not used.
- All parts of the classic type hoods are made of 100% AISI 304 stainless steel. It can also be produced from galvanized or AISI 316 stainless sheet according to the customer's request.
- The body of the hood is produced from AISI 304 quality stainless sheet with brushed appearance. The main elements are assembled with easy-to-assemble sealed connections. Sealing elements or welded connections are used where necessary. The hood has a condensation pan with rounded corners, free from burrs and covering the hood all around. The lower corners are combined with leak-proof welded manufacturing to prevent harmful water from dripping.

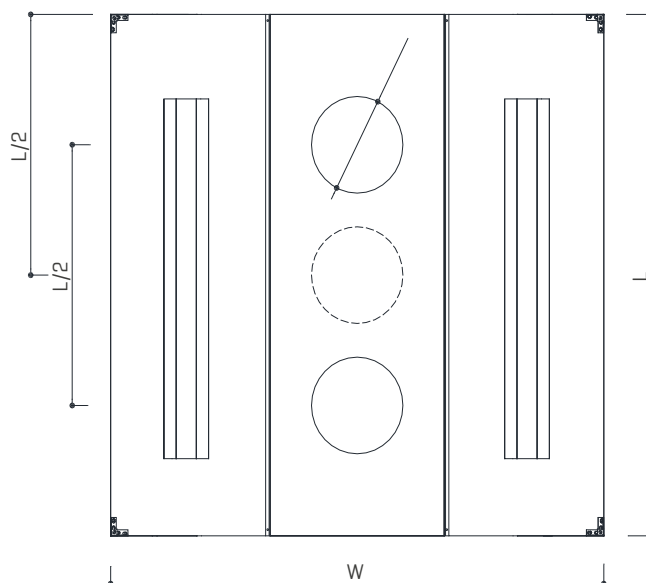
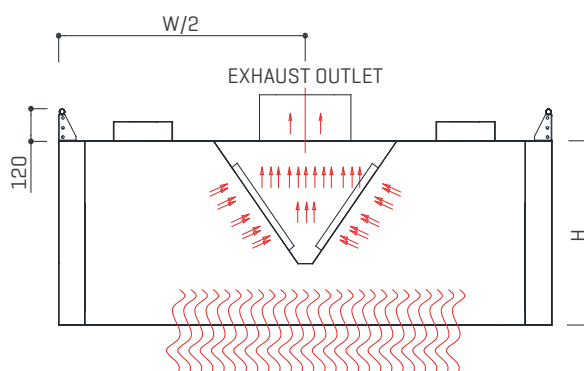


Classic Filtered Hood Selection Wall Mounted



LENGTH (L)	WIDTH (W)	HEIGHT (H)	Q	Q1	LIGHTING MODULE SIZE	NUMBER OF LIGHTING MODULES	NUMBER OF EXHAUST CONNECTIONS	NUMBER OF FRESH AIR CONNECTIONS
650...1500	800...2000	400/600	ø 315	-	750x150x85	1	1	-
1500...1700		400/600	ø 315	-	1250x150x85	1	1	-
1700...2000		400/600	ø 315	-	1250x150x85	1	2	-
2000...2600		400/600	ø 315	-	1750x150x85	1	2	-

2-HDD CLASSIC FILTER KITCHEN HOOD



LENGTH (L)	WIDTH (W)	HEIGHT (H)	Q	Q1	LIGHTING MODULE SIZE	NUMBER OF LIGHTING MODULES	NUMBER OF EXHAUST CONNECTIONS	NUMBER OF FRESH AIR CONNECTIONS
1000...1500	1700...2000	400/600	ø 315	-	750x150x85	2	2	-
1500...1700		400/600	ø 315	-	1250x150x85	2	2	-
1700...2000		400/600	ø 315	-	1250x150x85	2	4	-
2000...2600		400/600	ø 315	-	1750x150x85	2	4	-

3-HYH HIGH PERFORMANCE KITCHEN HOOD

High performance kitchen hoods, which provide energy savings of around 30-40%, pay for themselves within 1 year after the first investment in many projects. They also provide hygienic and quality environments in the cooking and show sections of kitchens and restaurants.

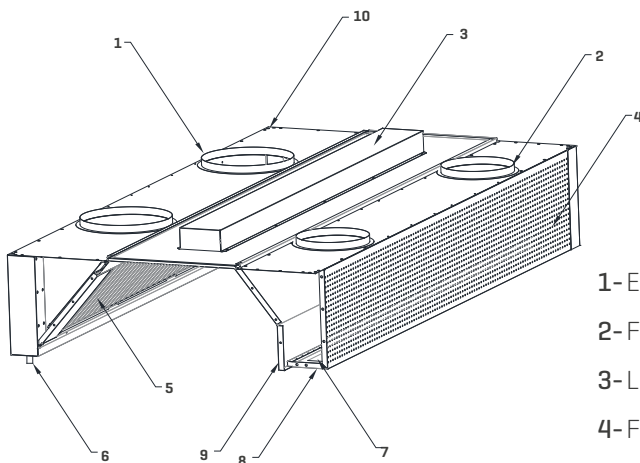


Unlike the classical type hood, the high performance hood supply fresh air over itself to the space and downwards to form an air curtain. In this way, less conditioned air is thrown out and some of the fresh air needed by the place is met.

General Features of High Performance Kitchen Hoods

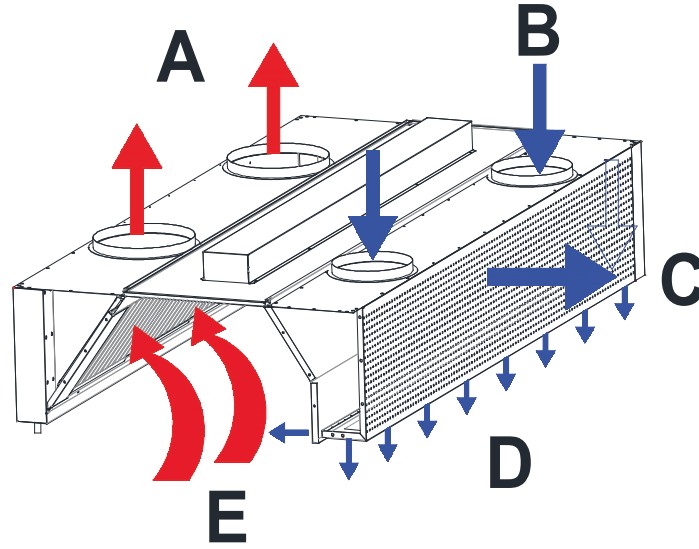
- ☞ Production as modular in every dimension
- ☞ Flame retardant cyclone type filter
- ☞ 30% 40% reduction in exhaust air flow compared to conventional hood
- ☞ The fresh air side of the hood is insulated against internal condensation

Yüksek Performanslı Davlumbaz Elemanları



- | | |
|--------------------------------------|------------------------------|
| 1- Exhaust duct connection point | 6- Drain valve |
| 2- Fresh air duct connection | 7- Air curtain supply damper |
| 3- Lighting module | 8- Bottom supply diffuser |
| 4- Fresh air supply perforated sheet | 9- Internal supply diffuser |
| 5- Exhaust filter | 10- Hanger holes |

WORKING PRINCIPLE OF HIGH PERFORMANCE KITCHEN HOOD



A-Exhaust air

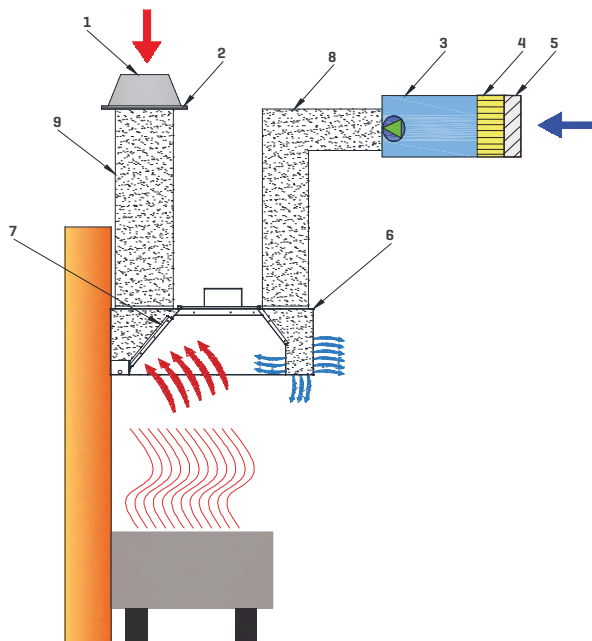
B-Fresh air

C-Fresh air is supply from the front surface towards the room with a homogeneous and low air velocity, both wrapping the hood and supporting the fresh air requirement of the space.

D- Fresh air is supply from the bottom of the hood vertically to the floor, preventing the pollutant air from the cooking units escaping into the space by forming an air curtain and directing it towards the exhaust side.

E- Fresh air is supply towards the filter, creating a pushing force on the pollutant air coming out of the cooking units and providing a better grip on the exhaust. Thanks to the fresh air, the conditioned air around the hood cannot be directed towards the hood and as a result, energy savings are achieved.

Yüksek performanslı davlumbaz uygulaması aşağıdaki şekilde gösterilmiştir.



1- Aspirator

2- Aspirator Filter

3- Ventilator

4- Dust Filter [F7]

5- Coarse Filter [G4]

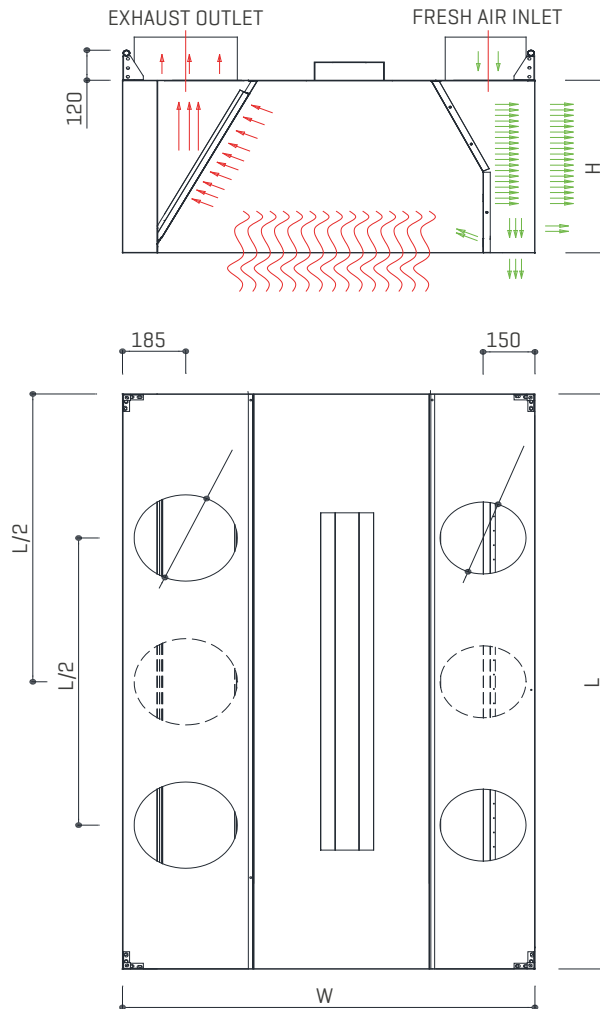
6- Kitchen Hood

7- Kitchen Hood Filter

8- Fresh Air Line

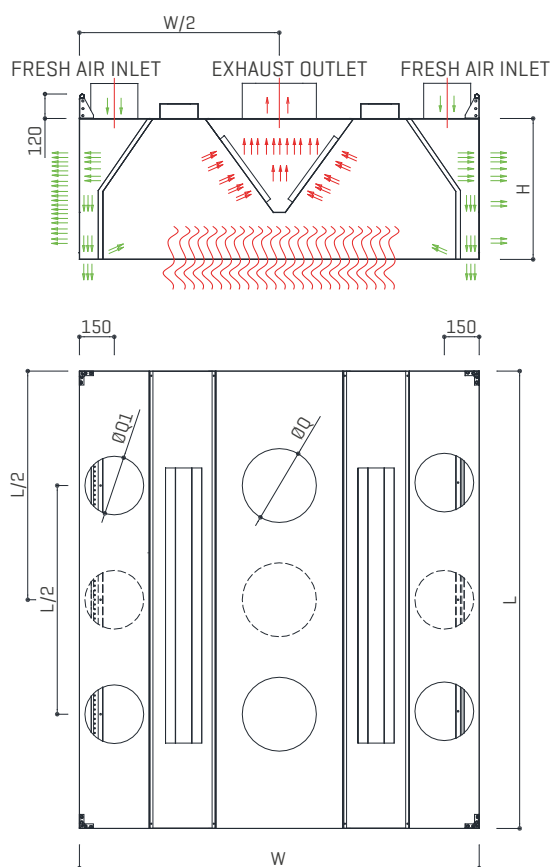
9- Egzoz Air Hattı

HIGH PERFORMANCE HOOD SELECTION [WALL MOUNTED]



LENGTH [L]	WIDTH [W]	HEIGHT [H]	Q	Q1	LIGHTING MODULE SIZE	NUMBER OF LIGHTING MODULES	NUMBER OF EXHAUST CONNECTIONS	NUMBER OF FRESH AIR CONNECTIONS
1000...1500	1000...2100	400/600	ø 315	ø 250	750x150x85	1	1	1
1500...1700		400/600	ø 315	ø 250	1250x150x85	1	1	1
1700...2000		400/600	ø 315	ø 250	1250x150x85	1	2	2
2000...2600		400/600	ø 315	ø 250	1750x150x85	1	2	2

ISLAND TYPE



LENGTH [L]	WIDTH [W]	HEIGHT [H]	Q	Q1	LIGHTING MODULE SIZE	NUMBER OF LIGHTING MODULES	NUMBER OF EXHAUST CONNECTIONS	NUMBER OF FRESH AIR CONNECTIONS
1000...1500	1700...2800	400/600	Ø 315	Ø 250	750x150x85	2	2	2
1500...1700		400/600	Ø 315	Ø 250	1250x150x85	2	2	2
1700...2000		400/600	Ø 315	Ø 250	1250x150x85	2	4	4
2000...2900		400/600	Ø 315	Ø 250	1750x150x85	2	4	4

4-HWW HIGH PERFORMANCE KITCHEN HOOD WITH WATER WASH

The high performance kitchen hood with water wash, developed with the TÜBITAK project in 2012, also includes all the features of the high performance kitchen hood.

With the washing installation in the exhaust line, filters, condensation pan and the line through which oily smoke passes are completely washed, preventing many problems such as the fire hazard that is frequently encountered in kitchens and not washing the filters.

The hood has a washing facility to wash the exhaust side and the back of the filters. All washing installation elements and connections used are leakproof. Panels and electrical components with IP55 protection class are used for the automation system.



GENERAL FEATURES OF HIGH PERFORMANCE KITCHEN HOODS WITH WATER WASH

- ☞ Realizing fresh air supply over itself with double-skin design
- ☞ 30-40% lower exhaust flow requirement compared to conventional hoods
- ☞ Uninterrupted hygiene and safety in kitchens with washable filter and condensation pan
- ☞ Automatically controlled 7 days and 24 hours programmable detergent washing function
- ☞ Flame retardant cyclone type filter
- ☞ Production as modular in every dimension

OPERATION PRINCIPLE

The hood, which is controlled by the automation system, can be programmed and can be washed for the desired time and duration. In the system with short, medium and long programs, the washing steps are as follows:

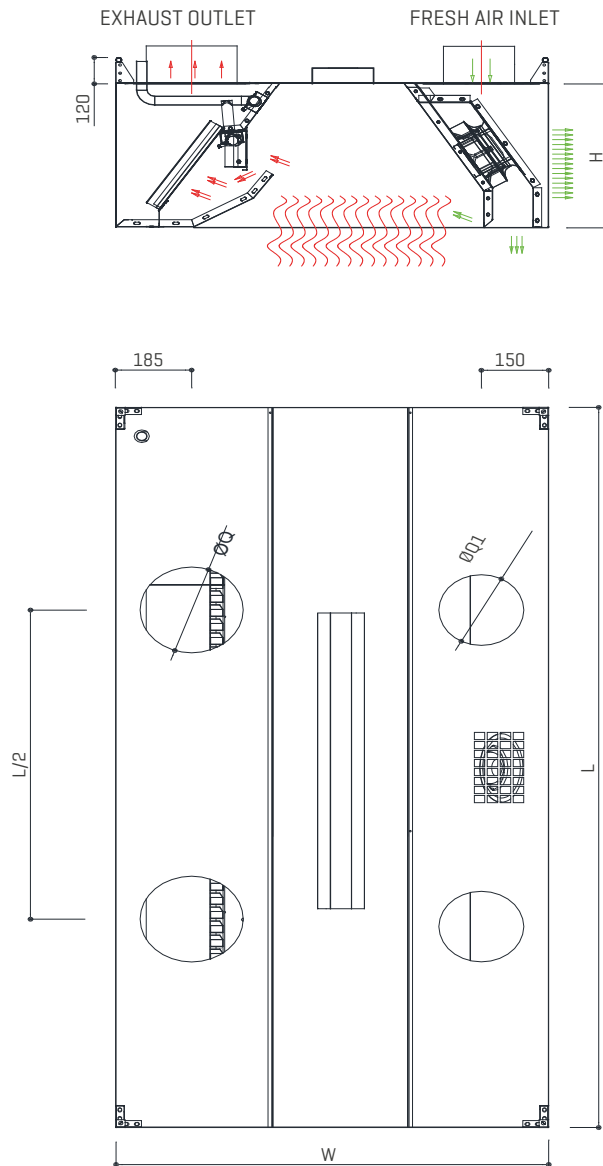
- 1-Pre-wash:** The oil accumulated on the exhaust side of the hood is softened with hot water.
- 2-Washing with detergent:** The washing liquid and water are mixed with the dosing pump and sent to the hoods and washing is carried out.
- 3-Rinsing:** After washing, the remaining detergent and dissolved oil in the hood are washed and discharged.

Note: The desired special program can also be created by the user.



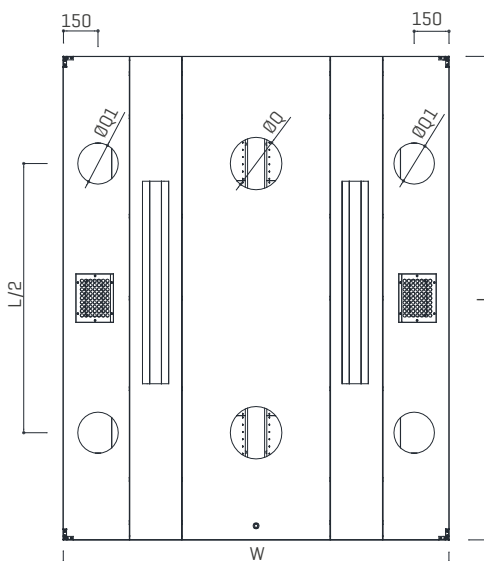
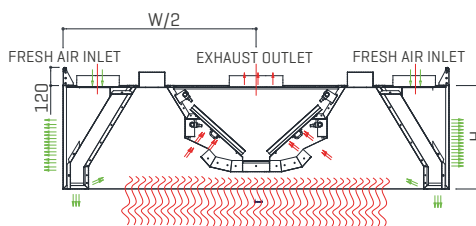
High Performance Kitchen Hood with Water Wash Top View

SELECTION OF HIGH PERFORMANCE KITCHEN HOOD WITH WATER WASH



LENGTH (L)	WIDTH (W)	HEIGHT (H)	Q	Q1	LIGHTING MODULE SIZE	NUMBER OF LIGHTING MODULES	NUMBER OF EXHAUST CONNECTIONS	NUMBER OF FRESH AIR CONNECTIONS
1000...1500	1700...2800	400/600	ø 315	ø 250	750x150x85	1	1	1
1500...1700		400/600	ø 315	ø 250	1250x150x85	1	1	1
1700...2000		400/600	ø 315	ø 250	1250x150x85	1	2	4
2000...2900		400/600	ø 315	ø 250	1750x150x85	1	2	2

ISLAND TYPE



LENGTH (L)	WIDTH (W)	HEIGHT (H)	Q	Q1	LIGHTING MODULE SIZE	NUMBER OF LIGHTING MODULES	NUMBER OF EXHAUST CONNECTIONS	NUMBER OF FRESH AIR CONNECTIONS
1000...1500	2200...2800	600	∅ 315	∅ 250	750x150x85	2	2	2
1500...1700		600	∅ 315	∅ 250	1250x150x85	2	2	2
1700...2000		600	∅ 315	∅ 250	1250x150x85	2	4	4
2000...2900		600	∅ 315	∅ 250	1750x150x85	2	4	4

HDS HIGH PERFORMANCE CONDENSING KITCHEN HOOD

High performance condensing kitchen hoods are designed to be used in places where water vapor is concentrated (laundry, dishwashing room and tea stoves). In order to capture the water vapor at the maximum level, the inner walls of the hood are covered with condensation pans. The exhaust air coming with the dense amount of steam hits the condensation pans and the water vapor turns into water particles. These particles are collected and accumulated in condensation pans. The accumulated water is discharged through the valves in the condensation pans.



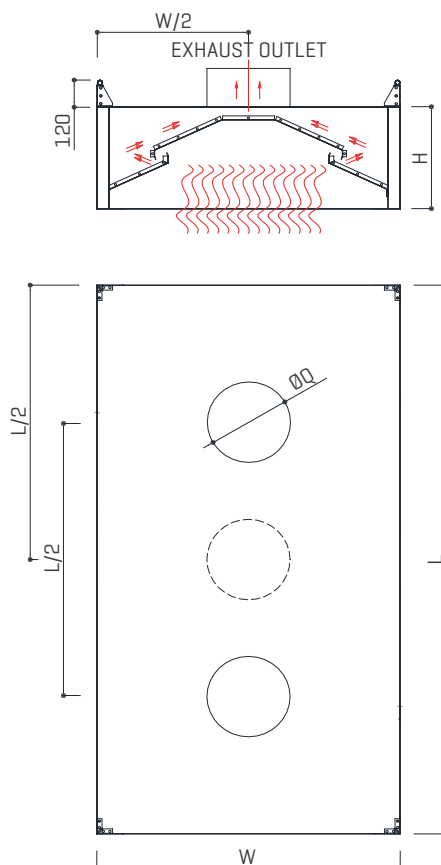
HDS High Performance Condensing Kitchen Hood

Condensing hood is produced from AISI 304 quality stainless sheet. The main elements are assembled with easy-to-assemble sealed connections. Where necessary, sealing elements and welded connections are used.

The hood has a condensation duct with rounded corners, free from burrs and covering the hood all around. There are two condensation pans in the hoods. This pan is produced as welded and sealed.

There are drainage valves on both sides to drain the collected water. The lower corners are produced as welded to prevent harmful water from dripping.

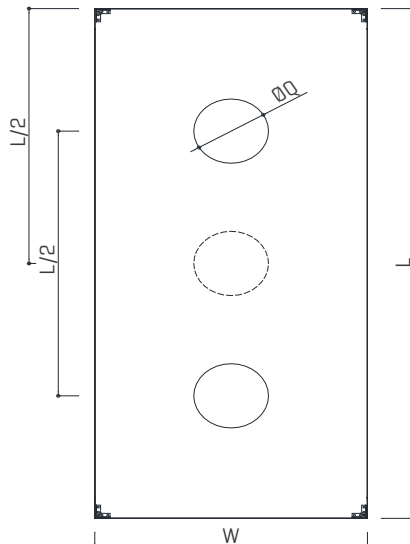
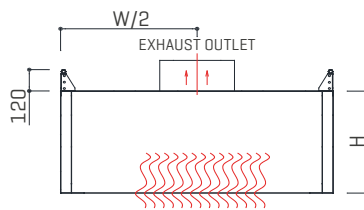
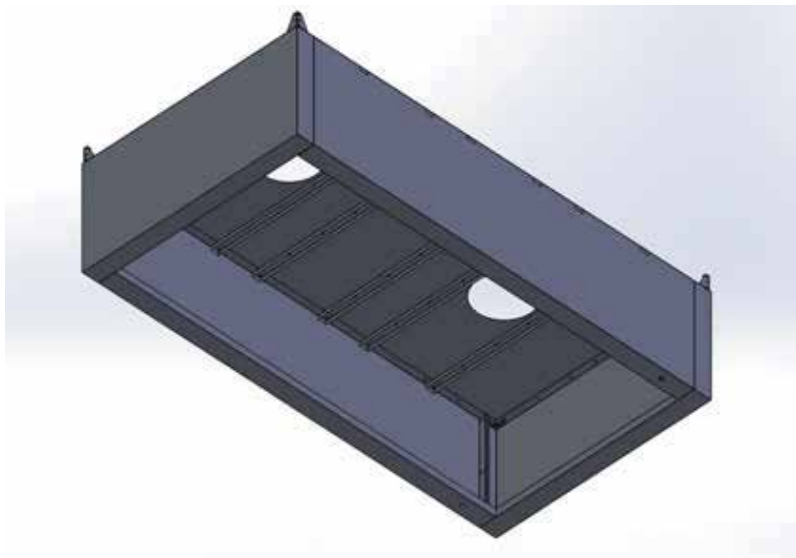
SELECTION OF HDS HIGH PERFORMANCE CONDENSING KITCHEN HOOD



LENGTH (L)	WIDTH (W)	HEIGHT (H)	Q	Q1	LIGHTING MODULE SIZE	NUMBER OF LIGHTING MODULES	NUMBER OF EXHAUST CONNECTIONS	NUMBER OF FRESH AIR CONNECTIONS
1000...1700	1000...2100	400/600	ø 315	-	-	-	1	-
1700...2950		400/600	ø 315	-	-	-	2	-

HDX CLASSIC KITCHEN HOOD WITHOUT FILTER

This type of kitchen hoods are used in places where there is no oil outlet, only for the purpose of removing the air in the environment. Absolutely no filterless hood should be used on a cooking counter. It is suitable to be used in the dishwasher, tea room or cold preparation sections. The body and duct connection elements of classical type hoods are produced from 100% AISI 304 stainless steel, as in other hoods. Classic type hoods without filter draw the exhaust air from the environment with a single aspirator with the help of a duct and give it to the outside air.



LENGTH (L)	WIDTH (W)	HEIGHT (H)	Q	Q1	LIGHTING MODULE SIZE	NUMBER OF LIGHTING MODULES	NUMBER OF EXHAUST CONNECTIONS	NUMBER OF FRESH AIR CONNECTIONS
500...1700	500...2100	400/600	ø 315	-	-	-	1	-
1700...2950		400/600	ø 315	-	-	-	2	-

High Performance Kitchen Hood With UV Lamp (HYH-UV)

Depending on the customer's request, a UV lamp can be added to the high performance kitchen hood. In this model, the filters and the section where the UV lamp is located are manufactured in a sealed structure to prevent UV rays from leaking. The hoods are delivered with the necessary electrical and automation infrastructure for the operation of the UV lamp.

HYH-UV model hoods are used in kitchens where there is intense oil and odor output, but where chimney problems are experienced. The ultraviolet rays and ozone gas created by the UV lamp break down the oil and odor molecules coming from the hood and prevent their passage to the exhaust duct. In this way, the exhaust ducts stay clean for longer and duct maintenance costs can be kept at a minimum. It also alleviates the load of filtered aspirators [air filtration units] to be used in the system.

In HYH-UV model hoods, V-UV type lamps producing rays with a wavelength of 185 nm are used. The light produced at this wavelength deforms the structure of organic molecules and neutralizes them, and also increases the filtration effect by producing ozone [O₃] gas.

HYY/Console Type Kitchen Hood

Console type kitchen hoods, also known as Köfteci hoods, are produced as double-skin and, on the one hand, they remove the exhaust fumes formed under the hood, on the other hand, they give fresh air to the space.

Console type high performance hoods are the hoods with high suction power preferred in fast food kitchens, grilling, frying and cooking areas of kitchens or narrow and small but high density kitchens. Thanks to its special design, it reduces the heat emitted in the cooking appliances. Due to this feature, it is a product that increases energy savings in air-conditioned kitchens.



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NOTES





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180 different types of products.



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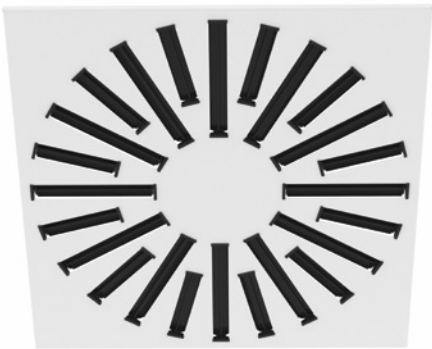
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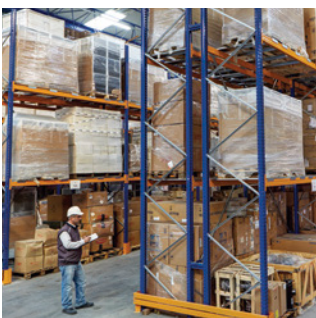


OSB
Adjustable Blade Swirl Diffuser – Type 2

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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 4 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 standards. 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 2 factories, in total area of 45.000 sqm in which 25.000 sqm indoor space that enables DOGU HVAC manufactures 180 various type of products. Additionally, DOGU HVAC has a powerful sales network with 4 sales offices located in İstanbul, Ankara, Antalya and Adana 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 55 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 standards], 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 TSEK, CE and GOST-R quality certifications.

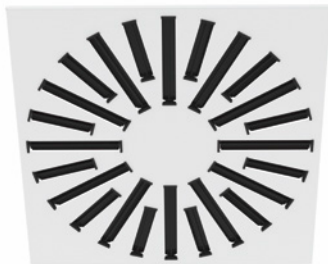


- ☞ OSB – Adjustable Blade Swirl Diffuser Type 2 effectively keeps the space comfort at the ideal level with the swirl effect it brings to the air. They can be used in distributor and collector systems.
- ☞ There are air supply options between 50 and 2750 m³/h air flow rates depending on the product dimensions.
- ☞ In applications with a temperature difference of ±14 °C in heating and cooling, blade positions can be adjusted in accordance with ambient conditions.
- ☞ The throw geometry remains stable regardless of the desired air flow and temperature difference in space ventilation.
- ☞ The air passage pattern is designed to create low pressure drop, low sound level and effective throw geometry. There are blades on the patterns that allow to adjust the throw directions.
- ☞ Compatible with ready-made aluminum suspended ceiling systems and metal suspended ceiling systems.
- ☞ It can be produced in square or circular form according to architectural requirements and has a decorative structure.
- ☞ Prismatic type OSB_P – Adjustable Swirl Diffusers can be sold as assembled with optional “Hepa Filter Box”, provided that the dimensions are specified for hepa in the catalog.
- ☞ It has TSE ISO EN 14644, DIN 1946/4, DIN 24194 and DIN 25414 hygiene quality standards.

PRODUCT OPTIONS

Two product options are available. In both options, the wings are arranged in a circular form on the case.

OSB_P



OSB_D



MATERIAL

- ☞ Standard Galvanized manufacturing, optional stainless manufacturing.
- ☞ There are ABS plastic blades that provide air direction inside the case.

SURFACE COATING

- ☞ RAL 9010 or RAL 9016 electrostatic powder paint as standard.
- ☞ Optional
 - Different RAL color codes
 - Paintless production

INSTALLATION

Standard Installation Types

Screwed	{OSB_P}
Tile	{OSB_P}
Clip-in	{OSB_P}
Center Bolted	{OSB_P ve OSB_D}

Installation with Hepa Filter Box

Screwed from the corners	{OSB_P}
Center Bolted	{OSB_P}

STANDARD SIZES

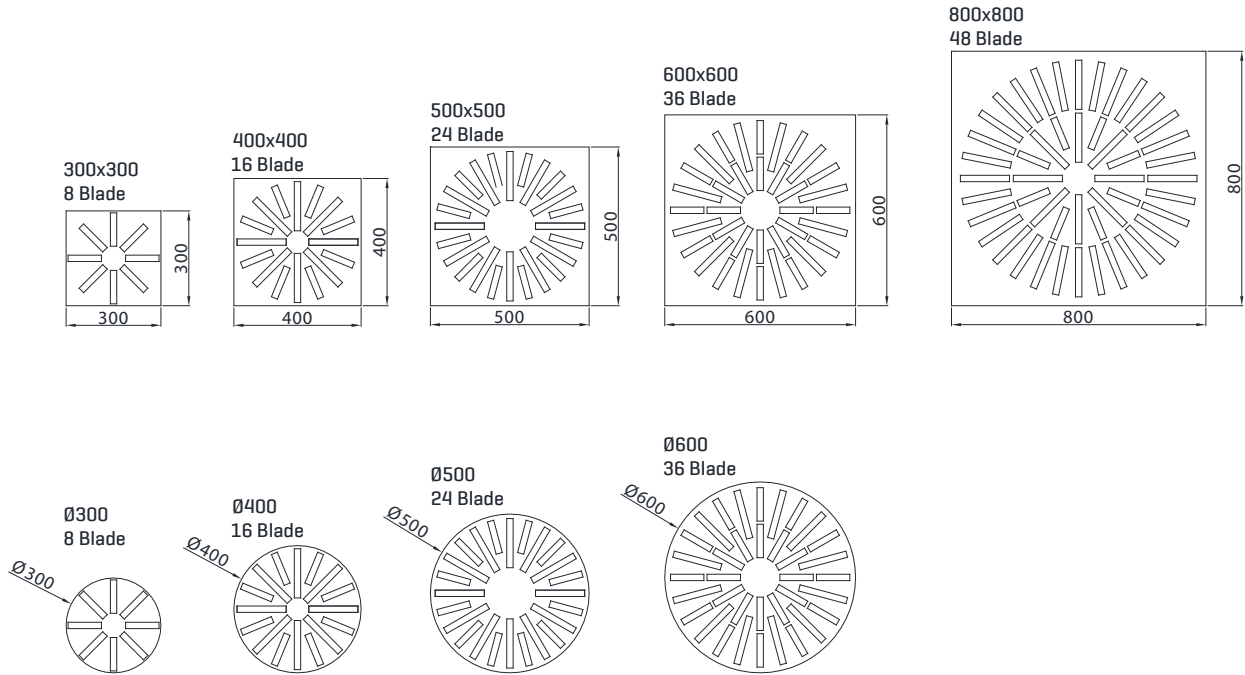
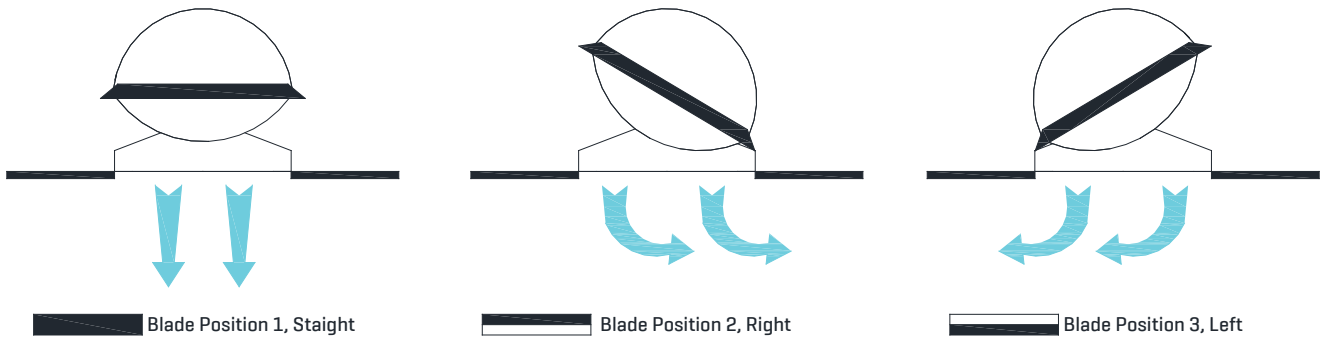


Table 1. Standard Sizes

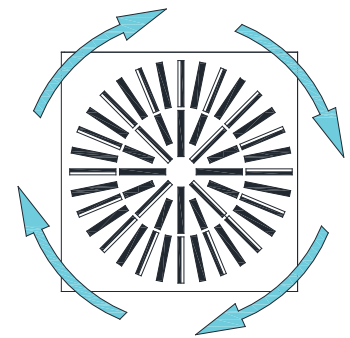
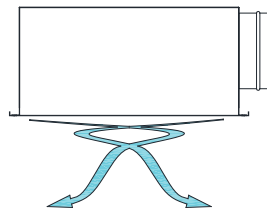
Product Series	Product Dimension [mm]	Number of Wings
OSB_P Kare OSB Swirl Diffuser	300x300	8
	400x400	16
	500x500	24
	600x600	36
	800x800	48
OSB_D Dairesel OSB Swirl Diffuser	Ø300	8
	Ø400	16
	Ø500	24
	Ø600	36

BLADE ADJUSTMENTS FOR SPECIAL AIR THROW

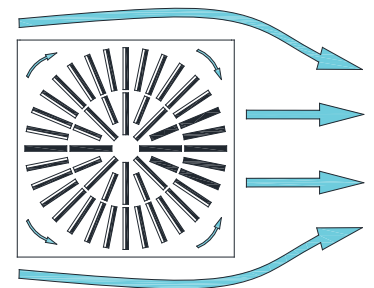
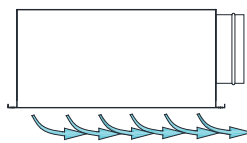
OSB Swirl diffuser has the ability to throw air that will meet the desired comfort conditions. Adjustment of each blade is done separately.



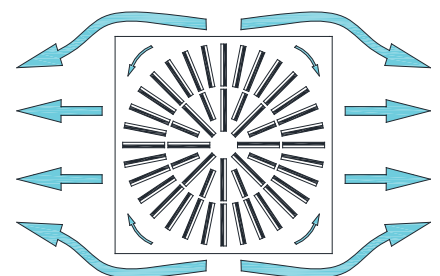
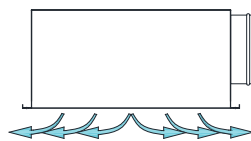
Recommended blade position for areas where high performance spreading and penetration properties are required:



Suggested blade position to ensure one-way air supply from the ceiling in the room:



Suggested blade position to provide air supply from ceiling in the room in two directions:



PERFORMANCE DATA

Table 2. Performance Data

		Sizes [mm]				
		Ø300 / 300x300	Ø400 / 400x400	Ø500 / 500x500	Ø600 / 600x600	Ø800 / 800x800
50	Pressure Drop [Pa]	<1	<1	<1	<1	1
	Sound Pressure Level [db(A)]	<15	<15	<15	<15	<15
	Throw Distance [m]	1	1	<1	<1	<1
150	Pressure Drop [Pa]	20	3	1	<1	1
	Sound Pressure Level [db(A)]	28	<15	<15	<15	<15
	Throw Distance [m]	2	2	1	<1	<1
200	Pressure Drop [Pa]	33	5	2	<1	1
	Sound Pressure Level [db(A)]	35	<15	<15	<15	<15
	Throw Distance [m]	3	3	1	1	<1
250	Pressure Drop [Pa]	49	8	4	1	1
	Sound Pressure Level [db(A)]	42	18	<15	<15	<15
	Throw Distance [m]	4	3	1	1	<1
300	Pressure Drop [Pa]	75	11	6	2	1
	Sound Pressure Level [db(A)]	48	23	<15	<15	<15
	Throw Distance [m]	5	4	2	1	<1
400	Pressure Drop [Pa]		20	10	4	2
	Sound Pressure Level [db(A)]		32	23	<15	<15
	Throw Distance [m]		5	2	1	<1
500	Pressure Drop [Pa]		32	16	6	3
	Sound Pressure Level [db(A)]		39	30	17	<15
	Throw Distance [m]		6	3	2	1
750	Pressure Drop [Pa]		72	35	13	6
	Sound Pressure Level [db(A)]		51	42	29	20
	Throw Distance [m]		8	4	2	1
1000	Pressure Drop [Pa]			63	23	12
	Sound Pressure Level [db(A)]			51	38	29
	Throw Distance [m]			5	3	2
1250	Pressure Drop [Pa]			98	36	18
	Sound Pressure Level [db(A)]			58	45	36
	Throw Distance [m]			7	4	2
1500	Pressure Drop [Pa]				52	27
	Sound Pressure Level [db(A)]				50	42
	Throw Distance [m]				5	3
1750	Pressure Drop [Pa]				70	36
	Sound Pressure Level [db(A)]				55	46
	Throw Distance [m]				5	3
2000	Pressure Drop [Pa]				91	48
	Sound Pressure Level [db(A)]				59	50
	Throw Distance [m]				6	4
2250	Pressure Drop [Pa]					60
	Sound Pressure Level [db(A)]					54
	Throw Distance [m]					4
2500	Pressure Drop [Pa]					74
	Sound Pressure Level [db(A)]					57
	Throw Distance [m]					5
2750	Pressure Drop [Pa]					90
	Sound Pressure Level [db(A)]					60
	Throw Distance [m]					5

- ⓘ The data is obtained when the blades are in the flat position, the heating mode temperature difference is 8K.
- ⓘ Throw distance: It is the vertical distance of the air in the comfort zone leaving the air diffuser equipment at a speed of 0.25 m/s.

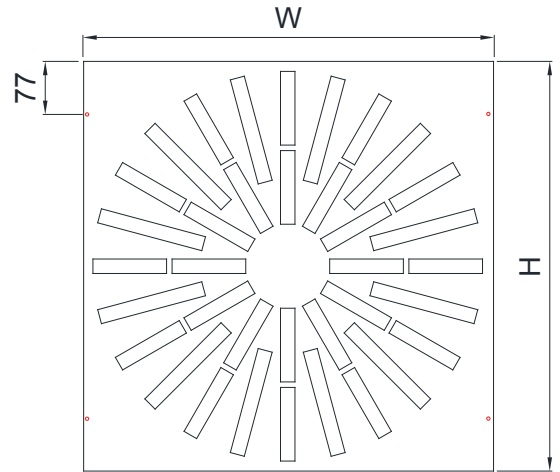
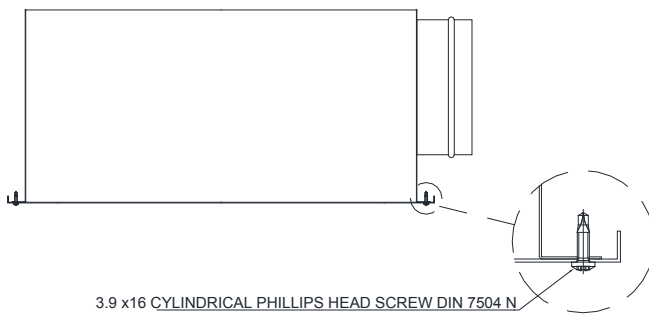
THROW DISTANCE CORRECTION TABLE

Table 3. Throw Distance Correction Table

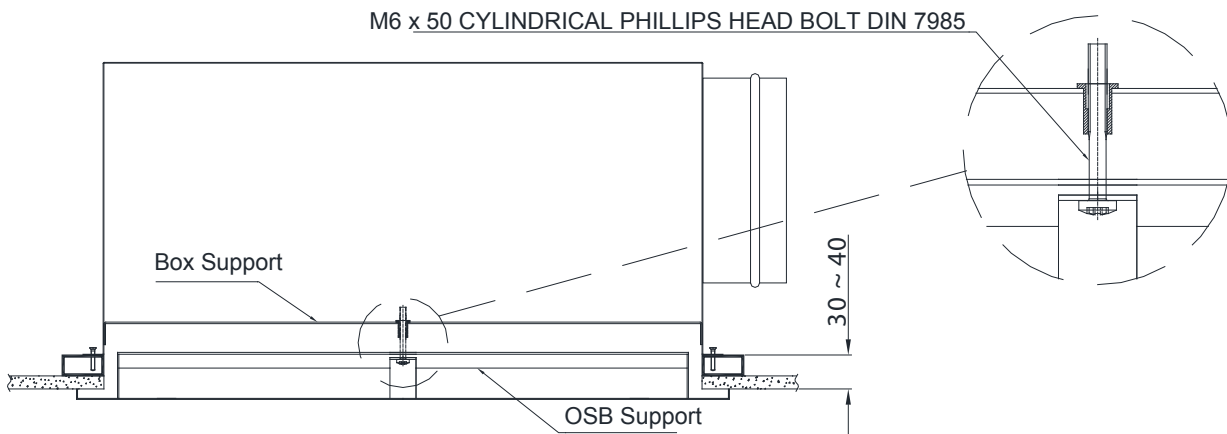
Heating Mode [ΔT]	4	6	8	10	12
Throw Range Multiplier	1.07	1.02	1	0.90	0.83
Cooling Mode [ΔT]	4	6	8	10	12
Throw Range Multiplier	1.31	1.36	1.42	1.48	1.54

INSTALLATION TYPES

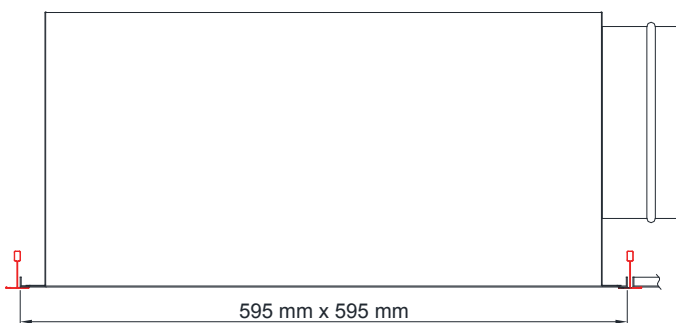
OSB_P SCREW INSTALLATION



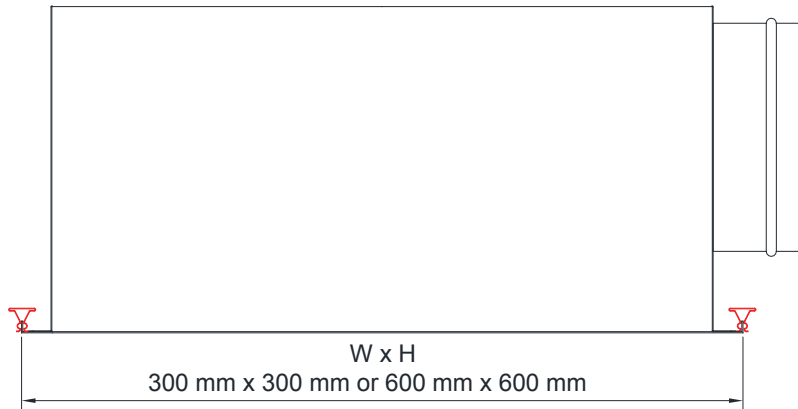
OSB_P CENTER BOLTED INSTALLATION



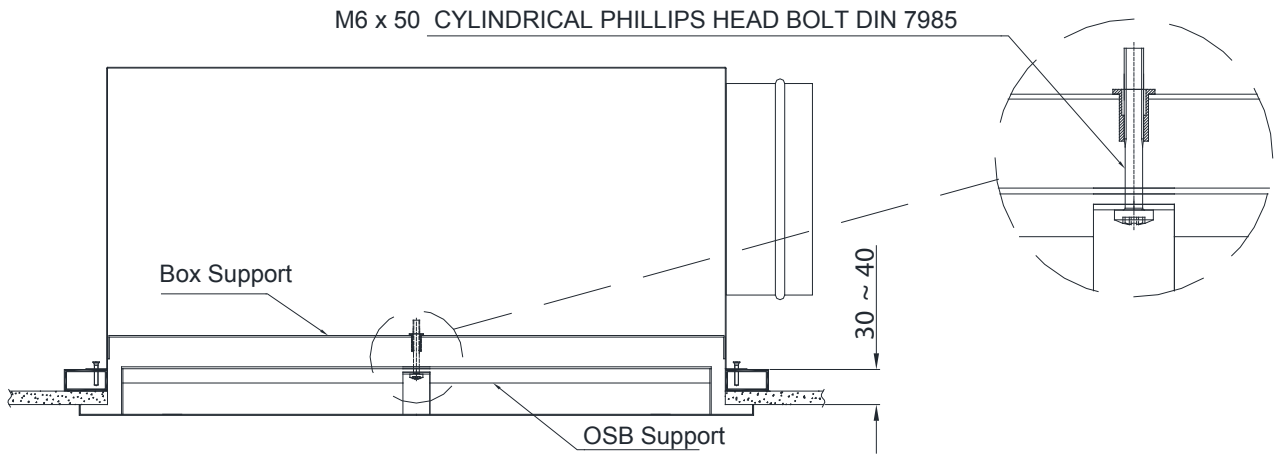
OSB_P TILE INSTALLATION



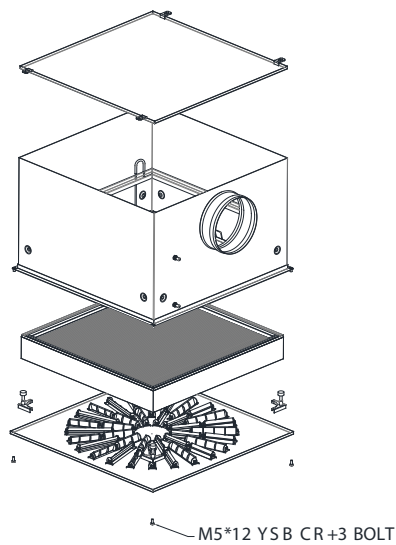
OSB_P CLIP-IN INSTALLATION



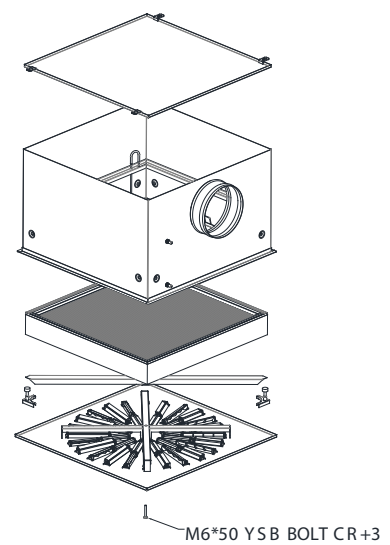
OSB_D CENTER BOLTED INSTALLATION



GFP - INSTALLATION FROM HEPA BOX CORNERS



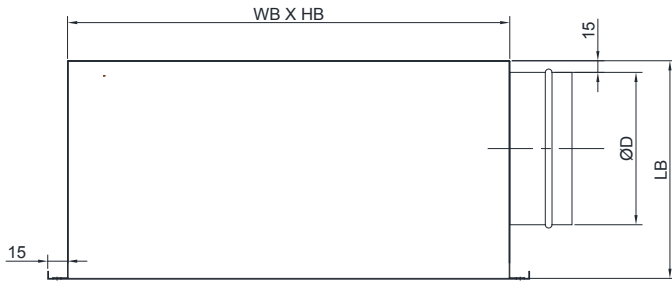
GFP - HEPA BOX CENTER BOLTED INSTALLATION



Note: The drawing above is valid for GFP – Standard Hepa Box. GFP, GFB and GFD catalogs should be consulted for detailed hepa box product selection.

BOX SIZES

Standard box dimensions for OSB_P.



Standard box Sizes for OSB_D are given below.

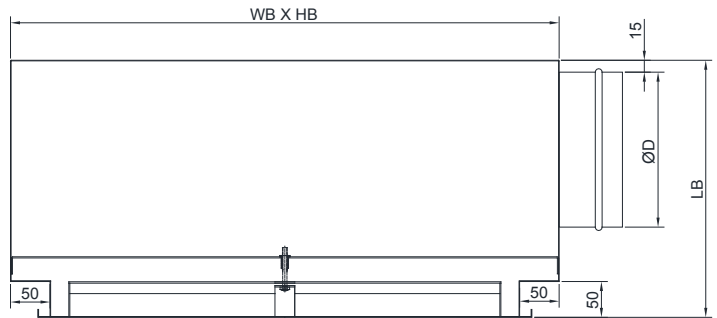


Table 4. Standard Box Sizes for OSB_P

OSB_P	Box Throat Diameter [ØD] [mm]	Box Height [LB] [mm]	Box Width [WB] [mm]	Box Length [HB] [mm]
300	200	275	270	270
400	200	275	370	370
500	250	325	470	470
600	300	375	570	570
800	350	425	770	770

Table 5. Standard Box Sizes for OSB_D

OSB_D	Box Throat Diameter [ØD] [mm]	Box Height [LB] [mm]	Box Width [WB] [mm]	Box Length [HB] [mm]
300	200	325	400	400
400	200	325	500	500
500	250	375	600	600
600	300	425	700	700

PRODUCT SELECTION

Example: The air flow rate distributed in the space is 4000 m³/h and the cooling temperature difference is determined as -8 K. 10 prismatic swirl diffusers will be used. Make your product selection.

Solution: Supply flow rate for a diffuser 4000/10 = 400 m³/h

From the performance data table [Table 2], the product corresponding to the appropriate pressure drop, sound pressure level and throw distance at 400m³/h air flow is selected.

For example, the pressure drop that will occur in a 400 mm x 400 mm product will be 20 Pa, the sound pressure level will be 32 dB(A) and the throw distance will be 5 m.

Throw Distance Correction Chart

In the previous example, the throw distance was found to be 5 m for the heating mode 8K. For cooling mode -8 K, refer to the Throw Distance Correction Table [Table 4]. The multiplier is 1.42.

Corrected throw distance = 5 m x 1,42 = 7.1 m

OSB_P ORDER CODE

You can place your prismatic swirl diffuser orders according to the coding format below.

OSB_P . <A> . . <C> . <D>

A	Raw Material Type	
	GAL	Galvanized
	PAS	Stainless Steel
B	Installation Type	
	VD	Screwed
	GC	Center Bolted
	KR	Tile
	KL	Clip - in
	KM	Center Bolted (Hepa Box)
	GK	Center Bolted + Clip - in (Hepa Box)
C	Size [mm]	
	300-08	300 x 300 - 8 blade
	400-16	400 x 400 - 16 blade
	500-24	500 x 500 - 24 blade
	600-36	600 x 600 - 36 blade
	825-48	825 x 825 - 48 blade
	355-08	355 x 355 - 8 blade - 305 x 305 (Hepa Box)
	507-16	507 x 507 - 16 blade - 457 x 457 (Hepa Box)
	585-24	585 x 585 - 24 blade - 535 x 535 (Hepa Box)
	625-36	625 x 625 - 36 blade - 575 x 575 (Hepa Box)
	660-36	660 x 660 - 36 blade - 610 x 610 (Hepa Box)
	812-48	812 x 812 - 48 blade - 762 x 762 (Hepa Box)
	366-16	355 x 660 - 16 blade - 305 x 610 (Hepa Box)
	566-36	507 x 660 - 36 blade - 457 x 610 (Hepa Box)
D	Paint	
	00	Unpainted
	S1	Standard Painted - RAL 9010
	S2	Standard Painted - RAL 9016
	XX	Special Painted

Sample Coding: OSB_P.GAL.GC.600-36.XX

OSB_D ORDER CODE

You can place your circular swirl diffuser orders according to the coding format below.

OSB_D . < A > . < B > . < C > . < D >

A	Raw Material Type	
	GAL	Galvanized
	PAS	Stainless Steel
B	Installation Type	
	GC	Center Bolted
C	Size [mm]	
	300-08	300 mm - 8 blade
	400-16	400 mm - 16 blade
	500-24	500 mm - 24 blade
	600-36	600 mm - 36 blade
D	Paint	
	00	Unpainted
	S1	Standard Painted - RAL 9010
	S2	Standard Painted - RAL 9016
	XX	Special Painted

Sample Coding: OSB_D.GAL.GC.600-36.S1



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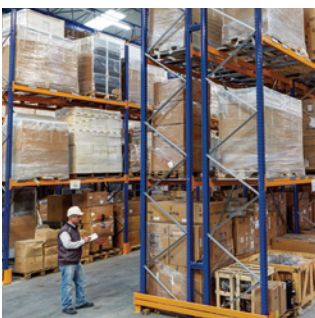


OLA
Slot Diffuser

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- ☞ OLA-Slot Diffuser, with its cylindrical shaped blades, is ideal for meeting comfort parameters in areas that are difficult to air-conditioning.
- ☞ It can be produced modularly. In this way, it provides a thin-striped decorative appearance.
- ☞ Aerodynamic optimization has been done, so it saves energy with low pressure loss.
- ☞ They are used as feed or return diffusers in ceiling and wall applications. It is suitable for horizontal shot from the ceiling. Creates effective throw geometry in cooling applications with Coanda effect.

MATERIAL

- ☞ Aluminum 6063 extrusion profile production.
- ☞ ABS plastic or optional aluminum blades that provide air direction inside the case.
- ☞ Slide damper that can be added into the slot diffuser for optional air flow adjustment.

SURFACE COATING

- ☞ RAL 9010 or RAL 9016 electrostatic powder paint as standard.
- ☞ Optional
 - Different RAL color codes
 - Unpainted manufacturing
 - Matt aluminum anodized finish

ASSEMBLY

- ☞ Standard Bridged assembly
- ☞ Screw mounting

STANDARD DIMENSIONS

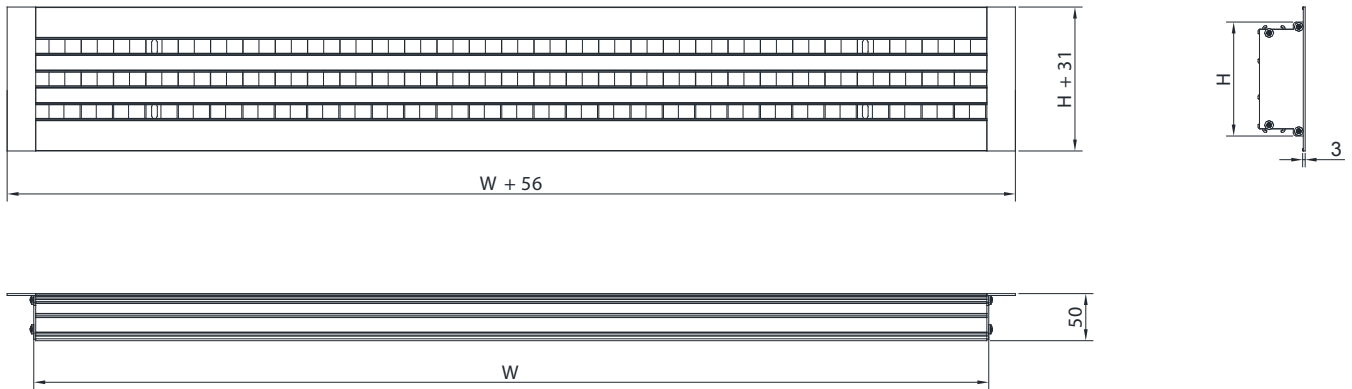


Table 1. Standard Dimensions

Standard Dimensions		H (Height) [mm]			
		With 1 Slot	With 2 Slot	With 3 Slot	With 4 Slot
		52	86	121	156
W (Width) [mm]	100	✓	✓	✓	✓
	150	✓	✓	✓	✓
	200	✓	✓	✓	✓
	250	✓	✓	✓	✓
	300	✓	✓	✓	✓
	400	✓	✓	✓	✓
	500	✓	✓	✓	✓
	750	✓	✓	✓	✓
	1000	✓	✓	✓	✓
	1250	✓	✓	✓	✓
	1500	✓	✓	✓	✓
	1750	✓	✓	✓	✓
	2000	✓	✓	✓	✓
2300	✓	✓	✓	✓	

PERFORMANCE DATA

Table 2. Effective Area Table

Effective Area [mm ²]		H (Height) [mm]			
		With 1 Slot	With 2 Slot	With 3 Slot	With 4 Slot
		52	86	121	156
W (Width) [mm]	100	0,0025	0,0041	0,0058	0.0075
	150	0,0037	0,0062	0,0087	0.0112
	200	0,0050	0,0083	0,0116	0.0150
	250	0,0062	0,0103	0,0145	0.0187
	300	0,0075	0,0124	0,0174	0.0225
	400	0,0100	0,0165	0,0233	0.0300
	500	0,0125	0,0207	0,0291	0.0375
	750	0,0187	0,0310	0,0436	0.0562
	1000	0,0250	0,0413	0,0582	0.0750
	1250	0,0312	0,0517	0,0727	0.0937
	1500	0,0375	0,0620	0,0872	0.1125
	1750	0,0437	0,0723	0,1018	0.1312
	2000	0,0500	0,0827	0,1163	0.1500
	2300	0,0575	0,0951	0,1338	0.1724

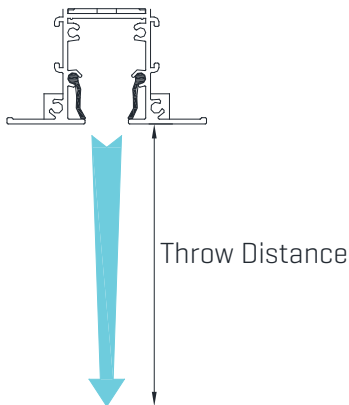
SUPPLY DATA

Table 3. Supply Data Table

Flow Rate [m ³ /h]		Effective Velocity [m/s]									
		0,5	1,0	1,5	2,0	2,5	3,0	3,5	4,0	4,5	5,0
50	Effective Area [m ²]	0,0278	0,0139	0,0093	0,0069	0,0056	0,0046	0,0040	0,0035	0,0031	
	Pressure Drop [Pa]	<1	5	11	22	36	55	77	105	136	
	Throw Distance [m]	0,8	1,4	1,9	2,4	2,8	3,2	3,6	3,9	4,3	
	Sound Pressure Level [dB(A)]	<15	<15	<15	<15	21	27	31	35	38	
100	Effective Area [m ²]	0,056	0,028	0,0185	0,0139	0,0111	0,0093	0,0079	0,0069	0,0062	
	Pressure Drop [Pa]	<1	4	10	19	31	47	67	91	118	
	Throw Distance [m]	1,1	1,9	2,6	3,2	3,8	4,3	4,9	5,4	5,8	
	Sound Pressure Level [dB(A)]	<15	<15	<15	16	23	28	32	36	40	
200	Effective Area [m ²]	0,1111	0,056	0,037	0,0278	0,0222	0,0185	0,0159	0,0139	0,0123	0,0111
	Pressure Drop [Pa]	<1	3	9	16	27	41	58	79	102	130
	Throw Distance [m]	1,6	2,6	3,5	4,3	5,1	5,9	6,6	7,3	8,0	8,6
	Sound Pressure Level [dB(A)]	<15	<15	<15	18	24	29	34	38	41	44
300	Effective Area [m ²]	0,1667	0,0833	0,0556	0,0417	0,0333	0,0278	0,0238	0,0208	0,0185	
	Pressure Drop [Pa]	<1	3	8	15	25	38	53	72	94	
	Throw Distance [m]	1,9	3,1	4,2	5,2	6,1	7,0	7,9	8,7	9,5	
	Sound Pressure Level [dB(A)]	<15	<15	<15	19	25	30	35	39	42	
400	Effective Area [m ²]	0,1111	0,0741	0,0556	0,0444	0,0370	0,0317	0,0278			
	Pressure Drop [Pa]		3	7	14	24	36	50	68		
	Throw Distance [m]		3,5	4,8	5,9	7,0	8,0	8,9	9,9		
	Sound Pressure Level [dB(A)]		<15	<15	19	26	31	35	39		
500	Effective Area [m ²]	0,1389	0,0926	0,0694	0,0556	0,0463	0,0397				
	Pressure Drop [Pa]		3	7	14	22	34	48			
	Throw Distance [m]		3,9	5,3	6,5	7,7	8,8	9,9			
	Sound Pressure Level [dB(A)]		<15	<15	20	26	31	36			
600	Effective Area [m ²]	0,1667	0,1111	0,0833	0,0667	0,0556					
	Pressure Drop [Pa]		3	7	13	22	33				
	Throw Distance [m]		4,2	5,7	7,1	8,3	9,5				
	Sound Pressure Level [dB(A)]		<15	<15	20	26	32				
700	Effective Area [m ²]			0,1296	0,0972	0,0778					
	Pressure Drop [Pa]			7	13	21					
	Throw Distance [m]			6,1	7,6	8,9					
	Sound Pressure Level [dB(A)]			<15	20	27					
800	Effective Area [m ²]			0,1481	0,1111	0,0889					
	Pressure Drop [Pa]			6	12	20					
	Throw Distance [m]			6,5	8,0	9,4					
	Sound Pressure Level [dB(A)]			<15	21	27					
900	Effective Area [m ²]			0,1667	0,1250	0,1000					
	Pressure Drop [Pa]			6	12	20					
	Throw Distance [m]			6,8	8,4	9,9					
	Sound Pressure Level [dB(A)]			<15	21	27					
1000	Effective Area [m ²]				0,1389						
	Pressure Drop [Pa]				12						
	Throw Distance [m]				8,8						
	Sound Pressure Level [dB(A)]				21						

Hızlı Seçim: Safe Selection Design Upper Limit High Pressure Drop

- Data were obtained with the wings in a straight position. If the shot is adjusted horizontally, the pressure drop and sound pressure level data in the table have acceptable variability.
- Throw distance: The vertical distance of the air in the comfort zone leaving the air distribution equipment at a speed of 0.25 m / s.



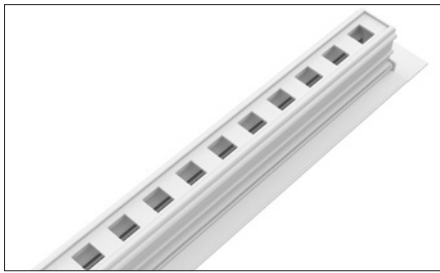
THROW DISTANCE CORRECTION TABLE

Table 4. Throw Distance Correction Table

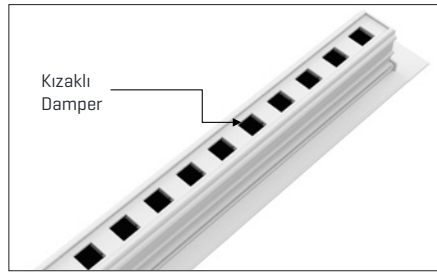
Heating Mode (ΔT)	4	6	8	10	12
Throw Distance Correction	1.07	1.02	1	0.90	0.83
Cooling Mode (ΔT)	4	6	8	10	12
Throw Distance Correction	1.31	1.36	1.42	1.48	1.54

DAMPER OPTION

In the OLA slot diffuser, if the air flow rate adjustment is desired, a damper can be added inside the diffuser. Thanks to the slide-shaped plastic damper, the flow rate through the diffuser is adjusted.



Without Damper



Damper Opened



Damper Closed

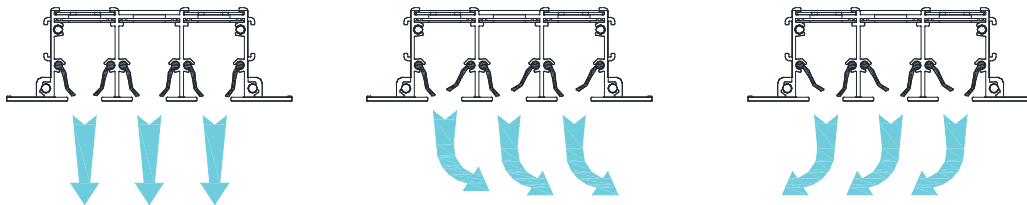
DAMPER CORRECTION TABLE

Table 5. Damper Correction Table

Damper Position	Pressure Drop Correction	Sound Generation [dB(A)]
Opened	1,1	+1
%25 Closed	1,14	+4
%50 Closed	2,48	+14
%75 Closed	5,11	+29

AIR FLOW DIRECTION

Sample application examples for air throw and air collector blade position are given below.

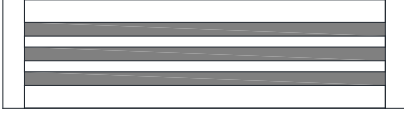


Note: The use of the OLA slot diffuser is suitable for variable flow systems and the air discharge directing characteristic remains constant between 100% and 25% flow rate.

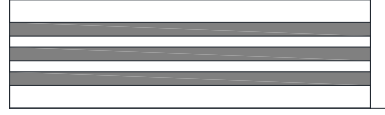
COVER OPTIONS

If specified in the order, the slot diffuser is produced in the following ways, with the slot cover option with a single cover or both sides without covers. If the cover option is not specified in the order, standard cover production is made.

With Standard Frame



With One Side Frame

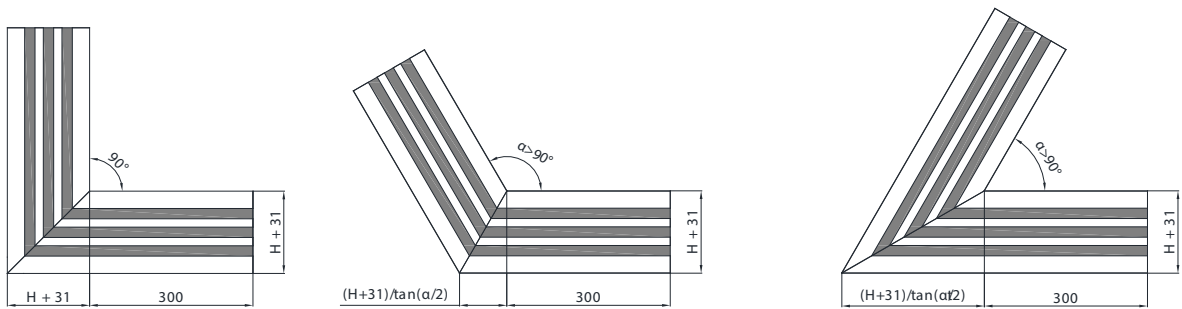


Without Frame



CORNER JOINING

In order to ensure the continuity of OLA installation in wall-to-wall applications, a stylish appearance is provided with the corner joining system that allows different angles to pass.



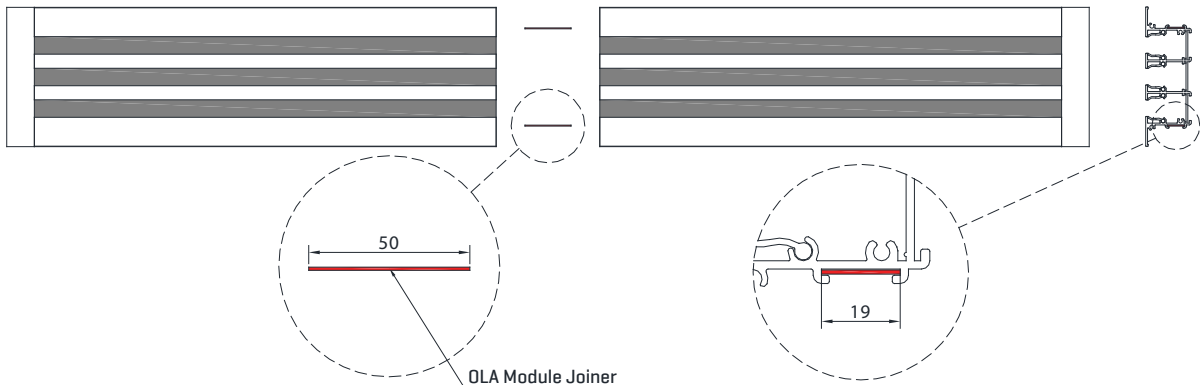
Standard corner joint length is 300 mm.

α : Corner piece angle. The standard corner joint is a right angle [90 °]. The desired angle dimensions must be specified in the order. Corner piece angle is minimum 45 °

MODULE COMBINATION

When the slot length [W] given in the OLA Slot Diffuser orders is over 2300 mm, the slot profiles are combined with the module joining piece in a modular way. In this way, the slot diffuser appears in one piece with its strength.

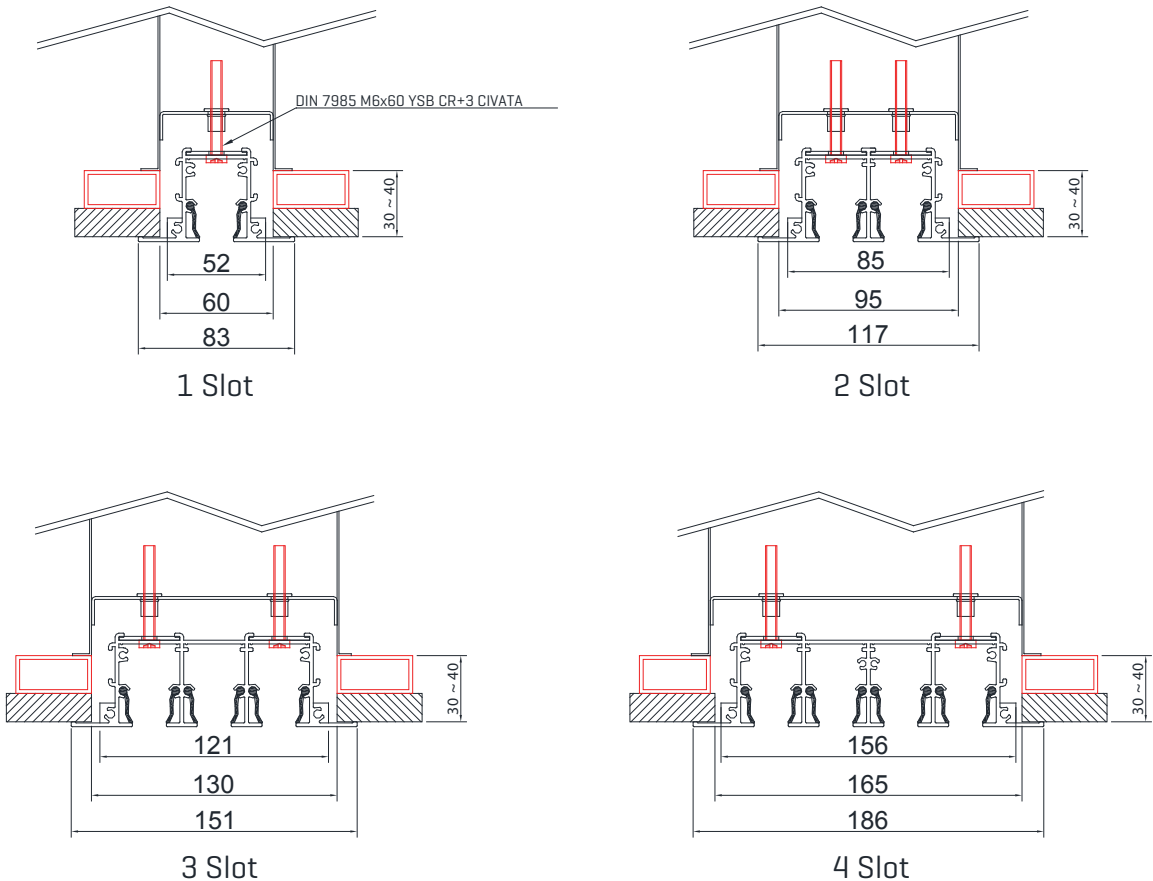
Number of Modules = Round Up [Order Size / 230]



ASSEMBLY

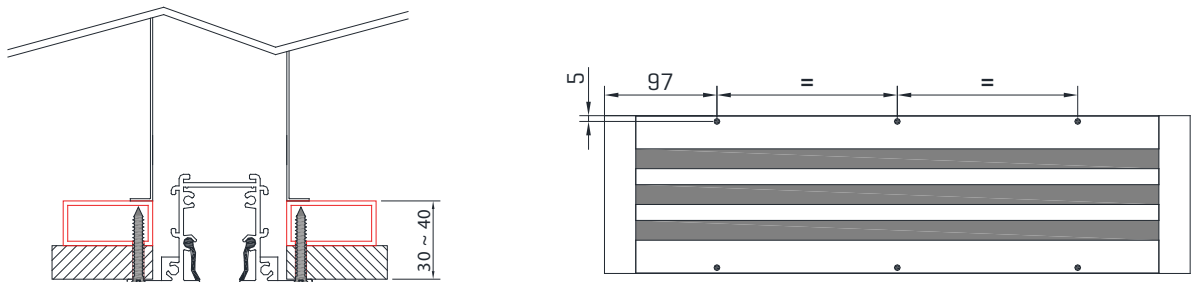
BRIDGE INSTALLATION

Bridged assembly is made as standard. Decorative appearance is provided with bridged mounting. For each slot module, there are 2 mounting plates on OLA and 2 mounting plates [bridge] on the box. The bolt is screwed into the mounting plate on the OLA, the nut is screwed into the mounting plate on the box and the assembly is completed by tightening the bolt with a phillips screwdriver.



SCREW INSTALLATION

Screw mounting is made to the screw holes on the sides of the slot diffuser profile. DIN 7504 P 3.9x38 self-drilling cross head screw is mounted. In screw mounting, there are 4 screw holes for a module when the width [W] dimension is 600 mm or less. In modules with a width of more than 600 mm, 2 screw holes are added in the middle of the module, 6 screws are used in total.



BOX DIMENSIONS

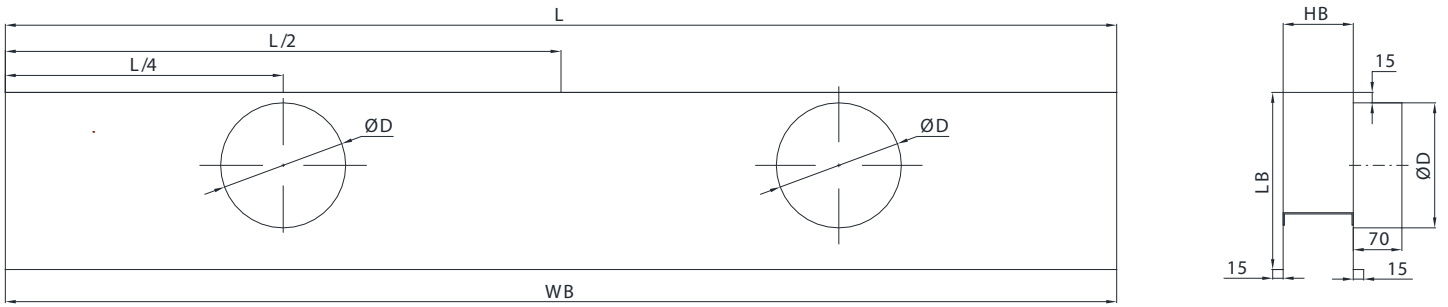


Table 5. Box Size Table

Box Size Table		Slot Length [mm]								
Slot Sayısı	Özellik	400	600	800	1000	1200	1400	1600	1800	2000
1	Box Strait (ØD) [mm]	Ø100 - 1 Piece	Ø100 - 1 Piece	Ø100 - 1 Piece	Ø100 - 1 Piece	Ø150 - 1 Piece	Ø150 - 1 Piece	Ø150 - 2 Piece	Ø200 - 2 Piece	Ø200 - 2 Piece
	Box Height (LB) [mm]	175	175	225	225	225	275	275	275	275
	Box 1. Size (WB) [mm]	410	610	810	1010	1210	1410	1610	1810	2010
	Box 2. Size (HB) [mm]	60	60	60	60	60	60	60	60	60
2	Box Strait (ØD) [mm]	Ø100 - 1 Piece	Ø100 - 1 Piece	Ø150 - 1 Piece	Ø150 - 1 Piece	Ø150 - 1 Piece	Ø200 - 1 Piece	Ø200 - 2 Piece	Ø200 - 2 Piece	Ø200 - 2 Piece
	Box Height (LB) [mm]	175	175	225	225	225	275	275	275	325
	Box 1. Size (WB) [mm]	410	610	810	1010	1210	1410	1610	1810	2010
	Box 2. Size (HB) [mm]	95	95	95	95	95	95	95	95	95
3	Box Strait (ØD) [mm]	Ø100 - 1 Piece	Ø100 - 1 Piece	Ø150 - 1 Piece	Ø150 - 1 Piece	Ø150 - 1 Piece	Ø200 - 1 Piece	Ø200 - 2 Piece	Ø200 - 2 Piece	Ø250 - 2 Piece
	Box Height (LB) [mm]	175	175	225	225	275	275	275	325	325
	Box 1. Size (WB) [mm]	410	610	810	1010	1210	1410	1610	1810	2010
	Box 2. Size (HB) [mm]	130	130	130	130	130	130	130	130	130
4	Box Strait (ØD) [mm]	Ø100 - 1 Piece	Ø100 - 1 Piece	Ø150 - 1 Piece	Ø150 - 1 Piece	Ø200 - 1 Piece	Ø200 - 1 Piece	Ø200 - 2 Piece	Ø250 - 2 Piece	Ø250 - 2 Piece
	Box Height (LB) [mm]	175	175	225	225	275	275	275	325	325
	Box 1. Size (WB) [mm]	410	610	810	1010	1210	1410	1610	1810	2010
	Box 2. Size (HB) [mm]	165	165	165	165	165	165	165	165	165

PRODUCT SELECTION

Example: The air flow distributed in the space is determined as 600 m³ / h and the cooling temperature difference is -8 K. It will be used in the 4 meter slot diffuser feeding application. 3 meters throw distance is required. Make your product selection.

Solution: From the supply data table (Table 3), the effective areas corresponding to the appropriate pressure loss and flow rate values are selected. The method to be used for the desired lengths of performance data is made by calculating the number of modules. The result is reached by correcting the data found for 1 module.

- Number of modules for 4 meters of slot diffuser: Roll Up $\{4000/2300\} = 2$ modules.
- 1 module length = $4000/2$ (Module) = 2000 mm (Length to be used in calculation)
- Required flow rate for 1 module = $600/2$ (Module) = 300 m³ / h (Flow Rate Used in Calculation)
- From the effective area table (Table 2), the effective areas of 2000 mm wide slot diffusers are selected according to the number of slots. Accordingly, the effective area values of approximately 0.05 m² (with 1 slot), 0.0827 m² (with 2 slots), 0.1163 m² (with 3 slots) and 0.15 m² (with 4 slots) are obtained according to the number of slots.

Using the effective area values obtained from the supply data table (Table 3) and the required flow rate for 1 module, the appropriate effective area value is determined. The most suitable selection for 3 meters fthrow distance and 300 m³ / h air flow rate;

3-slot slot diffuser, Effective area: 0.1163m²

Pressure Drop: 1.47 Pa

Firing Distance: 2.4 m

Sound Pressure Level: <15 dB(A) Throw Distance Correction Table

2-module slot diffuser selection throw distance was found to be 2.4 m. For cooling mode -8 K, refer to the Throw Distance Correction Table (Table 4). The multiplier value is 1.42.

Corrected throw distance = 2,4 m x 1,42 = 3,4 m

PRODUCT ORDER CODE

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

OLA.ALM.<A>..<C>.<D>.<E>

A	Type	
	01	With Plastic Blade and Slide Damper
	02	Without Plastic Blade, Without Sliding Damper
	03	Without Blade, With Slide Damper
	04	Without Blade, Without Slide Damper
	05	With Aluminum Blade and Slide Damper
	06	With Aluminum Blade, Without Slide Damper
B	Mounting Type	
	KP	Bridged
	VD	Screwed System
C	Slot Width [W] [mm]	
	0000	View from Standard Sizes
D	Height [H] [mm] & Number of Slot	
	052-01	52mm.- 1 Slot
	086-02	86mm.- 2 Slot
	121-03	121mm.- 3 Slot
	165-04	165mm.- 4 Slot
E	Paint	
	00	Unpainted
	S1	Standard Painted - RAL 9010
	S2	Standard Painted - RAL 9016
	XX	Special Painted
	EK	Matt Anodized Coating

Sample Coding: OLA.ALM.02.KP.00600.063-02.S1



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180 different types of products.



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Tel: +90 216 250 55 45 | Fax: +90 216 250 55 56

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İKLİMLENDİRME | HVAC SYSTEMS





VGZ
CIRCULAR FIRE DAMPER

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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 standards. 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 standards], 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.

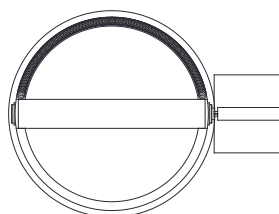
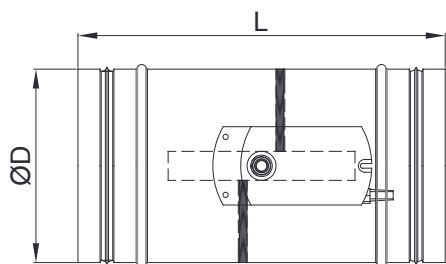


- VGZ – Circular Fire Damper is used to isolate other parts of the ventilation system from flame, smoke and heat in case of fire in one part of the system. It can be mounted in the direction of the air flow or in the opposite direction.
- The blade is in the open position as standard during operation,
- It works with a fused or spring return servo motor with 24V AC/DC - 230V AC supply voltage.

MATERIAL

- Galvanized case
- Fire resistant galvanized blade filled with rock wool
- Brass bush

DIMENSIONS



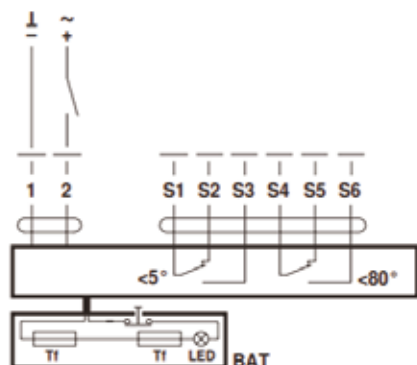
Tablo 1. Dimensions

Dimensions		
Product	ØD [mm]	L [mm]
VGZ-200	200	380
VGZ-250	250	380
VGZ-280	280	350
VGZ-300	300	400
VGZ-315	315	400
VGZ-355	355	400
VGZ-400	400	450
VGZ-450	450	500
VGZ-500	500	600

Tablo 2. Quick Selection

Quick Selection		
Product	ØD [mm]	Flow Rate [m³/h]
		Maximum
VGZ-200	200	8640
VGZ-250	250	10800
VGZ-280	280	12096
VGZ-300	300	12960
VGZ-315	315	13608
VGZ-355	355	15336
VGZ-400	400	17280
VGZ-450	450	19440
VGZ-500	500	21600

ACTUATOR CONNECTON



Cable colours:

- 1 = black
- 2 = red
- S1 = violet
- S2 = red
- S3 = white
- S4 = orange
- S5 = pink
- S6 = grey
- Tf: Thermal fuse (see "Technical data")

NOTES





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- 14 Different Models for FOUR-TCR & FOUR TCRH
- Rooftop Packaged Air Conditioners
- Optional Only Cooling or Heat-Pump Systems
- Different Range for Different Air Climates

Air Conditioning Solutions

- High Energy Efficient Packaged Air Conditioners
- Eco-Friendly R410A Refrigerant Gas
- Advanced Microprocessor Control Options
- Easy Maintenance and Installation

Compactness with Well Qualified Air

- Optimal Energy Efficiency, Air Quality and Comfort
- Wide and Versatile Range
- Energy Saving Solutions for All Commercial Buildings



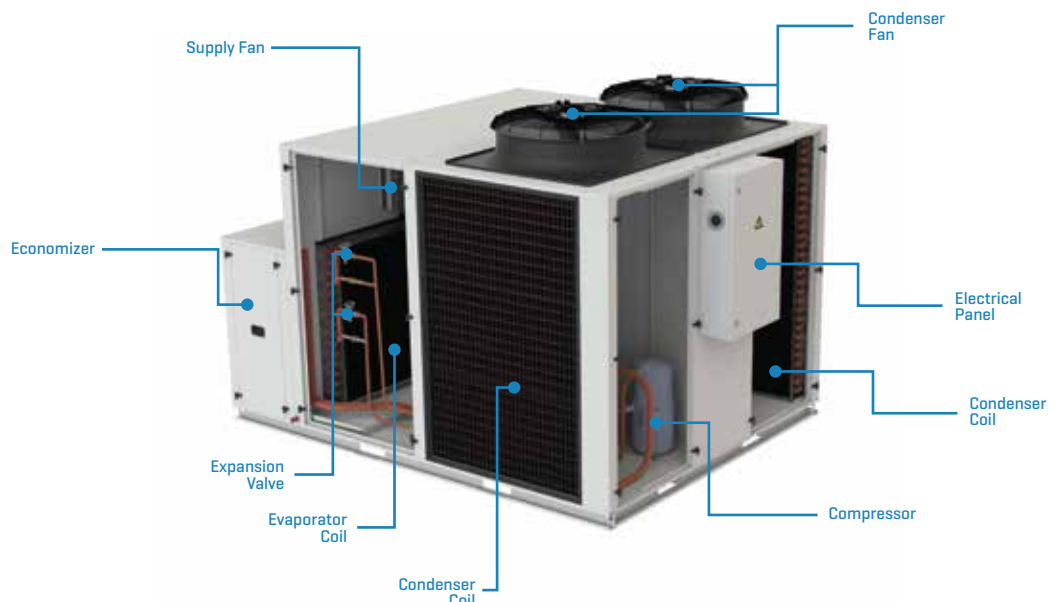
GENERAL SPECIFICATIONS

These are roof type (ROOFTOP) package air conditioners that can work only cooling or reversible with the direct expansion refrigerant system, cool the place air with the Cooling / DX battery in the summer and heat it in the winter. It provides the conditioning of the air inside the place by ducts, which will meet the fresh air requirement it needs and can perform all heating, cooling and ventilation processes in a compact unit. FOUR TCR is designed for climates that need cooling only (Tropical), and FOUR TCRH series is designed for areas that need heating and cooling. It is offered with many capacity options according to the size of the environment to be air-conditioned.

It has high energy efficiency and is budget friendly with fast and easy installation, low operating and initial investment cost. Its main areas of usage are that large commercial buildings, business centers, airports, restaurants, large stores, cinema and theatre halls, conference halls, industrial buildings and centers of logistic.



COMPONENTS



FOUR TCR & FOUR TCRH

- High efficient and low noise centrifugal fans
- Compact design
- Full integrated control system
- Plug&Play

COMPRESSOR

- High efficiency
- Quite operation, low sound levels
- Fewer moving parts
- Compact and light design
- Crank case heater



HEAT EXCHANGER COIL

- Copper pipe-aluminum fin exchanger
- High temperature and humidity efficiency

FILTER

- Large filtering area for energy efficiency and long service period
- High efficiency ISO Course filters

CASE

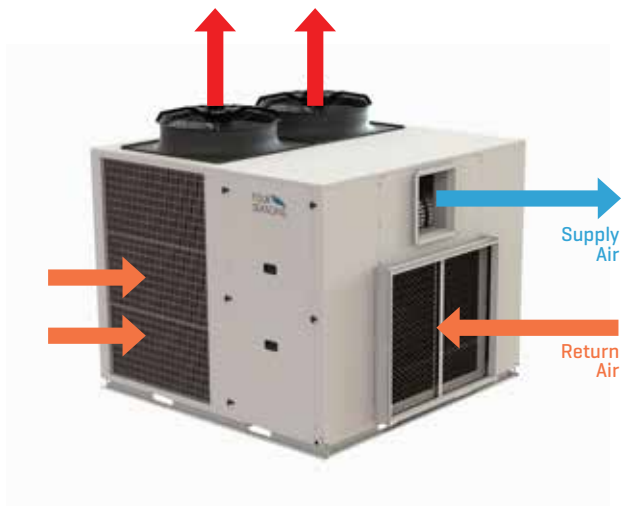
- Galvanized sheet with electrostatic powder paint
- Insulated with 19 mm rubber
- Easy maintainability and serviceability

OPERATING LIMITS

OPTIONS

- Economizer
- Bag filter chamber
- Electric heater
- Heating coil
- Cooling coil
- Coil coating
- Electronic expansion valve
- Dirty filter sensor
- CO₂ sensor
- Enthalpy control
- Condenser fan speed control
- Smoke detector

AIR CONFIGURATION



COOLING	Outdoor Air Temperature		Indoor Air Temperature	
	Dry Bulb	Wet Bulb	Dry Bulb	Wet Bulb
	°C	°C	°C	°C
Minimum	15	7	18	14
Average	35	24	27	19
Maximum	52	27	36	24

HEATING	Outdoor Air Temperature		Indoor Air Temperature	
	Dry Bulb	Wet Bulb	Dry Bulb	Wet Bulb
	°C	°C	°C	°C
Minimum	-5	3	18	14
Average	7	6	27	19
Maximum	24	22	36	24

FOUR TCR Series Technical Data

		018 - 072						
		TCR-18	TCR-23	TCR-32	TCR-37	TCR-47	TCR-64	TCR-72
Airflow Rate	m ³ /h	2850	3600	4800	5650	7250	9400	10750
[1]Total Cooling Capacity	kW	19	24	33	38	48	65	73
[1]Sensible Cooling Capacity		14	18	24	28	36	48	54
[2]Total Cooling Capacity		17	22	29	34	44	58	67
[2]Sensible Cooling Capacity		13	17	23	26	34	45	51
Total Absorbed Power [High]		7.1	8.6	12.8	14.1	16.7	24.6	26.3
Fan Motor Absorbed Power		0.8	1.1	1.5	1.5	2.2	3	3
Total Compressor Absorbed Power		4.8	5.9	7.7	9.5	11.6	15,4	17.5
Compressor / Circuit Number		pcs.	1/1	1/1	1/1	2/2	2/2	2/2
[3]Max. External Static Pressure	Pa	524	538	621	504	594	596	486
Energy	380-400 V / 3 ph. / 50 Hz.							
Refrigerant	R410A							

		080 - 176						
		TCR-80	TCR-94	TCR-108	TCR-122	TCR-138	TCR-154	TCR-176
Airflow Rate	m ³ /h	12200	14100	16500	18750	21150	23750	27100
[1]Total Cooling Capacity	kW	81	95	109	123	139	155	177
[1]Sensible Cooling Capacity		60	70	82	92	104	116	133
[2]Total Cooling Capacity		75	86	99	113	129	142	159
[2]Sensible Cooling Capacity		60	66	77	87	98	109	125
Total Absorbed Power [High]		29.9	33.6	40.6	47.5	54.7	58.8	69
Fan Motor Absorbed Power		4	5.5	5.5	5.5	7.5	7.5	11
Total Compressor Absorbed Power		19.5	22.7	26.5	30.2	34.7	39.1	44.4
Compressor / Circuit Number		pcs.	2/2	2/2	2/2	2/2	2/2	2/2
[3]Max. External Static Pressure	Pa	635	710	625	554	771	554	623
Energy	380-400 V / 3 ph. / 50 Hz.							
Refrigerant	R410A							

NOTES:

[1] Capacities as per of EN 14511 @ 27/19 °C coil inlet and 35 °C ambient temperature.

[2] Capacities @ 27/19 °C Coil inlet and 46 °C ambient temperature.

[2] Maximum ESP at nominal airflow rate for high pressure class units.

FOUR TCRH Series Technical Data

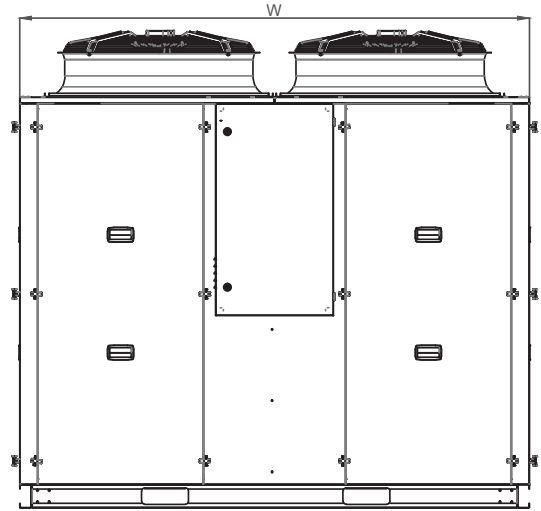
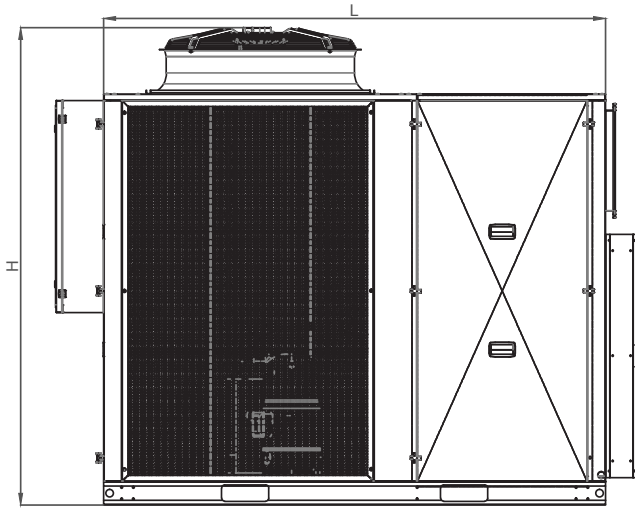
		018 - 072						
		TCRH-18	TCRH-23	TCRH-32	TCRH-37	TCRH-47	TCRH-64	TCRH-72
Airflow Rate	m ³ /h	2850	3600	4800	5650	7250	9400	10750
[1]Total Cooling Capacity	kW	19	24	33	38	49	65	75
[1]Sensible Cooling Capacity		15	19	25	30	38	51	59
[2]Total Heating Capacity		20	25	33	39	50	66	77
[2]Sensible HeatingCooling Capacity		15	19	25	30	38	50	58
[3]Total Cooling Capacity		17	22	29	35	44	58	67
[3]Sensible Cooling Capacity		14	17	23	27	34	46	53
[4]Total Heating Capacity		15	19	25	30	37	49	57
[4]Sensible Heating Capacity		11	14	19	22	28	37	43
Total Absorbed Power [High]		7	8.5	12.7	14.2	16.6	24.7	26.4
Fan Motor Absorbed Power		0.8	1.1	1.5	1.5	2.2	3	3
Total Compressor Absorbed Power		4.8	5.9	7.7	9.5	11.6	15.4	17.5
Compressor / Circuit Number		pcs.	1/1	1/1	1/1	2/2	2/2	2/2
[5]Max. External Static Pressure	Pa	524	538	621	504	594	596	486
Energy	380-400 V / 3 ph. / 50 Hz.							
Refrigerant	R410A							

		080 - 176						
		TCRH-80	TCRH-94	TCRH-108	TCRH-122	TCRH-138	TCRH-154	TCRH-176
Airflow Rate	m ³ /h	12200	14100	16500	18750	21150	23750	27100
[1]Total Cooling Capacity	kW	83	96	114	128	141	157	178
[1]Sensible Cooling Capacity		65	75	89	100	110	123	138
[2]Total Heating Capacity		85	99	117	131	144	161	182
[2]Sensible HeatingCooling Capacity		64	75	88	98	108	121	137
[3]Total Cooling Capacity		74	87	103	115	126	141	160
[3]Sensible Cooling Capacity		58	68	80	89	99	110	124
[4]Total Heating Capacity		63	74	87	98	107	120	135
[4]Sensible Heating Capacity		48	55	65	73	80	90	101
Total Absorbed Power [High]		29.8	33.8	40.5	47.3	54.6	58.6	69.1
Fan Motor Absorbed Power		4	5.5	5.5	5.5	7.5	7.5	11
Total Compressor Absorbed Power		19.5	22.7	26.5	30.2	34.7	39.1	44.4
Compressor / Circuit Number		pcs.	2/2	2/2	2/2	2/2	2/2	2/2
[5]Max. External Static Pressure	Pa	635	710	625	554	771	554	623
Energy	380-400 V / 3 ph. / 50 Hz.							
Refrigerant	R410A							

NOTES:

- [1] Capacities @ 27/19 °C coil inlet and 35 °C ambient temperature.
- [2] Capacities @ 21/15,5 °C coil inlet and 7 °C ambient temperature.
- [3] Capacities @ 27/19 °C coil inlet and 46 °C ambient temperature.
- [4] Capacities @ 21/15,5 °C coil inlet and -5 °C ambient temperature.
- [5] Maximum ESP at nominal airflow rate for high pressure class units.

DIMENSIONS



PRODUCT CODE	PRODUCT NAME	L	W	H
FOUR TCR / TCRH-018	Tropical Rooftop/ Heat-Pump Rooftop-018	1846	1130	1442
FOUR TCR / TCRH-023	Tropical Rooftop / Heat-Pump Rooftop-023	1846	1130	1592
FOUR TCR / TCRH-032	Tropical Rooftop / Heat-Pump Rooftop-032	1926	1130	1708
FOUR TCR / TCRH-037	Tropical Rooftop / Heat-Pump Rooftop-037	2210	1300	1780
FOUR TCR / TCRH-047	Tropical Rooftop / Heat-Pump Rooftop-047	2360	1490	1820
FOUR TCR / TCRH-064	Tropical Rooftop / Heat-Pump Rooftop-064	2360	1860	1860
FOUR TCR / TCRH-072	Tropical Rooftop / Heat-Pump Rooftop-072	2700	1860	1960
FOUR TCR / TCRH-080	Tropical Rooftop / Heat-Pump Rooftop-080	2700	2020	1980
FOUR TCR / TCRH-094	Tropical Rooftop / Heat-Pump Rooftop-094	2950	2160	2070
FOUR TCR / TCRH-108	Tropical Rooftop / Heat-Pump Rooftop-108	3210	2160	2154
FOUR TCR / TCRH-122	Tropical Rooftop / Heat-Pump Rooftop-122	3350	2160	2364
FOUR TCR / TCRH-138	Tropical Rooftop / Heat-Pump Rooftop-138	3500	2170	2400
FOUR TCR / TCRH-154	Tropical Rooftop / Heat-Pump Rooftop-154	3500	2280	2400
FOUR TCR / TCRH-176	Tropical Rooftop / Heat-Pump Rooftop-176	3900	2280	2500

NOTE:

*All dimensions are in mm.

**All dimensions are approximative.

HEATING COIL



- ☞ Coils are Eurovent certified.
- ☞ Coils are made of copper pipes and aluminum fins.
- ☞ The cassette material is galvanized or stainless steel.
- ☞ The coils were tested at a pressure of at least 20 bar. On request, 30 bars can be tested under pressure.
- ☞ The collectors used in the coils are copper pipes.
- ☞ In hot and cold water coils, the water inlet is from the bottom and the water outlet is at the top.
- ☞ Air and water flows are counter-flowing to increase the heat transfer between them.
- ☞ Under the cooling coil, a condensate pan with a double slope is placed and the accumulated water is discharged through the drain pipe. In the case of a Drip Holder, a high-performance drip holder made of PVC material that can withstand up to 90° C is used.

ELECTRIC HEATER



Rectangular electric heaters have two thermostats as standard.

The first thermostat is set to 70° C, the air in the electric heater cuts off the electric current when it reaches 70° C, allowing the device to restart automatically when the temperature drops.

The second thermostat used for safety purposes is activated at 110° C and cuts off the electric current. The thermostat must be reset manually from the red button in order for the appliance to operate again.

MODELS	AIR FLOW [m³/h]	DIMENSIONS	ΔT=5	ΔT=10
			kW	kW
FOUR TCR/TCRH-18	2800	800*572	6	9
FOUR TCR/TCRH-23	3600	800*572	6	12
FOUR TCR/TCRH-32	4750	800*762	8	16
FOUR TCR/TCRH-37	5600	970*762	9	20
FOUR TCR/TCRH-47	7200	1160*762	12	24
FOUR TCR/TCRH-64	9300	1520*826	15	33
FOUR TCR/TCRH-72	10800	1520*889	18	36
FOUR TCR/TCRH-80	12100	1680*889	20	42
FOUR TCR/TCRH-94	14000	1680*1016	25	48
FOUR TCR/TCRH-108	16600	1730*1143	27	57
FOUR TCR/TCRH-122	18800	1730*1334	33	63
FOUR TCR/TCRH-138	21200	1870*1397	36	72
FOUR TCR/TCRH-154	23700	1980*1397	42	81
FOUR TCR/TCRH-176	27000	1980*1651	48	93



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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 standards. 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 standards], 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.



- ☞ DMO - Perforated Grille provides homogeneous air distribution with its decorative appearance, used in supply and suction lines in ventilation systems.



MATERIAL

- ☞ The frame is made of 6063 extruded aluminum, the perforated part is made of galvanized sheet. It can also be produced from optional AISI 304 quality stainless steel.

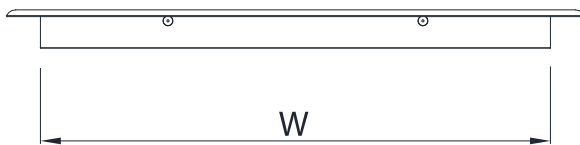
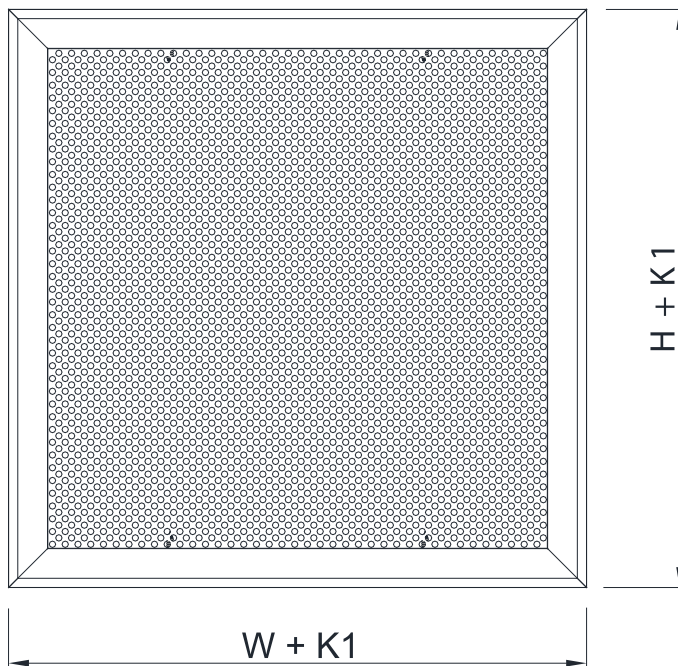
SURFACE COATING

- ☞ RAL 9010 or RAL 9016 Electrostatic powder paint as standard
- ☞ Optional
 - Different RAL color codes
 - Matt aluminum anodized finish for a matt and metallic look in the aluminum frame
 - Unpainted manufacturing
 - Stainless product

MOUNTING OPTIONS

- ☞ Screw System
- ☞ Without Mounting Hole
- ☞ Clip-in
- ☞ Suspended Ceiling

STANDARD DIMENSIONS



	K1 (mm)	K2 (mm)
31 mm Frame	54	30
Clip-in Frame	60	30
Stainless Frame	58	30

Table 1. Standard Dimensions

W [mm] [Width]	200 - 300 - 400 - 500 - 600 - 700 - 800 - 900 - 1000 - 1100 - 1200 1300 - 1400 - 1500 - 1600 - 1800 - 2000
H [mm] [Height]	100 - 200 - 300 - 400 - 500 - 600 - 700 - 800 - 900 - 1000

PERFORMANCE DATA

EFFECTIVE AREA TABLE

Table 2. Effective Area Table

Effective Area [m ²]		H (Height) [mm]									
		100	200	300	400	500	600	700	800	900	1000
W (Width) [mm]	200	0.003	0.006	0.008	0.011	0.014	0.017	0.020	0.022	0.025	0.028
	300	0.004	0.008	0.013	0.017	0.021	0.025	0.029	0.034	0.038	0.042
	400	0.006	0.011	0.017	0.022	0.028	0.034	0.039	0.045	0.050	0.056
	500	0.007	0.014	0.021	0.028	0.035	0.042	0.049	0.056	0.063	0.070
	600	0.008	0.017	0.025	0.034	0.042	0.050	0.059	0.067	0.076	0.084
	700	0.010	0.020	0.029	0.039	0.049	0.059	0.069	0.078	0.088	0.098
	800	0.011	0.022	0.034	0.045	0.056	0.067	0.078	0.090	0.101	0.112
	900	0.013	0.025	0.038	0.050	0.063	0.076	0.088	0.101	0.113	0.126
	1000	0.014	0.028	0.042	0.056	0.070	0.084	0.098	0.112	0.126	0.140
	1100	0.015	0.031	0.046	0.062	0.077	0.092	0.108	0.123	0.139	0.154
	1200	0.017	0.034	0.050	0.067	0.084	0.101	0.118	0.134	0.151	0.168
	1300	0.018	0.036	0.055	0.073	0.091	0.109	0.127	0.146	0.164	0.182
	1400	0.020	0.039	0.059	0.078	0.098	0.118	0.137	0.157	0.176	0.196
	1500	0.021	0.042	0.063	0.084	0.105	0.126	0.147	0.168	0.189	0.210
	1600	0.022	0.045	0.067	0.090	0.112	0.134	0.157	0.179	0.202	0.224
	1700	0.024	0.048	0.071	0.095	0.119	0.143	0.167	0.190	0.214	0.238
1800	0.025	0.050	0.076	0.101	0.126	0.151	0.176	0.202	0.227	0.252	
2000	0.028	0.056	0.084	0.112	0.140	0.168	0.196	0.224	0.252	0.280	

SUPPLY AIR DATA

Table 3. Supply Air Data

Flow Rate [m ³ /h]		Effective Velocity [m/s]																	
		0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	6.0	7.0	8.0	9.0	10.0	12.5		
50	Effective Area [m ²]	0.02778	0.01389	0.00926	0.00694	0.00556	0.00463	0.00397	0.00347	0.00309	0.00278	0.00231	0.00198	0.00174	0.00154				
	Pressure Drop [Pa]	<1	<1	<1	<1	3.0	4.4	6.3	8.4	11.0	13.9	20.9	29.4	39.6	51.5				
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	19.1	23.5	27.3	30.7				
100	Effective Area [m ²]	0.05556	0.02778	0.01852	0.01389	0.01111	0.00926	0.00794	0.00694	0.00617	0.00556	0.00463	0.00397	0.00347	0.00309	0.00278	0.00222		
	Pressure Drop [Pa]	<1	<1	<1	1.8	3.0	4.4	6.3	8.4	11.0	13.9	20.9	29.4	39.6	51.5	65.2	107.3		
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	<15	<15	<15	16.9	22.1	26.5	30.3	33.7	36.7	43.1		
200	Effective Area [m ²]	0.11111	0.05556	0.03704	0.02778	0.02222	0.01852	<15.87	0.01389	0.01235	0.01111	0.00926	0.00794	0.00694	0.00617	0.00556	0.00444		
	Pressure Drop [Pa]	<1	<1	<1	1.8	3.0	4.4	6.3	8.4	11.0	13.9	20.9	29.4	39.6	51.5	65.2	107.3		
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	<15	16.9	19.9	25.1	29.5	33.3	36.7	39.7	46.1			
300	Effective Area [m ²]	0.16667	0.08333	0.05556	0.04167	0.03333	0.02778	0.02381	0.02083	0.0182	0.01667	0.01389	0.0119	0.01042	0.00926	0.00833	0.00667		
	Pressure Drop [Pa]	<1	<1	<1	1.8	3.0	4.4	6.3	8.4	11.0	13.9	20.9	29.4	39.6	51.5	65.2	107.3		
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	<15	15.3	18.6	21.7	26.9	31.3	35.1	38.4	41.4	47.8		
400	Effective Area [m ²]	0.22222	0.11111	0.07407	0.05556	0.04444	0.03704	0.03175	0.02778	0.02469	0.02222	0.01852	0.01587	0.01389	0.01235	0.01111	0.00889		
	Pressure Drop [Pa]	<1	<1	<1	1.8	3.0	4.4	6.3	8.4	11.0	13.9	20.9	29.4	39.6	51.5	65.2	107.3		
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	<15	16.5	19.9	22.9	28.1	32.5	36.3	39.7	42.7	49.1		
500	Effective Area [m ²]	0.27778	0.13889	0.09259	0.06944	0.05556	0.0463	0.03968	0.03472	0.03086	0.02778	0.02315	0.01984	0.01736	0.01543	0.01389	0.01111		
	Pressure Drop [Pa]	<1	<1	<1	1.8	3.0	4.4	6.3	8.4	11.0	13.9	20.9	29.4	39.6	51.5	65.2	107.3		
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	<15	17.5	20.9	23.9	29.1	33.5	37.3	40.7	43.7	50.0		
600	Effective Area [m ²]	0.16667	0.11111	0.08333	0.06667	0.05556	0.04762	0.04167	0.03704	0.03333	0.02778	0.02381	0.02083	0.01852	0.01667	0.01333			
	Pressure Drop [Pa]	<1	<1	<1	1.8	3.0	4.4	6.3	8.4	11.0	13.9	20.9	29.4	39.6	51.5	65.2	107.3		
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	15.3	18.3	21.7	24.7	29.9	34.3	38.1	41.5	44.5	50.8		
700	Effective Area [m ²]	0.19444	0.12963	0.9722	0.07778	0.06481	0.05556	0.04861	0.04321	0.03889	0.03241	0.02778	0.02431	0.0216	0.01944	0.01556			
	Pressure Drop [Pa]	<1	<1	1.8	3.0	4.4	6.3	8.4	11.0	13.9	20.9	29.4	39.6	51.5	65.2	107.3			
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	15.1	19.0	22.3	25.3	30.5	34.9	38.8	42.1	45.1	51.5			
800	Effective Area [m ²]	0.22222	0.14815	0.11111	0.08889	0.07407	0.06349	0.05556	0.04938	0.04444	0.03704	0.03175	0.02778	0.02469	0.02222	0.01778			
	Pressure Drop [Pa]	<1	<1	1.8	3.0	4.4	6.3	8.4	11.0	13.9	20.9	29.4	39.6	51.5	65.2	107.3			
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	15.7	19.5	22.9	25.9	31.1	35.5	39.3	42.7	45.7	52.1		
900	Effective Area [m ²]	0.25	0.16667	0.125	0.1	0.08333	0.07143	0.0625	0.0556	0.05	0.04167	0.03571	0.03125	0.02778	0.025	0.02			
	Pressure Drop [Pa]	<1	<1	1.8	3.0	4.4	6.3	8.4	11.0	13.9	20.9	29.4	39.6	51.5	65.2	107.3			
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	16.2	20.1	23.4	26.4	31.6	36.0	39.8	43.2	46.2	52.6		
1000	Effective Area [m ²]	0.27778	0.18519	0.13889	0.111	0.09259	0.07937	0.06944	0.06173	0.05556	0.0463	0.03968	0.03472	0.03086	0.02778	0.02222			
	Pressure Drop [Pa]	<1	<1	1.8	3.0	4.4	6.3	8.4	11.0	13.9	20.9	29.4	39.6	51.5	65.2	107.3			
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	16.7	20.5	23.9	26.9	32.1	36.5	40.3	43.7	46.7	53.1		
1250	Effective Area [m ²]	0.23148	0.17361	0.13889	0.11574	0.09921	0.08681	0.07716	0.06944	0.05787	0.0496	0.0434	0.03858	0.03472	0.02778				
	Pressure Drop [Pa]	<1	<1	1.8	3.0	4.4	6.3	8.4	11.0	13.9	20.9	29.4	39.6	51.5	65.2	107.3			
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	17.7	21.5	24.8	27.9	33.1	37.5	41.3	44.6	47.6	54.0			
1500	Effective Area [m ²]	0.27778	0.20833	0.16667	0.13889	0.11905	0.10417	0.09259	0.08333	0.06944	0.05952	0.05208	0.0463	0.04167	0.03333				
	Pressure Drop [Pa]	<1	1.8	3.0	4.4	6.3	8.4	11.0	13.9	20.9	29.4	39.6	51.5	65.2	107.3				
	Sound Power Level [dB(A)]	<15	<15	<15	<15	18.5	22.3	25.6	28.6	33.9	38.3	42.1	45.4	48.4	54.8				
1750	Effective Area [m ²]	0.24306	0.19444	0.16204	0.13889	0.12153	0.10802	0.09722	0.08102	0.06944	0.0676	0.05401	0.04861	0.03889					
	Pressure Drop [Pa]	1.8	3.0	4.4	6.3	8.4	11.0	13.9	20.9	29.4	39.6	51.5	65.2	107.3					
	Sound Power Level [dB(A)]	<15	<15	<15	19.1	22.9	26.3	29.3	34.5	38.9	42.7	46.1	49.1	55.5					
2000	Effective Area [m ²]	0.27778	0.22222	0.18519	0.15873	0.13889	0.12346	0.11111	0.09259	0.07937	0.06944	0.06173	0.5556	0.0444					
	Pressure Drop [Pa]	1.8	3.0	4.4	6.3	8.4	11.0	13.9	20.9	29.4	39.6	51.5	65.2	107.3					
	Sound Power Level [dB(A)]	<15	<15	15.3	19.7	23.5	26.9	29.9	35.1	39.5	43.3	46.7	49.7	56.1					
2500	Effective Area [m ²]	0.27778	0.23148	0.19841	0.17361	0.15432	0.13889	0.11574	0.09921	0.08681	0.7716	0.06944	0.05556						
	Pressure Drop [Pa]	3.0	4.4	6.3	8.4	11.0	13.9	20.9	29.4	39.6	51.5	65.2	107.3						
	Sound Power Level [dB(A)]	<15	18.3	20.7	24.5	27.9	30.9	36.1	40.5	44.3	47.6	50.7	57.0						
3000	Effective Area [m ²]	0.27778	0.2381	0.20833	0.18519	0.1667	0.13889	0.11905	0.10417	0.9259	0.8333	0.6667							
	Pressure Drop [Pa]	4.4	6.3	8.4	11.0	13.9	20.9	29.4	39.6	51.5	65.2	107.3							
	Sound Power Level [dB(A)]	17.1	21.5	25.3	28.6	31.7	36.9	41.3	45.1	48.4	51.4	57.8							
4000	Effective Area [m ²]	0.27778	0.24691	0.22222	0.18519	0.15873	0.13889	0.12346	0.11111	0.8889	0.12346	0.11111	0.8889						
	Pressure Drop [Pa]	8.4	11.0	13.9	20.9	29.4	39.6	51.5	65.2	107.3									
	Sound Power Level [dB(A)]	26.5	29.9	32.9	36.1	42.5	46.3	49.7	52.7	59.1									
5000	Effective Area [m ²]	0.27778	0.23148	0.19841	0.17361	0.15432	0.13889	0.11574	0.09921	0.08681	0.7716	0.06944	0.05556						
	Pressure Drop [Pa]	13.9	20.9	29.4	39.6	51.5	65.2	107.3											
	Sound Power Level [dB(A)]	33.9	39.1	43.5	47.3	50.7	53.7	60.0											
7500	Effective Area [m ²]	0.26042	0.23148	0.20833	0.16667														
	Pressure Drop [Pa]	39.6	51.5	65.2	107.3														
	Sound Power Level [dB(A)]	49.1	52.4	55.4	61.8														
10000	Effective Area [m ²]	0.27778	0.22222																
	Pressure Drop [Pa]	65.2	107.3																
	Sound Power Level [dB(A)]	56.7	63.1																
12500	Effective Area [m ²]	0.27778																	
	Pressure Drop [Pa]	107.3																	
	Sound Power Level [dB(A)]	64																	

Note: The data are obtained with the air distribution equipment where the room air temperature difference is T = 8 K.

Throw Distance: It is the distance between the point where the air velocity is at 0.25 m / s and the air distribution equipment.

THROW DISTANCE CORRECTION TABLE

Table 4. Throw Distance Correction Table

Heating Mode (ΔT)	4	6	8	10	12
Throw Distance Factor	1.07	1.02	1	0.90	0.83
Cooling Mode (ΔT)	4	6	8	10	12
Throw Distance Factor	1.31	1.36	1.42	1.48	1.54

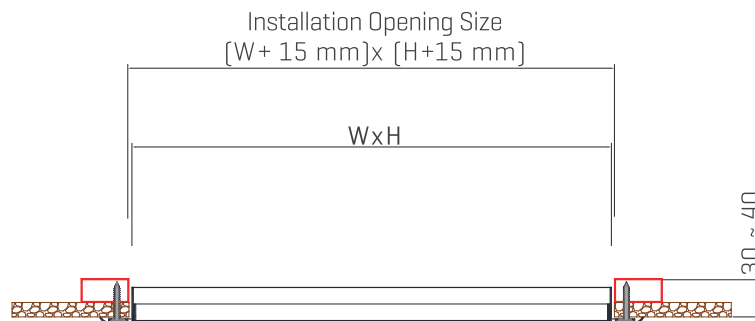
DAMPER PRESSURE DROP TABLE

Table 5. Damper Pressure Correction Table

Damper Position	Pressure Drop Multiplier	Additional Noise [dB(A)]
Open	1,1	+1
25% Closed	1,14	+4
50% Closed	2,48	+14
75% Closed	5,11	+29

INSTALLATION OPTIONS

1. SCREW SYSTEM



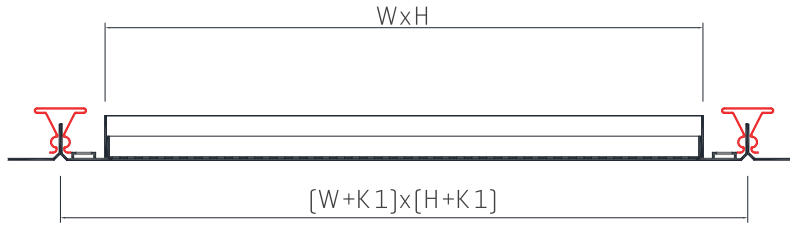
2. SUSPENDED CEILING



W and H sizes that can be selected according to the frame sizes specified in the product selection are shown in the table on the right.

	W [mm]	H [mm]
31 mm Frame	541	541
Stainless Steel	537	537

3. WITH CLIP-IN

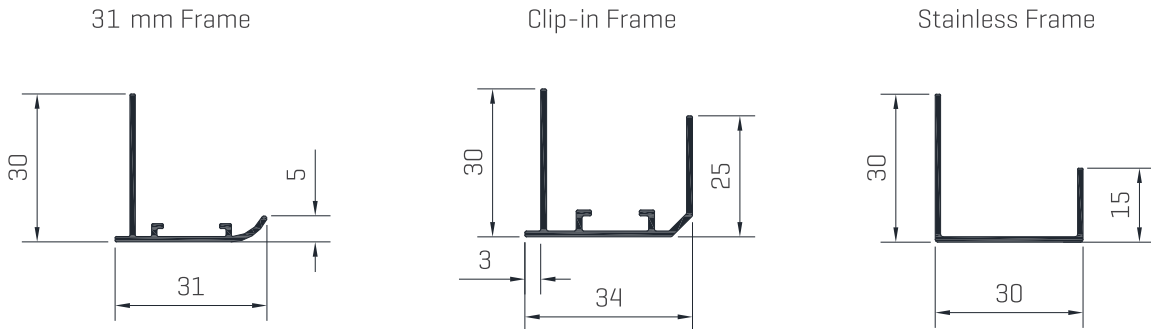


Note:

W and H sizes that can be selected according to the frame sizes specified in the product selection are shown in the table on the right.

	Clip-in Frame K1 = 60 mm	W (mm)	H (mm)
Standard Dimensions	Option 1	540	540
	Option 2	240	240

FRAME TYPES



PRODUCT SELECTION

Example: The supply air flow to the space has been determined as 1500 m³/h. 3 perforated grille will be used.

Solution: 1500/3=500 m³/h air flow rate is calculated for one grille.

For 500 m³/h air flow, the effective areas corresponding to the appropriate pressure loss and flow rate values are selected from the supply data table [Table 3].

For example, in an effective area of 0.0556 m², the effective velocity is 2.5 m/s, the pressure loss is 3 Pa, the throw distance is 5 m, and the sound power level is less than 15 dB [A].

The appropriate grille size is selected from the effective area table as 800 mm x 500 mm corresponding to the value of 0.056 m².

Damper Condition

Damper Pressure Loss Table [Table 5] is referenced for the pressure loss caused by the use of damper. The correction factor for the 45° damper opening is 1.24.

Total pressure loss: 3x1.4=4.2 Pa.

PRODUCT ORDER CODES

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

ALUMINUM PRODUCT ORDER CODE

DMO.<A>..<C>.<D>.<E>.<F>

A	Raw Material Type	
	ALM	Aluminum
B	Frame Type	
	05	31 mm
	09	Clip-in
C	Mounting Type	
	VD	Screw System
	MD	Without Mounting Hole
	KR	Tile
	KM	Assembled From Corners
	KL	Clip-in
D	Horizontal Size [W] (mm)	
	0000	You can look at the standard sizes.
E	Vertical Size [W] (mm)	
	0000	You can look at the standard sizes.
F	Paint	
	00	Unpainted
	S1	Standard Paint - RAL 9010
	S2	Standard Painted - RAL 9016
	XX	Special Painted

Sample Coding; DMO.ALM.01.DZ.VD.0100.0600.S1

STAINLESS PRODUCT ORDER CODE

DMO.PAS.32.<A>..<C>.00

A	Mounting Type	
	VD	Screwed System
	MD	Without Mounting Hole
	KR	Suspended Ceiling
B	Horizontal Size [W] (mm)	
	0000	You can look at the standard sizes
C	Vertical Size [W] (mm)	
	0000	You can look at the standard sizes

Sample Coding; DMO.PAS.32.DZ.VD.0100.0600.00



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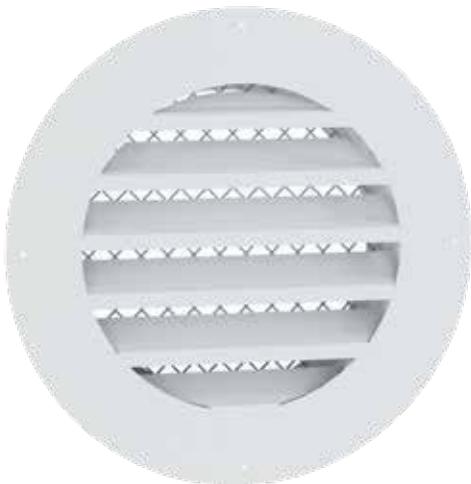
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DPC
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DOGU HVAC founded in 1999, and ever since has been manufacturing Energy-and Cost-Efficient products as Air Handling Units, Air Distribution & Management & Movement Systems [HVAC Components] and 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.



- ☞ DPC - Circular External Louvre is practical to clean as it is convenient for mounting in circular ducts with its circular design.
- ☞ It is resistant to external environment thanks to its galvanized sheet coating.
- ☞ The fixed blade design of the product prevents the ingress of unwanted rain water from the outside environment.



MATERIAL

- ☞ Galvanized sheet

SURFACE COATING

- ☞ RAL 9010 or RAL 9016 electrostatic powder paint as standard
- ☞ Optional
 - Different RAL color codes
 - Unpainted manufacturing

MOUNTING OPTIONS

- ☞ Screw System
- ☞ Mounting Without Hole

ACCESSORIES

- ☞ Optional
 - 10x10 wire



10x10 wire

PRODUCT SELECTION

After determining the desired product dimensions, characteristic performance data are checked from the selection table.

STANDARD DIMENSIONS

The size limits to be given for the order, with the selected diameter size $\emptyset D$:

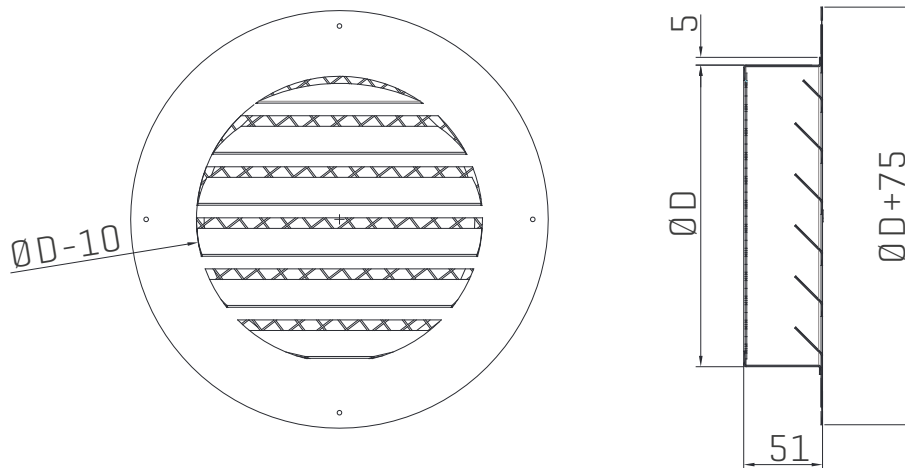


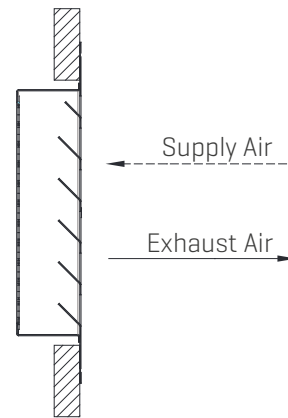
Table 1. Standard Dimensions

D (Diameter) [mm]	65 - 95 - 100 - 115 - 125 - 140 - 150 - 155 - 160 - 170
	180 - 185 - 190 - 195 - 200 - 210 - 225 - 240 - 245 - 250
	260 - 270 - 280 - 290 - 295 - 300 - 315 - 330 - 340 - 350
	355 - 370 - 380 - 385 - 390 - 400 - 440 - 450 - 460 - 480
	490 - 500 - 510 - 540 - 550 - 580 - 590 - 600 - 620 - 630
	690 - 700 - 710 - 750 - 800 - 880 - 900

PERFORMANCE DATA

Performance data according to the fresh air supply into the space and the exhaust air from the space to the outside are given below.

Product selection is made according to the desired diameter and flow rate values.



SUPPLY AIR DATA

Table 2. Supply air data for sizes between Ø65 - Ø200

Flow Rate [m ³ / h]		D (Diameter) [mm]														
		65	95	100	115	125	140	150	155	160	170	180	185	190	195	200
50	Pressure Drop [Pa]	145	32	26	11	11	7	5	4	4	3	2	2	2	2	2
	Sound Power Level [dB(A)]	<39	19	16	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15
100	Pressure Drop [Pa]		126	103	59	42	27	20	18	16	12	10	9	8	7	6
	Sound Power Level [dB(A)]		40	37	30	26	20	16	<15	<15	<15	<15	<15	<15	<15	<15
125	Pressure Drop [Pa]				91	65	42	32	28	24	19	15	14	12	11	10
	Sound Power Level [dB(A)]				37	32	26	23	21	19	16	<15	<15	<15	<15	<15
150	Pressure Drop [Pa]				131	94	60	45	40	35	27	22	20	18	16	14
	Sound Power Level [dB(A)]				42	38	32	28	27	25	22	19	17	16	<15	<15
175	Pressure Drop [Pa]					128	81	62	54	48	37	30	27	24	22	19
	Sound Power Level [dB(A)]					43	37	33	31	30	26	23	22	21	19	18
200	Pressure Drop [Pa]					106	80	71	62	49	39	35	31	28	25	22
	Sound Power Level [dB(A)]					41	37	35	34	31	28	26	25	23	22	22
225	Pressure Drop [Pa]					134	102	89	79	62	49	44	39	36	32	32
	Sound Power Level [dB(A)]					44	41	39	37	34	31	30	28	27	26	26
250	Pressure Drop [Pa]						125	110	97	76	60	54	49	44	40	40
	Sound Power Level [dB(A)]						44	42	40	37	34	33	31	30	29	29
300	Pressure Drop [Pa]								139	109	87	78	70	63	57	57
	Sound Power Level [dB(A)]								46	43	40	38	37	36	34	34
350	Pressure Drop [Pa]									149	118	106	95	86	77	77
	Sound Power Level [dB(A)]									47	44	43	42	40	39	39
400	Pressure Drop [Pa]												138	124	112	101
	Sound Power Level [dB(A)]												47	46	44	43
450	Pressure Drop [Pa]														141	128
	Sound Power Level [dB(A)]														48	47

Table 3. Supply air data for sizes Ø210 - Ø350

Flow Rate [m ³ / h]		D (Diameter) [mm]														
		210	225	240	245	250	260	270	280	290	295	300	315	330	340	350
100	Pressure Drop [Pa]	5	4	3	3	3	2	2	2	1	1	1	1	1	1	1
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15
200	Pressure Drop [Pa]	21	16	12	11	10	9	8	7	6	5	5	4	3	3	3
	Sound Power Level [dB(A)]	19	16	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15
300	Pressure Drop [Pa]	47	36	27	25	23	20	17	15	13	12	11	9	8	7	6
	Sound Power Level [dB(A)]	32	28	25	24	23	21	19	17	<15	<15	<15	<15	<15	<15	<15
400	Pressure Drop [Pa]	83	63	49	45	41	35	30	26	23	21	20	16	14	12	11
	Sound Power Level [dB(A)]	40	37	34	32	31	29	27	25	24	23	22	19	17	15	<15
500	Pressure Drop [Pa]	130	98	76	70	65	55	47	41	36	33	31	26	21	19	17
	Sound Power Level [dB(A)]	47	44	40	39	38	36	34	32	30	30	29	26	24	22	21
600	Pressure Drop [Pa]		141	109	101	93	79	68	59	51	48	45	37	31	27	24
	Sound Power Level [dB(A)]		49	46	45	44	42	40	38	36	35	34	32	29	28	26
700	Pressure Drop [Pa]			148	137	126	108	93	80	70	65	61	50	41	37	33
	Sound Power Level [dB(A)]			50	49	48	46	44	42	41	40	39	36	34	32	31
800	Pressure Drop [Pa]						141	121	105	91	85	79	65	54	48	43
	Sound Power Level [dB(A)]						50	48	46	45	44	43	40	38	36	35
900	Pressure Drop [Pa]								132	115	107	100	82	68	61	54
	Sound Power Level [dB(A)]								50	48	47	46	44	41	40	38
1000	Pressure Drop [Pa]									142	132	124	102	84	75	67
	Sound Power Level [dB(A)]									51	51	50	47	45	43	42
1250	Pressure Drop [Pa]														132	117
	Sound Power Level [dB(A)]														51	50
1500	Pressure Drop [Pa]															150
	Sound Power Level [dB(A)]															54

Table 4. Supply air data for sizes between Ø355 - Ø550

Flow Rate [m³ / h]		D (Diameter) [mm]														
		355	370	380	385	390	400	440	450	460	480	490	500	510	540	550
250	Pressure Drop [Pa]	4	3	3	3	3	2	2	2	1	1	1	1	1	1	1
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15
500	Pressure Drop [Pa]	16	13	12	11	11	10	7	6	5	4	4	4	4	3	3
	Sound Power Level [dB(A)]	20	18	16	16	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15
750	Pressure Drop [Pa]	36	30	27	26	24	22	15	14	13	11	10	9	8	7	6
	Sound Power Level [dB(A)]	32	30	29	28	27	26	21	20	19	16	15	<15	<15	<15	<15
1000	Pressure Drop [Pa]	63	53	48	46	43	39	27	24	22	19	17	16	15	12	11
	Sound Power Level [dB(A)]	41	39	37	37	36	35	30	28	27	25	24	23	22	19	18
1250	Pressure Drop [Pa]	98	83	75	71	67	61	42	38	35	29	27	25	23	18	17
	Sound Power Level [dB(A)]	48	45	44	43	43	41	36	35	34	32	31	30	29	26	25
1500	Pressure Drop [Pa]	141	120	108	102	97	88	60	55	50	42	39	36	33	26	24
	Sound Power Level [dB(A)]	53	51	50	49	48	47	42	41	40	37	36	35	34	31	30
1750	Pressure Drop [Pa]			146	139	132	119	81	74	68	57	53	49	45	36	33
	Sound Power Level [dB(A)]			54	54	53	52	47	45	44	42	41	40	39	36	35
2000	Pressure Drop [Pa]							106	97	89	75	69	64	59	47	43
	Sound Power Level [dB(A)]							51	49	48	46	45	44	43	40	39
2250	Pressure Drop [Pa]							134	123	112	95	87	80	74	59	55
	Sound Power Level [dB(A)]							54	53	52	50	49	48	47	44	43
2500	Pressure Drop [Pa]									139	117	108	99	92	73	68
	Sound Power Level [dB(A)]									55	53	52	51	50	47	46
3000	Pressure Drop [Pa]												143	132	105	97
	Sound Power Level [dB(A)]												51	55	52	51
3500	Pressure Drop [Pa]														142	132
	Sound Power Level [dB(A)]														57	56

Table 5. Supply air data for sizes from Ø560 to Ø900

Flow Rate [m³ / h]		D (Diameter) [mm]											
		580	590	600	620	630	690	700	710	750	800	880	900
500	Pressure Drop [Pa]	2	2	2	2	2	1	1	1	1	0	0	
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	
750	Pressure Drop [Pa]	5	5	4	4	4	2	2	2	2	1	1	1
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	
1000	Pressure Drop [Pa]	9	8	8	7	6	4	4	4	3	2	2	2
	Sound Power Level [dB(A)]	15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	
1500	Pressure Drop [Pa]	20	18	17	15	14	10	9	9	7	5	4	3
	Sound Power Level [dB(A)]	28	27	26	24	23	18	18	17	<15	<15	<15	<15
2000	Pressure Drop [Pa]	35	33	31	27	25	18	17	16	13	10	7	6
	Sound Power Level [dB(A)]	36	35	34	33	32	27	26	26	23	19	<15	<15
2500	Pressure Drop [Pa]	55	51	48	42	39	27	26	24	20	15	10	9
	Sound Power Level [dB(A)]	43	42	41	40	39	34	33	32	30	26	21	20
3000	Pressure Drop [Pa]	79	74	69	60	57	39	37	35	28	22	15	14
	Sound Power Level [dB(A)]	49	48	47	45	44	39	39	38	35	32	27	26
3500	Pressure Drop [Pa]	107	100	93	82	77	53	50	48	38	30	20	18
	Sound Power Level [dB(A)]	53	52	51	50	49	44	43	43	40	36	31	30
4000	Pressure Drop [Pa]	140	130	122	107	100	70	66	62	50	39	26	24
	Sound Power Level [dB(A)]	57	56	55	54	53	48	47	47	44	40	35	34
4500	Pressure Drop [Pa]				135	127	88	83	79	63	49	33	30
	Sound Power Level [dB(A)]				57	57	52	51	50	47	44	39	38
5000	Pressure Drop [Pa]						109	103	97	78	60	41	38
	Sound Power Level [dB(A)]						55	54	53	51	47	42	41
6000	Pressure Drop [Pa]							147	139	112	86	59	54
	Sound Power Level [dB(A)]							60	59	56	53	48	47
7000	Pressure Drop [Pa]										117	80	73
	Sound Power Level [dB(A)]										57	52	51
8000	Pressure Drop [Pa]											105	96
	Sound Power Level [dB(A)]											56	55
9000	Pressure Drop [Pa]											132	121
	Sound Power Level [dB(A)]											60	59
10000	Pressure Drop [Pa]												149
	Sound Power Level [dB(A)]												62

EXHAUST AIR DATA

Table 6. Exhaust air data for sizes from Ø65 to Ø200

Flow Rate [m³ / h]		D [Diameter] [mm]														
		65	95	100	115	125	140	150	155	160	170	180	185	190	195	200
50	Pressure Drop [Pa]	105	22	17	10	7	4	3	3	2	2	1	1	1	1	1
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15
100	Pressure Drop [Pa]	91	73	41	29	18	13	12	10	8	6	6	5	5	4	
	Sound Power Level [dB(A)]	36	34	26	21	15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15
125	Pressure Drop [Pa]	144	116	65	46	29	21	19	16	13	10	9	8	7	6	
	Sound Power Level [dB(A)]	43	40	33	28	22	19	17	15	<15	<15	<15	<15	<15	<15	<15
150	Pressure Drop [Pa]			95	67	42	31	27	24	19	15	13	12	10	9	
	Sound Power Level [dB(A)]			39	34	28	24	23	21	18	<15	<15	<15	<15	<15	<15
175	Pressure Drop [Pa]			130	92	57	43	38	33	26	20	18	16	14	13	
	Sound Power Level [dB(A)]			43	39	33	29	27	26	22	19	18	16	<15	<15	<15
200	Pressure Drop [Pa]				121	76	57	50	43	34	27	24	21	19	17	
	Sound Power Level [dB(A)]				43	37	33	31	30	27	23	22	20	19	18	18
225	Pressure Drop [Pa]					97	72	63	55	43	34	30	27	24	22	
	Sound Power Level [dB(A)]					41	37	35	33	30	27	26	24	23	21	21
250	Pressure Drop [Pa]					120	90	79	69	54	42	38	34	30	27	
	Sound Power Level [dB(A)]					44	40	38	37	33	30	29	27	26	25	25
300	Pressure Drop [Pa]						132	115	101	78	62	55	49	44	40	
	Sound Power Level [dB(A)]						46	44	42	39	36	35	33	32	30	30
350	Pressure Drop [Pa]								139	108	85	76	68	61	55	
	Sound Power Level [dB(A)]								47	44	41	39	38	37	35	35
400	Pressure Drop [Pa]									142	112	100	89	80	72	
	Sound Power Level [dB(A)]									48	45	44	42	41	39	39
450	Pressure Drop [Pa]										143	127	114	102	92	
	Sound Power Level [dB(A)]										49	47	46	44	43	43

Table 7. Exhaust air data for sizes from Ø210 to Ø350

Flow Rate [m3 / h]		D [Diameter] [mm]															
		210	225	240	245	250	260	270	280	290	295	300	315	330	340	350	
100	Pressure Drop [Pa]	3	2	2	2	2	1	1	1	1	1	1	1	1	0	0	
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	
200	Pressure Drop [Pa]	14	10	8	7	7	6	5	4	4	3	3	2	2	2	2	
	Sound Power Level [dB(A)]	15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	
300	Pressure Drop [Pa]	32	24	19	17	16	13	11	10	8	8	7	6	5	4	4	
	Sound Power Level [dB(A)]	28	24	21	19	18	16	<15	<15	<15	<15	<15	<15	<15	<15	<15	
400	Pressure Drop [Pa]	59	44	34	31	28	24	21	18	15	14	13	11	9	8	7	
	Sound Power Level [dB(A)]	37	33	30	28	27	25	23	21	19	18	17	<15	<15	<15	<15	
500	Pressure Drop [Pa]	93	70	54	49	45	38	33	28	24	23	21	17	14	13	11	
	Sound Power Level [dB(A)]	44	40	36	35	34	32	30	28	26	25	24	22	19	18	16	
600	Pressure Drop [Pa]	136	102	78	72	66	56	48	41	35	33	31	25	21	18	16	
	Sound Power Level [dB(A)]	49	46	42	41	40	38	36	34	32	31	30	27	25	23	22	
700	Pressure Drop [Pa]		141	108	99	91	77	66	57	49	45	42	35	29	25	22	
	Sound Power Level [dB(A)]		50	47	46	45	43	41	39	37	36	35	32	30	28	27	
800	Pressure Drop [Pa]			142	130	120	102	87	75	64	60	56	46	38	33	29	
	Sound Power Level [dB(A)]			51	50	49	47	45	43	41	40	39	36	34	32	31	
900	Pressure Drop [Pa]						130	111	95	82	77	71	58	48	42	38	
	Sound Power Level [dB(A)]						50	48	46	45	44	43	40	38	36	34	
1000	Pressure Drop [Pa]							138	119	102	95	89	73	60	53	47	
	Sound Power Level [dB(A)]							52	50	48	47	46	43	41	39	38	
1250	Pressure Drop [Pa]												141	115	95	84	74
	Sound Power Level [dB(A)]												53	50	48	46	45
1500	Pressure Drop [Pa]													139	122	108	108
	Sound Power Level [dB(A)]													54	52	50	50

Table 8. Exhaust air data for sizes Ø355 - Ø550

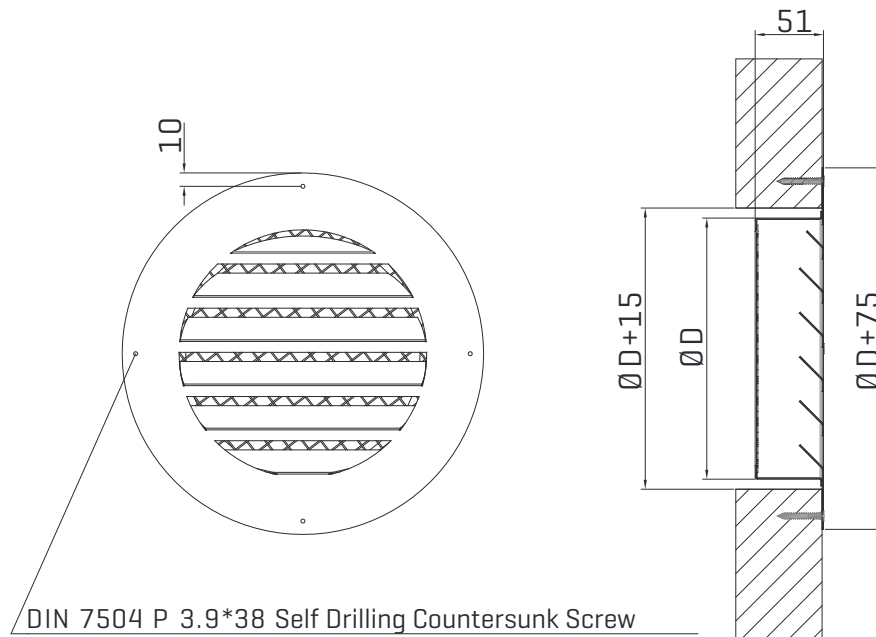
Flow Rate [m³ / h]		D (Diameter) [mm]														
		355	370	380	385	390	400	440	450	460	480	490	500	510	540	550
250	Pressure Drop [Pa]	2	2	2	2	2	2	1	1	1	1	1	1	1	0	0
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15
500	Pressure Drop [Pa]	10	9	8	7	7	6	4	4	4	3	3	3	2	2	2
	Sound Power Level [dB(A)]	15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15
750	Pressure Drop [Pa]	24	20	18	17	16	15	10	9	8	7	6	6	5	4	4
	Sound Power Level [dB(A)]	28	26	24	24	23	22	16	<15	<15	<15	<15	<15	<15	<15	<15
1000	Pressure Drop [Pa]	44	37	33	31	30	27	18	16	15	13	11	11	10	8	7
	Sound Power Level [dB(A)]	37	35	33	33	32	31	25	24	23	21	20	18	17	<15	<15
1250	Pressure Drop [Pa]	70	59	53	50	47	43	29	26	24	20	18	17	15	12	11
	Sound Power Level [dB(A)]	44	42	40	40	39	37	32	31	30	28	27	25	24	21	20
1500	Pressure Drop [Pa]	102	86	77	73	69	62	42	38	35	29	27	24	23	18	16
	Sound Power Level [dB(A)]	50	47	46	45	45	43	38	37	36	33	32	31	30	27	26
1750	Pressure Drop [Pa]	141	118	106	100	95	86	57	52	48	40	37	34	31	24	23
	Sound Power Level [dB(A)]	54	52	51	50	49	48	43	42	40	38	37	36	35	32	31
2000	Pressure Drop [Pa]			140	132	125	113	76	69	63	53	48	44	41	32	30
	Sound Power Level [dB(A)]			55	54	54	52	47	46	45	42	41	40	39	36	35
2250	Pressure Drop [Pa]						144	97	88	80	67	62	57	52	41	38
	Sound Power Level [dB(A)]						56	51	49	48	46	45	44	43	40	39
2500	Pressure Drop [Pa]						120	110	100	84	77	71	65	51	47	47
	Sound Power Level [dB(A)]						54	53	52	49	48	47	46	43	42	42
3000	Pressure Drop [Pa]									146	122	112	103	95	75	69
	Sound Power Level [dB(A)]									57	55	54	53	52	49	48
3500	Pressure Drop [Pa]												142	131	103	95
	Sound Power Level [dB(A)]												58	56	53	52

Table 9. Exhaust air data for sizes from Ø560 to Ø900

Flow Rate [m³ / h]		D (Diameter) [mm]											
		580	590	600	620	630	690	700	710	750	800	880	900
500	Pressure Drop [Pa]	1	1	1	1	1	1	1	1	0	0	0	0
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15
750	Pressure Drop [Pa]	3	3	3	2	2	2	1	1	1	1	1	1
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15
1000	Pressure Drop [Pa]	6	5	5	4	4	3	3	2	2	1	1	1
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15
1500	Pressure Drop [Pa]	13	12	11	10	9	6	6	6	5	3	2	2
	Sound Power Level [dB(A)]	23	22	21	20	19	<15	<15	<15	<15	<15	<15	<15
2000	Pressure Drop [Pa]	24	22	21	18	17	12	11	10	8	6	4	4
	Sound Power Level [dB(A)]	32	31	30	28	28	23	22	21	18	<15	<15	<15
2500	Pressure Drop [Pa]	38	35	33	29	27	18	17	16	13	10	7	6
	Sound Power Level [dB(A)]	39	38	37	35	35	30	29	28	25	22	17	15
3000	Pressure Drop [Pa]	56	52	48	42	39	27	25	24	19	15	10	9
	Sound Power Level [dB(A)]	45	44	43	41	40	35	35	34	31	27	22	21
3500	Pressure Drop [Pa]	76	71	66	58	54	37	35	33	26	20	13	12
	Sound Power Level [dB(A)]	50	49	48	46	45	40	39	39	36	32	27	26
4000	Pressure Drop [Pa]	101	94	88	76	71	49	46	43	35	26	18	16
	Sound Power Level [dB(A)]	54	53	52	50	49	44	44	43	40	36	31	30
4500	Pressure Drop [Pa]	129	120	112	98	91	62	59	55	44	34	23	21
	Sound Power Level [dB(A)]	57	56	56	54	53	48	47	46	44	40	35	34
5000	Pressure Drop [Pa]		149	139	121	114	78	73	69	55	42	28	26
	Sound Power Level [dB(A)]		60	59	57	56	51	51	50	47	43	38	37
6000	Pressure Drop [Pa]						113	107	101	80	61	41	37
	Sound Power Level [dB(A)]						57	56	55	52	49	44	43
7000	Pressure Drop [Pa]							147	139	110	84	57	52
	Sound Power Level [dB(A)]							61	60	57	54	49	47
8000	Pressure Drop [Pa]									145	111	75	68
	Sound Power Level [dB(A)]									61	58	53	52
9000	Pressure Drop [Pa]										142	95	87
	Sound Power Level [dB(A)]										62	57	55
10000	Pressure Drop [Pa]											119	108
	Sound Power Level [dB(A)]											60	59

INSTALLATION

SCREW SYSTEM



PRODUCT SELECTION

Example: In case the flow rate of the air to be exhausted is 1000 m³/h, the pressure drop created by the circular external louvre should be less than 30 Pa and the sound pressure level should be less than 36 dB [A].

Choose the circular external louvre.

Solution: The diameters that provide 1000 m³/h air flow are checked from the tables under the exhaust air data heading. In Table 7, the pressure drop is 30 Pa and the sound pressure level is 32 dB [A] for the diameter size Ø390 mm. Accordingly, the product selection is made as the appropriate size Ø390 mm.

PRODUCT ORDER CODES

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

DPC.<A>..<C>.<D>.<E>

A	Raw Material Type	
	GAL	Galvanized
B	Mounting Type	
	VD	Screw System
	MD	Without Mounting Hole
C	Accessory	
	00	Without Accessories
	10	10x10 Wire
D	Diameter (ØD) [mm]	
	000	View from Standard Sizes
E	Paint	
	00	Unpainted
	S1	Standard Painted - RAL 9010
	S2	Standard Painted - RAL 9016
	XX	Special Painted

Sample Coding; DPC.GAL.VD.10.315.S1



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VGC

MULTI BLADE DUCT TYPE SMOKE DAMPER



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Doğu İklimlendirme A.Ş.

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 solutions for well-being. DOGU HVAC's core business products which are subsumed under 3 major groups as HVAC Units, HVAC Components and Kitchen Ventilation all are manufactured in compliance with EU Standards. Particularly HVAC Units are entitled under the "FOURSEASONS" brand name for both domestic and foreign markets. DOGU HVAC's headquarter, based in Izmir/Turkey, operates in a large sized 25.000 sqm plant that enables us to manufacture 130 various types of products. Additionally DOGU HVAC has a powerful sales network with 3 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 40 countries.

Thanks to our "Customer Satisfaction","Zero-defect policy" motto and reinforced by complete certified products, more than 250 employees. DOGU HVAC R&D department 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 standards], 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.





VGC –MULTI BLADE DUCT TYPE SMOKE DAMPER

- ☞ Tested by accredited body in accordance with EN1366-10.
- ☞ Produced up to 1250x1250 mm.
- ☞ Fire resistance class E90.(EN 13501-4)
- ☞ Temperature class 600oC. (EN 13501-4)
- ☞ Pressure class 500Pa. (EN 13501-4)
- ☞ ON/OFF position tracking by damper electric actuator. (Belimo BLE)
- ☞ Class 2 in accordance with EN 1751.

WORKING PRINCIPALS

- ☞ **VGC –Multi Blade Duct Type Smoke Dampers** are used to evacuate and control the smoke from the environment during the fire. They perform their tasks according to the fire scenario, which enables blades open or close by the actuator. VGC resists fire 90 minutes under **500 Pa** and **600°C** conditions. Its performance was tested by EN1366-10 testing procedure and certified in accordance with EN 13501- 4 **E₆₀₀ 90 (h_o – i→o) S500 C₃₀₀ AA Single**
- ☞ Actuator needs 60 seconds in order to change its on-off position. If electricity is cut off, blades keep their current position. Actuator cables must be fire resistant in order to ensure the fire scenario works properly.
- ☞ **VGC – Multi Blade Duct Type Smoke Damper** is open when it does not detect smoke.
- ☞ Since they have guarantee for 10.000 on/off processes, they can be used for daily ventilation purposes.

SELECTION

1. Effective Area

W/H (m ²)	200	300	400	500	600	700	800	900	1000	1100	1200	1250
200	0,03	0,03	0,06	0,06	0,10	0,10	0,13	0,13	0,17	0,17	0,20	0,20
250	0,03	0,03	0,07	0,07	0,12	0,12	0,17	0,17	0,21	0,21	0,25	0,25
300	0,04	0,04	0,09	0,09	0,15	0,15	0,20	0,20	0,25	0,25	0,30	0,30
350	0,05	0,05	0,10	0,10	0,17	0,17	0,23	0,23	0,29	0,29	0,35	0,35
400	0,06	0,06	0,12	0,12	0,20	0,20	0,27	0,27	0,34	0,34	0,41	0,41
450	0,06	0,06	0,13	0,13	0,22	0,22	0,30	0,30	0,38	0,38	0,46	0,46
500	0,07	0,07	0,15	0,15	0,24	0,24	0,33	0,33	0,42	0,42	0,51	0,51
550	0,08	0,08	0,16	0,16	0,27	0,27	0,37	0,37	0,46	0,46	0,56	0,56
600	0,08	0,08	0,18	0,18	0,29	0,29	0,40	0,40	0,50	0,50	0,61	0,61
650	0,09	0,09	0,19	0,19	0,32	0,32	0,43	0,43	0,55	0,55	0,66	0,66
700	0,10	0,10	0,20	0,20	0,34	0,34	0,46	0,46	0,59	0,59	0,71	0,71
750	0,10	0,10	0,22	0,22	0,37	0,37	0,50	0,50	0,63	0,63	0,76	0,76
800	0,11	0,11	0,23	0,23	0,39	0,39	0,53	0,53	0,67	0,67	0,81	0,81
850	0,12	0,12	0,25	0,25	0,42	0,42	0,56	0,56	0,71	0,71	0,86	0,86
900	0,13	0,13	0,26	0,26	0,44	0,44	0,60	0,60	0,76	0,76	0,91	0,91
950	0,13	0,13	0,28	0,28	0,46	0,46	0,63	0,63	0,80	0,80	0,96	0,96
1000	0,14	0,14	0,29	0,29	0,49	0,49	0,66	0,66	0,84	0,84	1,01	1,01
1050	0,15	0,15	0,31	0,31	0,51	0,51	0,70	0,70	0,88	0,88	1,06	1,06
1100	0,15	0,15	0,32	0,32	0,54	0,54	0,73	0,73	0,92	0,92	1,12	1,12
1150	0,16	0,16	0,34	0,34	0,56	0,56	0,76	0,76	0,96	0,96	1,17	1,17
1200	0,17	0,17	0,35	0,35	0,59	0,59	0,80	0,80	1,01	1,01	1,22	1,22
1250	0,17	0,17	0,37	0,37	0,61	0,61	0,83	0,83	1,05	1,05	1,27	1,27

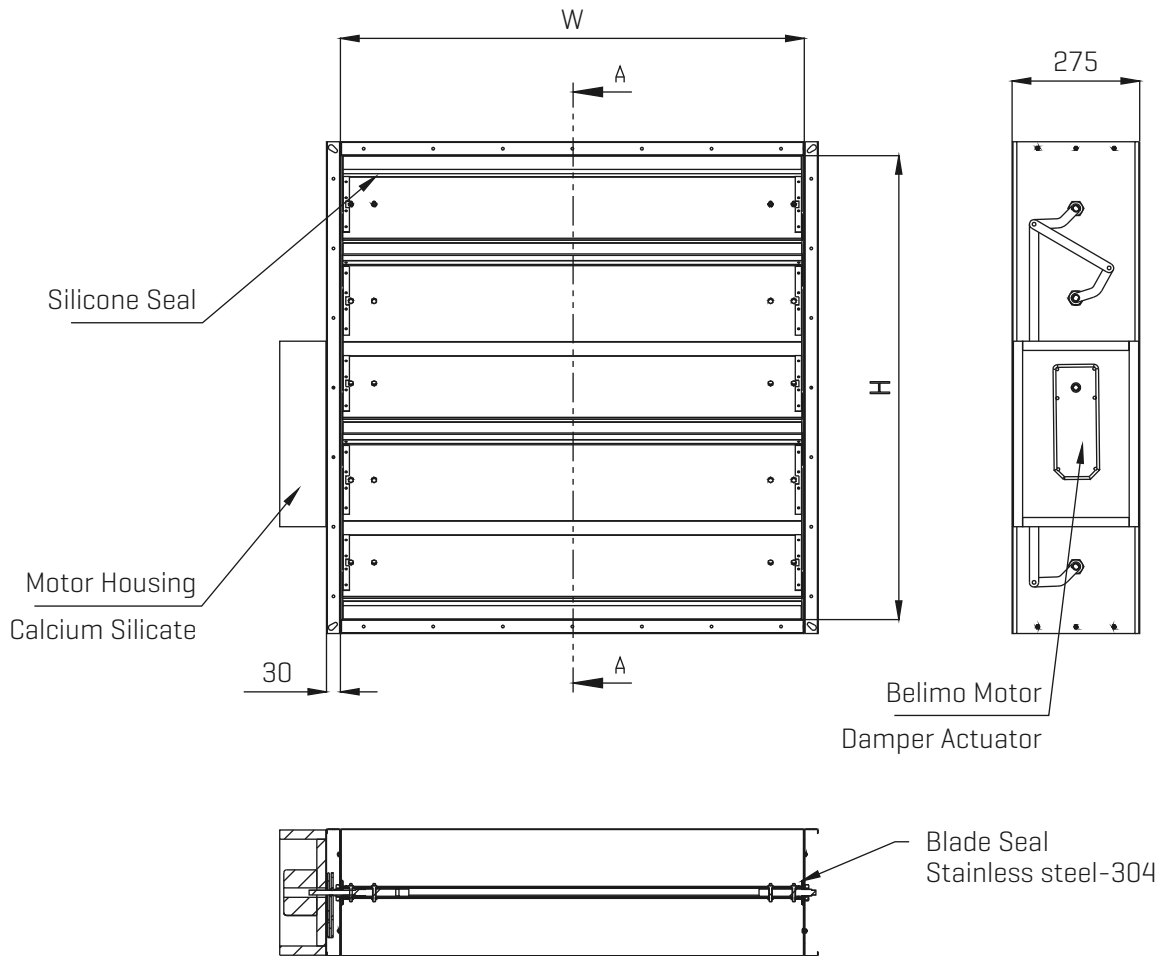
2. Damper Weight

W/H (m ²)	200	300	400	500	600	700	800	900	1000	1100	1200	1250
200	14,1	15,3	16,9	18,1	19,7	20,9	22,6	23,7	25,4	26,6	28,2	28,8
250	14,7	15,9	17,6	18,8	20,5	21,8	23,5	24,7	26,4	27,6	28,3	29,9
300	15,3	16,5	18,3	19,6	21,3	22,6	24,4	25,7	27,4	28,7	29,5	31,1
350	15,8	17,1	19,0	20,3	22,1	23,4	25,3	26,6	28,5	29,8	30,6	32,3
400	16,4	17,7	19,7	21,0	22,9	24,3	26,2	27,6	29,5	30,8	31,8	33,5
450	16,9	18,3	20,3	21,7	23,7	25,1	27,1	28,5	30,5	31,9	32,9	34,6
500	17,5	18,9	21,0	22,4	24,5	26,0	28,0	29,5	31,6	33,0	34,0	35,8
550	18,1	19,5	21,7	23,2	25,3	26,8	29,0	30,4	32,6	34,1	35,2	37,0
600	18,6	20,1	22,4	23,9	26,1	27,6	29,9	31,4	33,6	35,1	36,3	38,1
650	19,2	20,7	23,1	24,6	26,9	28,5	30,8	32,3	34,7	36,2	37,5	39,3
700	19,8	21,3	23,7	25,3	27,7	29,3	31,7	33,3	35,7	37,3	38,6	40,5
750	20,3	21,9	24,4	26,0	28,5	30,1	32,6	34,2	36,7	38,4	39,8	41,6
800	20,9	22,5	25,1	26,8	29,3	31,0	33,5	35,2	37,7	39,4	40,9	42,8
850	21,4	23,2	25,8	27,5	30,1	31,8	34,4	36,2	38,8	40,5	42,1	44,0
900	22,0	23,8	26,5	28,2	30,9	32,7	35,4	37,1	39,8	41,6	43,2	45,1
950	22,6	24,4	27,1	28,9	31,7	33,5	36,3	38,1	40,8	42,6	44,4	46,3
1000	23,1	25,0	27,8	29,6	32,5	34,3	37,2	39,0	41,9	43,7	45,4	47,5
1050	23,7	25,6	28,5	30,4	33,3	35,2	38,1	40,0	42,9	44,8	46,7	48,6
1100	24,3	26,2	29,2	31,1	34,1	36,0	39,0	40,9	43,9	45,9	47,8	49,8
1150	24,8	26,8	29,9	31,8	34,9	36,8	39,9	41,9	45,0	46,9	49,0	51,0
1200	25,4	27,4	30,5	32,5	35,7	37,7	40,8	42,8	46,0	48,0	50,1	52,2
1250	25,9	28,0	31,2	33,3	36,5	38,5	41,8	43,8	47,0	49,1	51,3	53,3

3. Sound Power Level and Pressure Loss

	V[m/s]	h								
		200	300	400	500	600	700	800	900	1000
Pressure Loss [Pa]	2 m/s	<5	15	<5	5	<5	<5	<5	<5	<5
	3 m/s	<5	25	<5	8	<5	6	<5	<5	<5
	4 m/s	6	39	5	10	<5	8	<5	5	<5
	5 m/s	10	60	7	16	5	13	5	12	<5
	6 m/s	15	85	10	23	8	19	8	17	7
	7 m/s	19	>100	14	30	12	27	12	25	11
	8 m/s	25	>100	18	40	15	33	15	30	14
	9 m/s	31	>100	23	51	20	42	20	39	19
	10 m/s	39	>100	27	63	24	51	24	49	22
	Sound Power Level [dB]	2 m/s	41	46	41	44	41	42	41	42
3 m/s		49	55	49	53	49	51	49	51	49
4 m/s		56	62	56	60	56	58	56	58	56
5 m/s		62	68	62	65	62	65	62	65	62
6 m/s		66	72	66	70	66	68	66	68	66
7 m/s		70	76	70	73	70	72	70	72	70
8 m/s		73	79	73	77	73	76	73	76	73
9 m/s		75	81	75	79	75	76	75	76	75
10 m/s		77	82	77	80	77	76	77	76	77

DIMENSIONS



H	200≤...<400	400≤...<600	600≤...<800	800≤...<1000	1000≤...<1200	1200≤...<1250
Kanat Sayısı	1	2	3	4	5	6

MATERIAL AND SURFACE COATING

Name of Items	Material Type
Frame	1,50 mm Galvanized Sheet Steel
Sealed Damper Blade	1,20 mm Galvanized Sheet Steel
Blade Bearings	Brass Rod - Ø30 mm
Blade Inside	50 kg/m ³ Rock Wool
Blade Seal	1,00 mm Stainless Sheet Steel - 304
Joint Mechanism	4 mm Stainless Sheet Steel - 304
Seal	Fire Resistant Seal-EN 1366/10
Motor Housing	Calcium Silicate

Frame and blades of **VGC-Multi Blade Duct Type Smoke Damper** is manufactured from galvanized sheet steel without any welding process. Therefore it has a high corrosion resistance. Silicone based fire resistant gasket is mounted at the end of the blades. There is a 304 grade stainless steel sealing sheet between frame and blades. Damper blades are equipped with 50kg/m³ density rock wool.

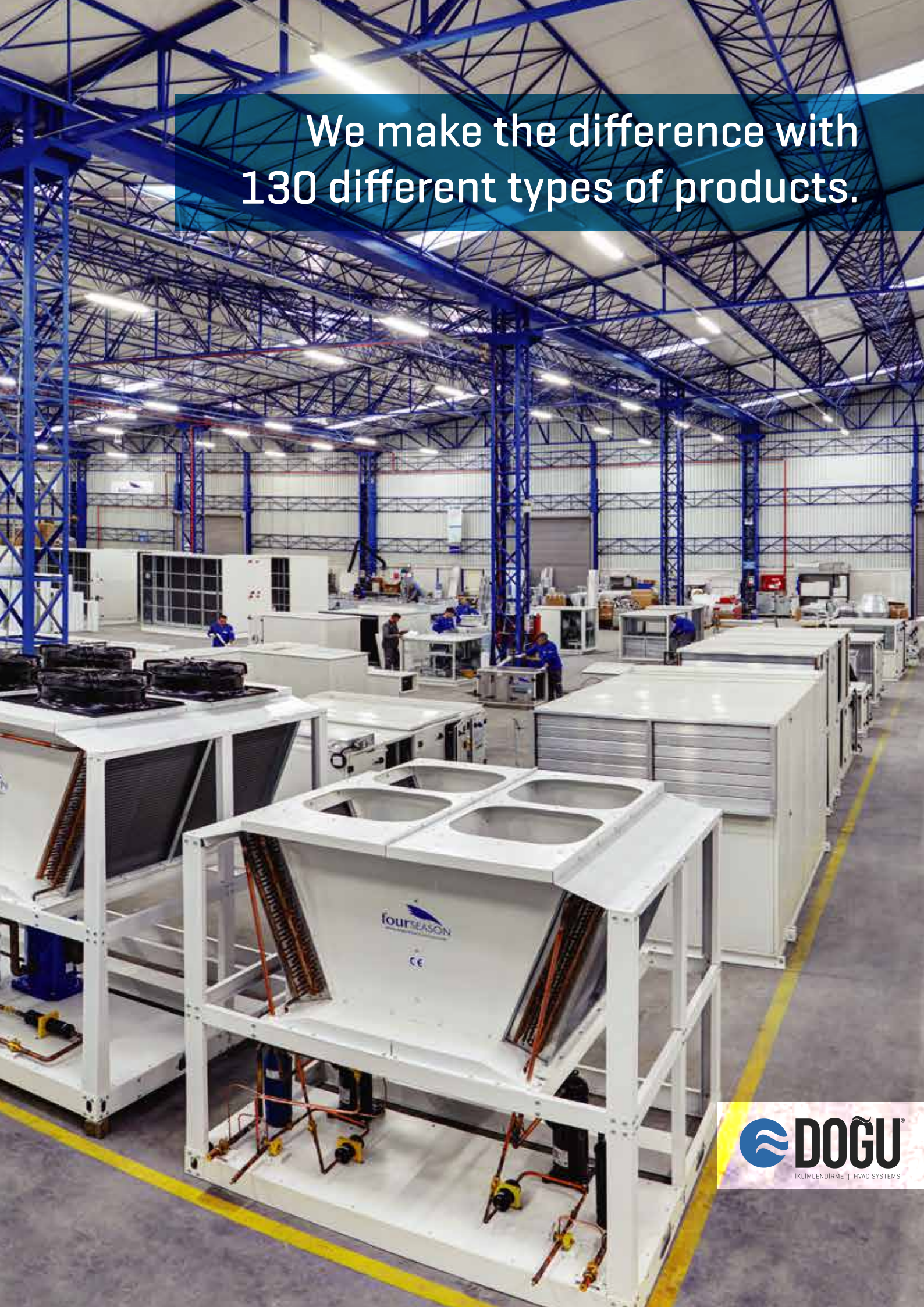
The blade shaft is manufactured from automat material and then galvanized and gets high corrosion resistance. Bearings are made of brass. Since these two materials are compatible, they do not require lubrication for many years and maintain their first day performance.

The joint mechanism ensures that the blades work in the opposite direction. It is made of 4mm 304 grade stainless steel. The union of joint mechanism parts is made with 304 grade stainless steel rods.

Damper actuator is located inside the box made of Ca-Si [Calcium silicate]



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130 different types of products.





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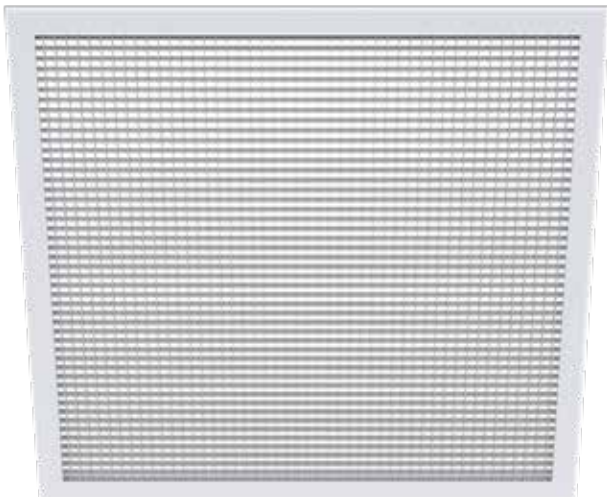
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DMP
Egg Crate Grille

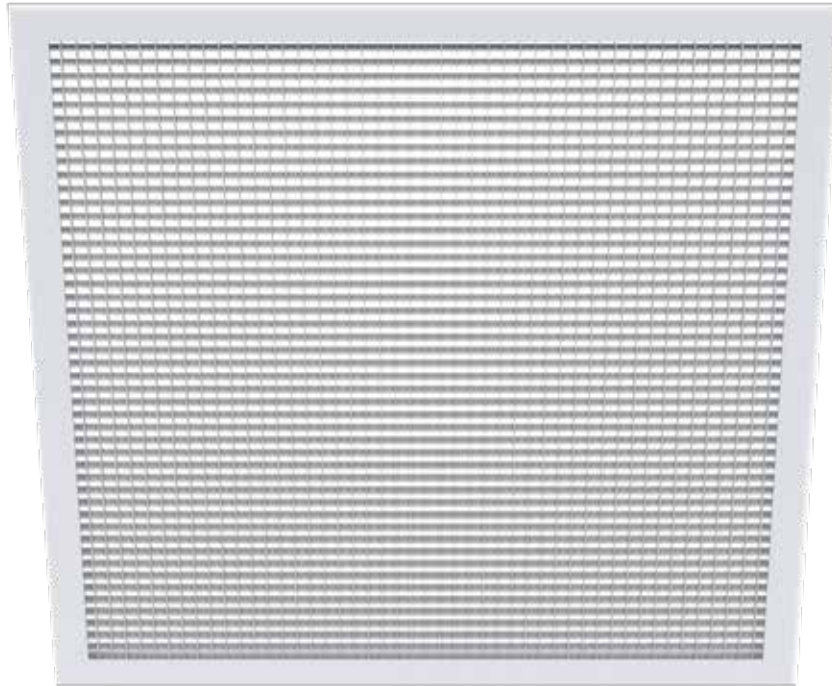
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- ☞ DMP – Egg Crate Grille is a suction grille with egg crate mesh structure.
- ☞ It has a low pressure drop value since its effective area is higher than other grilles. For this reason, it can be used as a suction grille in ventilation systems.



MATERIAL

- ☞ The frame is made of aluminum 6063 extrusion profile.
- ☞ Egg crates manufactured from aluminum 1050 sheet metal.

SURFACE COATING

- ☞ RAL 9010 or RAL 9016 electrostatic powder paint as standard.
- ☞ Optional
 - Different RAL color codes
 - Unpainted manufacturing

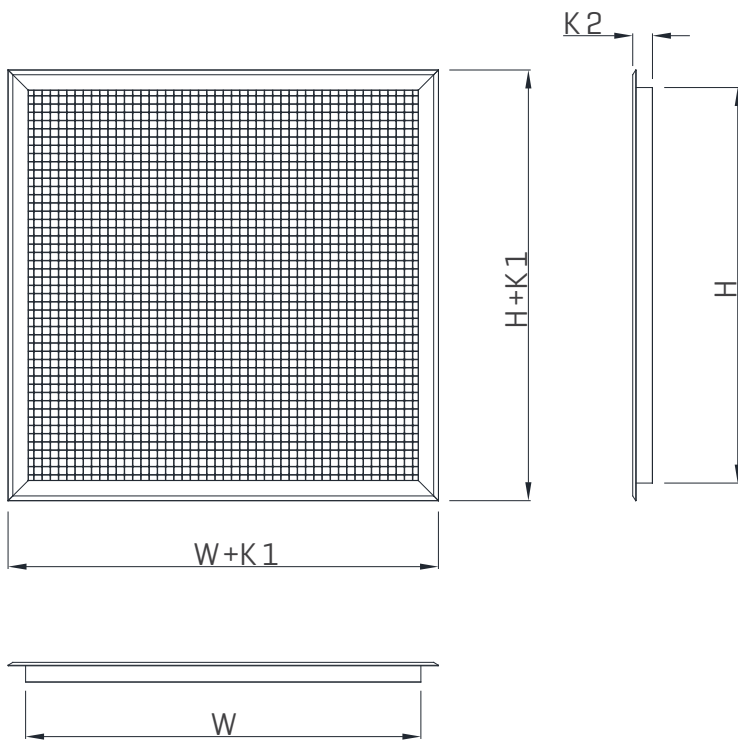
INSTALLATION OPTIONS

- ☞ Screw System
- ☞ Suspended Ceiling
- ☞ Clip-In Ceiling
- ☞ With Latch
- ☞ Long Clip
- ☞ Subframe Short Clip
- ☞ With Damper

ACCESSORIES

- ☞ Optional
 - ZKD - Opposed Blade Air Adjustment Damper (Production from aluminum 6063 extrusion profile)
 - Fiber Filter
 - Polyurethane Filter
 - Neck Reducer

STANDARD DIMENSIONS



	K1 [mm]	K2 [mm]
22 mm Frame	35.6	30
31 mm Frame	54	30
Clip-In Frame	59.2	30

W [mm] [Width]	50 - 100 - 200 - 400 - 500 - 600 - 700 - 800 - 900 - 1000 - 1100 1200 - 1300 - 1400 - 1500 - 1600 - 1800 - 2000
H [mm] [Height]	50 - 100 - 200 - 400 - 600 - 800 - 1000

PERFORMANCE DATA

Table 1. Effective Area

Effective Areas (m ²)		H Height (mm)																		
		50	100	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
W Width (mm)	50	0.0022	0.0045	0.0091	0.0114	0.0137	0.0160	0.0183	0.0206	0.0229	0.0252	0.0275	0.0298	0.0321	0.0344	0.0367	0.0390	0.0413	0.0436	0.0459
	100	0.0045	0.0091	0.0183	0.0229	0.0275	0.0321	0.0367	0.0413	0.0459	0.0505	0.0551	0.0597	0.0643	0.0689	0.0735	0.0781	0.0827	0.0873	0.0919
	200	0.0091	0.0183	0.0367	0.0459	0.0551	0.0643	0.0735	0.0827	0.0919	0.1011	0.1103	0.1194	0.1286	0.1378	0.1470	0.1562	0.1654	0.1746	0.1838
	250	0.0114	0.0229	0.0459	0.0574	0.0689	0.0804	0.0919	0.1034	0.1149	0.1263	0.1378	0.1493	0.1608	0.1723	0.1838	0.1953	0.2068	0.2183	0.2298
	300	0.0137	0.0275	0.0551	0.0689	0.0827	0.0965	0.1103	0.1240	0.1378	0.1516	0.1654	0.1792	0.1930	0.2068	0.2206	0.2343	0.2481	0.2619	0.2757
	350	0.0160	0.0321	0.0643	0.0804	0.0965	0.1126	0.1286	0.1447	0.1608	0.1769	0.1930	0.2091	0.2252	0.2412	0.2573	0.2734	0.2895	0.3056	0.3217
	400	0.0183	0.0367	0.0735	0.0919	0.1103	0.1286	0.1470	0.1654	0.1838	0.2022	0.2206	0.2389	0.2573	0.2757	0.2941	0.3125	0.3309	0.3492	0.3676
	450	0.0206	0.0413	0.0827	0.1034	0.1240	0.1447	0.1654	0.1861	0.2068	0.2275	0.2481	0.2688	0.2895	0.3102	0.3309	0.3515	0.3722	0.3929	0.4136
	500	0.0229	0.0459	0.0919	0.1149	0.1378	0.1608	0.1838	0.2068	0.2298	0.2527	0.2757	0.2987	0.3217	0.3447	0.3676	0.3906	0.4136	0.4366	0.4596
	550	0.0252	0.0505	0.1011	0.1263	0.1516	0.1769	0.2022	0.2275	0.2527	0.2780	0.3033	0.3286	0.3538	0.3791	0.4044	0.4297	0.4550	0.4802	0.5055
	600	0.0275	0.0551	0.1103	0.1378	0.1654	0.1930	0.2206	0.2481	0.2757	0.3033	0.3309	0.3584	0.3860	0.4136	0.4412	0.4687	0.4963	0.5239	0.5515
	650	0.0298	0.0597	0.1194	0.1493	0.1792	0.2091	0.2389	0.2688	0.2987	0.3286	0.3584	0.3883	0.4182	0.4481	0.4779	0.5078	0.5377	0.5676	0.5974
	700	0.0321	0.0643	0.1286	0.1608	0.1930	0.2252	0.2573	0.2895	0.3217	0.3538	0.3860	0.4182	0.4504	0.4825	0.5147	0.5469	0.5790	0.6112	0.6434
	750	0.0344	0.0689	0.1378	0.1723	0.2068	0.2412	0.2757	0.3102	0.3447	0.3791	0.4136	0.4481	0.4825	0.5170	0.5515	0.5859	0.6204	0.6549	0.6894
	800	0.0367	0.0735	0.1470	0.1838	0.2206	0.2573	0.2941	0.3309	0.3676	0.4044	0.4412	0.4779	0.5147	0.5515	0.5882	0.6250	0.6618	0.6985	0.7353
	850	0.0390	0.0781	0.1562	0.1953	0.2343	0.2734	0.3125	0.3515	0.3906	0.4297	0.4687	0.5078	0.5469	0.5859	0.6250	0.6641	0.7031	0.7422	0.7813
	900	0.0413	0.0827	0.1654	0.2068	0.2481	0.2895	0.3309	0.3722	0.4136	0.4550	0.4963	0.5377	0.5790	0.6204	0.6618	0.7031	0.7445	0.7859	0.8272
	950	0.0436	0.0873	0.1746	0.2183	0.2619	0.3056	0.3492	0.3929	0.4366	0.4802	0.5239	0.5676	0.6112	0.6549	0.6985	0.7422	0.7859	0.8295	0.8732
	1000	0.0459	0.0919	0.1838	0.2298	0.2757	0.3217	0.3676	0.4136	0.4596	0.5055	0.5515	0.5974	0.6434	0.6894	0.7353	0.7813	0.8272	0.8732	0.9192
	1100	0.0505	0.1011	0.2022	0.2527	0.3033	0.3538	0.4044	0.4550	0.5055	0.5561	0.6066	0.6572	0.7077	0.7583	0.8088	0.8594	0.9100	0.9605	1.0111
1200	0.0551	0.1103	0.2206	0.2757	0.3309	0.3860	0.4412	0.4963	0.5515	0.6066	0.6618	0.7169	0.7721	0.8272	0.8824	0.9375	0.9927	1.0478	1.1030	
1500	0.0689	0.1378	0.2757	0.3447	0.4136	0.4825	0.5515	0.6204	0.6894	0.7583	0.8272	0.8962	0.9651	1.0341	1.1030	1.1719	1.2409	1.3098	1.3788	
1750	0.0804	0.1608	0.3217	0.4021	0.4825	0.5630	0.6434	0.7238	0.8043	0.8847	0.9651	1.0455	1.1260	1.2064	1.2868	1.3673	1.4477	1.5281	1.6086	
2000	0.0919	0.1838	0.3676	0.4596	0.5515	0.6434	0.7353	0.8272	0.9192	1.0111	1.1030	1.1949	1.2868	1.3788	1.4707	1.5626	1.6545	1.7464	1.8384	

Table 2. Performance 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	7.0	8.0	9.0	10.0
50	Effective Area [m²]	0.0278	0.0139	0.0093	0.0069	0.0056	0.0046	0.004	0.0035	0.0031	0.0028	0.0023				
	Pressure Drop [Pa]	<1	1	2	4	6	9	12	15	19	24	34				
	Throw Distance [m]	1	2	2	3	3	3	4	4	4	5	5				
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	<15	<15	<15	17	20	25			
100	Effective Area [m²]	0.0556	0.0278	0.0185	0.0139	0.0111	0.0093	0.0079	0.0069	0.0062	0.0056	0.0046	0.004	0.0035	0.0031	0.0028
	Pressure Drop [Pa]	<1	1	2	4	6	9	12	15	19	24	34	46	61	77	95
	Throw Distance [m]	1	2	3	3	4	4	5	5	5	6	6	7	8	8	9
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	<15	<15	17	20	23	27	31	35	38
200	Effective Area [m²]	0.1111	0.0556	0.037	0.0278	0.0222	0.0185	0.0159	0.0139	0.0123	0.0111	0.0093	0.0079	0.0069	0.0062	0.0056
	Pressure Drop [Pa]	<1	1	2	4	6	8	11	15	19	23	34	46	60	76	94
	Throw Distance [m]	2	3	3	4	5	5	6	6	7	7	8	9	10	11	11
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	16	20	23	26	30	34	38	41	44
300	Effective Area [m²]	0.1667	0.0833	0.0556	0.0417	0.0333	0.0278	0.0238	0.0208	0.0185	0.0167	0.0139	0.0119	0.0104	0.0093	0.0083
	Pressure Drop [Pa]	<1	1	2	4	6	8	11	15	19	23	34	46	60	76	94
	Throw Distance [m]	2	3	4	5	5	6	7	7	8	8	9	10	11	12	13
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	18	21	25	27	32	36	40	43	45
400	Effective Area [m²]	0.2222	0.1111	0.0741	0.0556	0.0444	0.037	0.0317	0.0278	0.0247	0.0222	0.0185	0.0159	0.0139	0.0123	0.0111
	Pressure Drop [Pa]	<1	1	2	4	6	8	11	15	19	23	34	46	60	75	93
	Throw Distance [m]	2	3	4	5	6	6	7	8	8	9	10	11	12	13	14
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	15	19	23	26	29	33	37	41	44	47
500	Effective Area [m²]	0.2778	0.1389	0.0926	0.0694	0.0556	0.0463	0.0397	0.0347	0.0309	0.0278	0.0231	0.0198	0.0174	0.0154	
	Pressure Drop [Pa]	<1	1	2	4	6	8	11	15	19	23	33	45	59	75	
	Throw Distance [m]	2	3	4	5	6	7	8	8	9	10	11	12	13	14	
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	16	20	24	27	29	34	38	42	45	
600	Effective Area [m²]	0.3333	0.1667	0.1111	0.0833	0.0667	0.0556	0.0476	0.0417	0.037	0.0333	0.0278	0.0238	0.0208		
	Pressure Drop [Pa]	<1	1	2	4	6	8	11	15	19	23	33	45	59		
	Throw Distance [m]	2	4	5	6	7	7	8	9	10	10.4	12	13	14		
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	17	21	25	28	31	36	40	43		
700	Effective Area [m²]	0.3889	0.1944	0.1296	0.0972	0.0778	0.0648	0.0556	0.0486	0.0432	0.0389	0.0324	0.0278	0.0243		
	Pressure Drop [Pa]	<1	1	2	4	6	8	11	15	19	23	33	45	59		
	Throw Distance [m]	2	4	5	6	7	8	9	9	10	10.9	12	14	15		
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	17	21	25	28	31	36	40	43		
800	Effective Area [m²]	0.4444	0.2222	0.1481	0.1111	0.0889	0.0741	0.0635	0.0556	0.0494	0.0444	0.037	0.0317			
	Pressure Drop [Pa]	<1	1	2	4	6	8	11	15	19	23	33	45			
	Throw Distance [m]	3	4	5	6	7	8	9	10	11	11.4	13	14			
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	18	22	26	29	31	36	40			
900	Effective Area [m²]	0.5	0.25	0.1667	0.125	0.1	0.0833	0.0714	0.0625	0.0556	0.05	0.0417	0.0357			
	Pressure Drop [Pa]	<1	1	2	4	6	8	11	15	19	23	33	45			
	Throw Distance [m]	3	4	5	7	8	9	9	10	11	11.9	13	15			
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	19	23	26	29	32	37	41			
1000	Effective Area [m²]	0.5556	0.2778	0.1852	0.1389	0.1111	0.0926	0.0794	0.0694	0.0617	0.0556	0.0463				
	Pressure Drop [Pa]	<1	1	2	4	6	8	11	15	19	23	33				
	Throw Distance [m]	3	4	6	7	8	9	10	11	12	12.3	14				
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	19	23	27	30	32	37				
1250	Effective Area [m²]	0.6944	0.3472	0.2315	0.1736	0.1389	0.1157	0.0992	0.0868	0.0772	0.0694	0.0579				
	Pressure Drop [Pa]	<1	1	2	4	6	8	11	15	19	23	33				
	Throw Distance [m]	3	5	6	7	8	9	11	11	12	13.2	15				
	Sound Power Level [dB(A)]	<15	<15	<15	<15	15	20	24	27	31	33	38				
1500	Effective Area [m²]	0.8333	0.4167	0.2778	0.2083	0.1667	0.1389	0.119	0.1042	0.0926	0.0833					
	Pressure Drop [Pa]	<1	1	2	4	6	8	11	15	18	23					
	Throw Distance [m]	3	5	6	8	9	10	11	12	13.1	14.1					
	Sound Power Level [dB(A)]	<15	<15	<15	<15	16	21	25	28	31	34					
1750	Effective Area [m²]	0.9722	0.4861	0.3241	0.2431	0.1944	0.162	0.1389	0.1215	0.108	0.0972					
	Pressure Drop [Pa]	<1	1	2	4	6	8	11	15	18	23					
	Throw Distance [m]	3	5	7	8	9	11	12	13	14	15					
	Sound Power Level [dB(A)]	<15	<15	<15	<15	16	21	25	29	32	35					
2000	Effective Area [m²]		0.5556	0.3704	0.2778	0.2222	0.1852	0.1587	0.1389	0.1235						
	Pressure Drop [Pa]		1	2	4	6	8	11	15	18						
	Throw Distance [m]		5	7	8	10	11	12	13	15						
	Sound Power Level [dB(A)]		<15	<15	<15	17	22	26	29	32						
2500	Effective Area [m²]		0.6944	0.463	0.3472	0.2778	0.2315	0.1984	0.1736							
	Pressure Drop [Pa]		1	2	4	6	8	11	14							
	Throw Distance [m]		6	8	9	11	12	13	14							
	Sound Power Level [dB(A)]		<15	<15	<15	18	23	27	30							
3000	Effective Area [m²]		0.8333	0.5556	0.4167	0.3333	0.2778	0.2381								
	Pressure Drop [Pa]		1	2	4	6	8	11								
	Throw Distance [m]		6	8	10	11	13	14								
	Sound Power Level [dB(A)]		<15	<15	<15	19	24	28								
4000	Effective Area [m²]			0.7407	0.5556	0.4444	0.3704									
	Pressure Drop [Pa]			2	4	6	8									
	Throw Distance [m]			9	11	12	14									
	Sound Power Level [dB(A)]			<15	<15	20	25									

Note: The data are obtained when the temperature difference between the air distribution equipment and the ambient air is T=8 K.

Throw distance is the distance between the point where the air leaving the distribution equipment reaches to velocity of 0.25 m/s, and the air distribution equipment.

Table 3. Throw Distance Correction

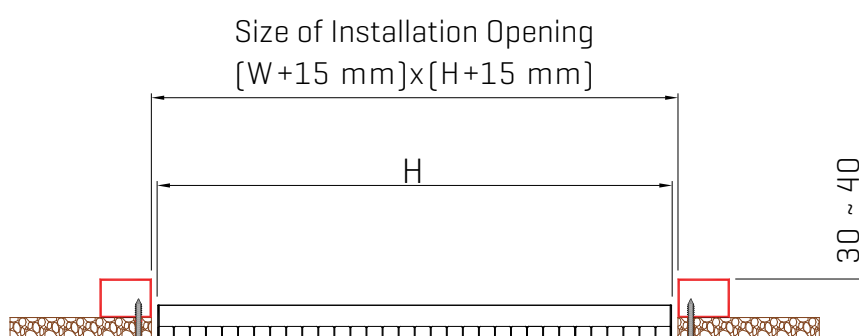
Heating Mode (ΔT)	4	6	8	10	12
Throw Distance Factor	1.07	1.02	1	0.90	0.83
Cooling Mode (ΔT)	4	6	8	10	12
Throw Distance Factor	1.31	1.36	1.42	1.48	1.54

Table 4. Damper Pressure Correction

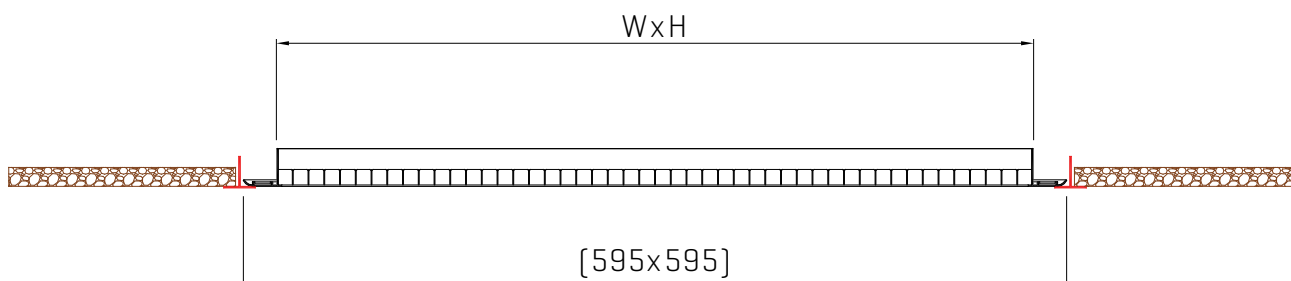
Damper Location	Pressure Drop Factor	Sound Production [dB(A)]
Opened	1.1	+1
25% Closed	1.14	+4
50% Closed	2.48	+14
75% Closed	5.11	+29

INSTALLATION

1. SCREW SYSTEM



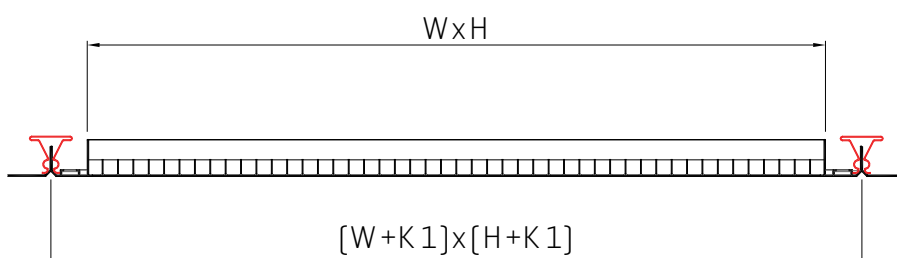
2. SUSPENDED CEILING



W and H sizes that can be selected according to the frame sizes specified in the product selection are shown in the table on the right.

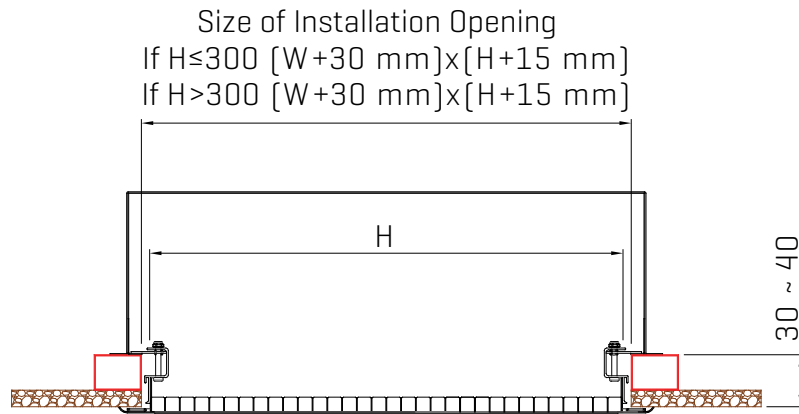
	W (mm)	H (mm)
22 mm Frame	559	559
32 mm Frame	541	541

3. CLIP-IN CEILING

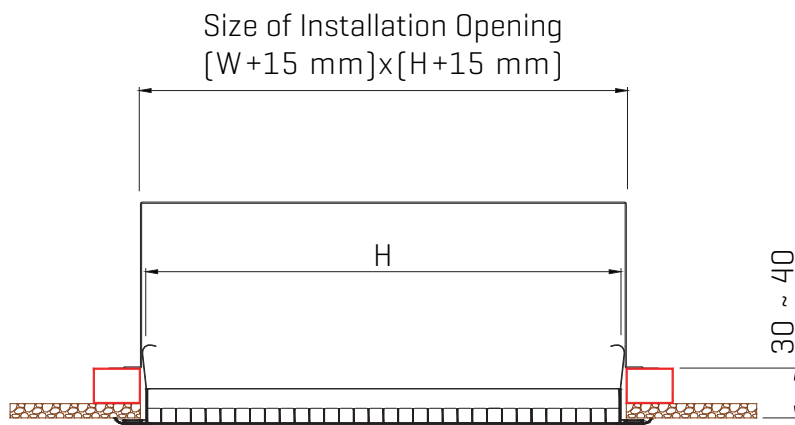


Clip-In Frame K1 = 59 mm	W (mm)	H (mm)
600x600	541	541
300x300	241	241

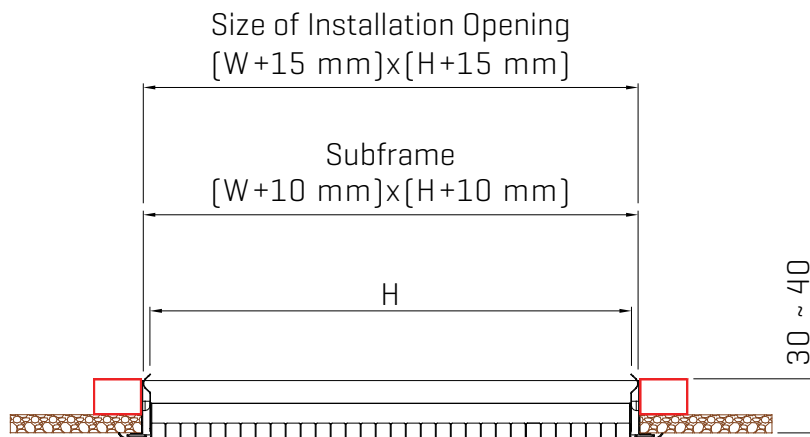
4. WITH LATCH



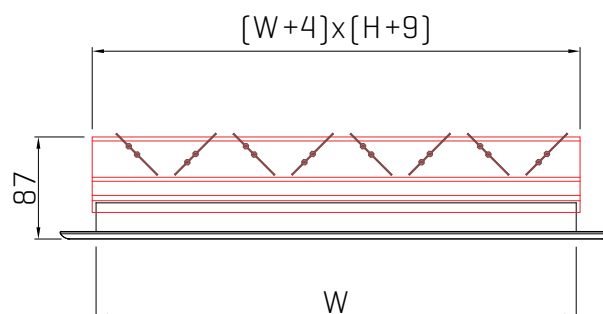
5. LONG CLIPS



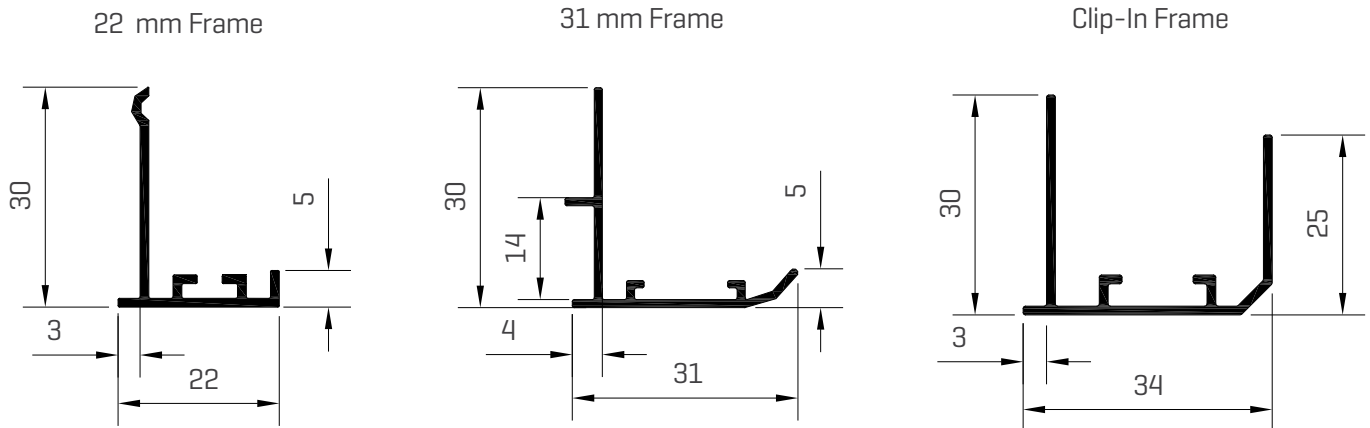
6. SUBFRAME SHORT CLIP



7. WITH DAMPER



FRAME TYPES



MAXIMUM MODULE SIZE

The standard size of a single piece product is in the limits of 50x50 to 2000x1000. If the order is placed over standard sizes, the grilles will be produced more than once in full pieces.

PRODUCT SELECTION

Example: The air flow distributed in the space has been determined as 3000 m³/h. 3 Egg Crate Grille will be used for air extract. Make your product selection.

Solution: Flow rate for a grille, $3000/3 = 1000$ m³/h

From the Performance Data Table [Table 2], the effective area corresponding to the appropriate pressure drop and flow rate values are selected.

For example, in 0.1389 m² effective area, the effective speed is 2 m/s, pressure loss is 4 Pa, and sound power level is less than 15 dB[A].

The appropriate grille size can be selected from the effective area table as 500 mm x 300 mm corresponding to 0.1389 m² value.

Opposed Blade Damper Condition

The pressure drop and sound power level changes in the damper product. Damper Correction Table [Table 4] should be used.

For example, the pressure multiplier for the damper product in the 50% closed position of the damper is 2.48 corresponding to the table and the sound generation to be added is +14 dB[A].

Total static pressure drop: $4 \times 2.48 = 9.9$ Pa

Total sound power level is less than 29 dB[A].

PRODUCT ORDER CODES

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

DMP.<A>..<C>.<D>.<E>.<F>.<G>.<H>

A	Raw Material Type	
	ALM	Aluminum
B	Case Type	
	04	22 mm
	05	31 mm
	09	Clip-In Ceiling
	00	Without Frame
C	Damper	
	ZD	Opposed Blade Damper
	DZ	Without Damper
D	Installation Type	
	VD	Screw System
	KR	Suspended Ceiling
	KL	Clip-In Ceiling
	MD	Without Mounting Hole
	MN	With Latch
	UK	Long Clips
	KO	Subframe Short Clip
	KK	Short Clip without Subframe
E	Accessories	
	00	Without Accessories
	EF	Fiber Filter
	PF	Polyurethane Filter
	BD	Neck Reducer
F	Horizontal Dimension (W) (mm)	
	0000	You can view it from standard dimensions.
G	Vertical Dimension (H) (mm)	
	0000	You can view it from standard dimensions.
H	Paint	
	00	Unpainted
	S1	Standard Painted - RAL 9010
	S2	Standard Painted - RAL 9016
	XX	Special Painted

Sample Coding; DMP.ALM.24.ZD.KR.00.0500.0500.S1



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GLD
Laminar Flow Ceiling Systems
[Horizontal Filter Type]

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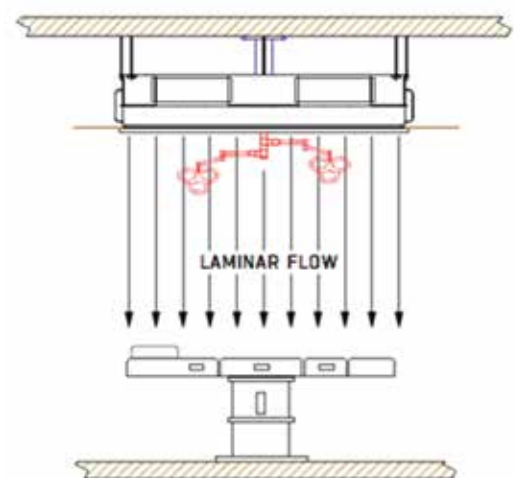
GLD – Laminar Flow Ceiling Systems

- GLD – Laminar Flow Ceiling Systems with Horizontal Filter, are used in operating theaters, intensive care units and industrial facilities which are producing clean room standards.
- Every manufactured Laminar Flow Ceiling System is tested according to DIN 1946/4 and DIN 25414, and ensured to customer with “100% Leak Proof Warranty”.
- H13/H14 class gel seal hepa filter is used in the system. Thanks to its gel seal structure, a high level of leak proofis provided between the filter and the main case. Thus, it provides protection against harmful particles that may spread into the environment.
- H13/H14 class aluminum frame and gel seal filter has at tested in EN 1822 standards and it has at least 99.995% efficiency according to the related standard.

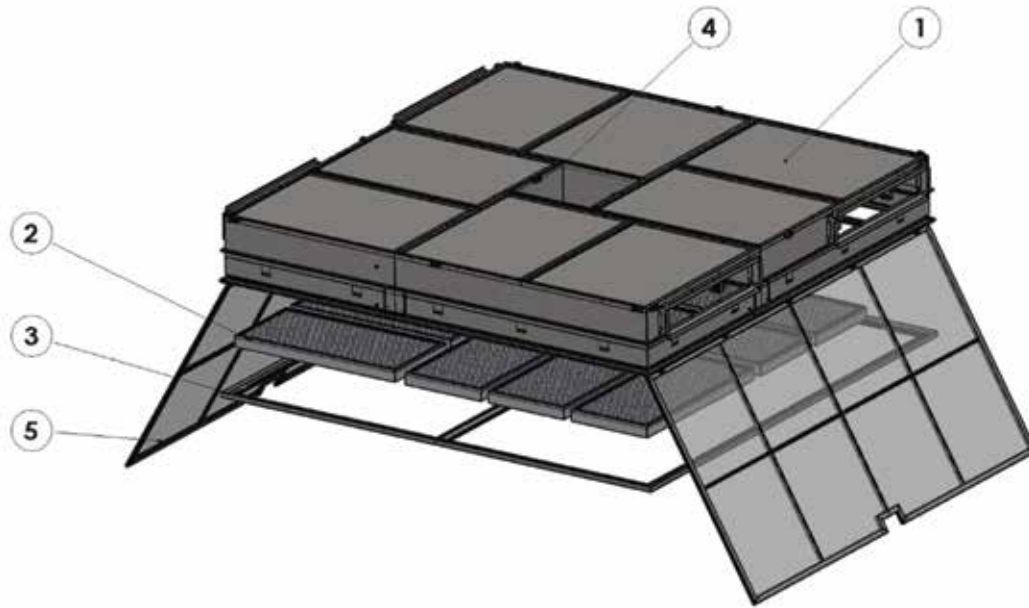
OPERATION

GLD – Laminar Flow Ceiling Systems with Horizontal Filter creates turbulent airflow over the patient and operating room personnel and protects against bacteria, viruses and microbes by pushing the air. This reduces the risk of infection for the occupied zone.

In terms of comfort, the human body is adversely affected by constant velocity air flows higher than 0.18-0.40 m/s. If the velocity of air exceeds 0.18-0.40 m/s, no doubt, the high speed will be disturb the patient. Nonetheless, the medical team which are performing surgery should also be able to work comfortably. For long hour surgery conditions, the occupied zone needs to be have low velocity airflow and this conditions can be achieved with Laminar Flow Ceiling System.



MATERIALS AND COATING



GLD – Laminar Flow Ceiling Systems with Horizontal Filter consists of main parts. These parts are Main Case, H14 Gel Seal Hepa Filter Set, Pendant Box, Laminarizer and Laminarizer Frame.

1- Main Case: Manufactured from AISI 304 stainless steel with V2A class, which convenient to DIN 1.4301 standard. Main case does not contain indentations, by this way it is easy to clean and becomes leak-proof. It is produced in a modular structure for ease of assembly and shipment. The casing has manometer terminals for the examination of pressure difference of HEPA filters.

2- HepaFilters: H14 class, and it has high flow rate and low initial pressure loss values. Filter case is made of anodic oxidation coated aluminum, for preventing the microorganism activity. To prevent damage to the filter during assembly, protection wire shall be provided on both sides of filter. Thanks to its gel seal structure, a high level of sealing is provided between the filter and the main case.

2-3- Laminarizer Frame: It closes the gap between the laminarizer and the main case, gives the GLD an aesthetic appearance.

3-4- Pendant Box: Located in the center of GLD, because of to hide the flange of the surgery lamp and for interfering if it needs.

5- Laminarizer: The frame is made of stainless steel profile. Covered with special silk cloth made of non-decay and fire resistant micro nets which develops the laminar flow and it can be disinfected by wiping. The laminarizer is attached to the case with torque hinges and clips. Torque hinges system provides easeness for changing the filters.

Soft Wall



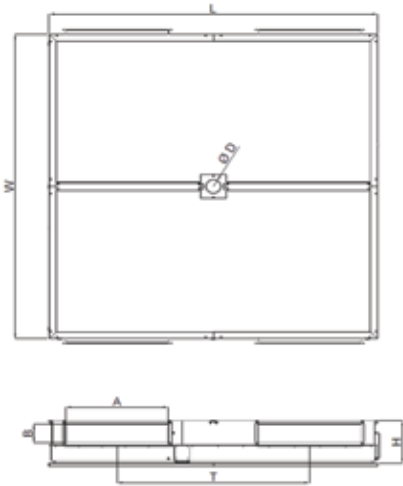
To decrease turbulence effect on the laminar flow zone edges, a soft wall that made of PET-G can be integrated on the entire circumference of the unit as an accessory.

QUICK SELECTION

Product Code	Dimensions			v=0,23 m/s Hepa Filter and with		
	Width (mm)	Length (mm)	Height (mm)	Air Volume (m ³ /h)	Average Sound Pressure Level (dB)	Initial Pressure Loss (Pa)
GLD - 1400x2400	1400	2400	450	2600	35	90
GLD - 1600x2400	1600	2400	450	3200	35	90
GLD - 1800x2400	1800	2400	450	3600	35	90
GLD - 2400x2400	2400	2400	450	4800	40	95
GLD - 2400x3000	2400	3000	450	6000	40	95
GLD - 3000x3000	3000	3000	450	7500	40	95
GLD - 3200x3200	3200	3200	450	8500	40	95
GLD - 3800x3800	3800	3600	450	12000	40	97

Note: Recommended final pressure loss level is maximum 250 Pa.

DIMENSIONS



1- If the dimensions are only 1400x2400 mm, it has 2 ducts placed by crossed on the long edge. Another dimensions of the module will have 4 ducts.

2- "ØD" Pendant diameter will be given by the customer at the time of order.

3- The number and size of the hepa filters are varying from different global dimensions. Changes can be seen from the table below.

Product Code	Dimensions [mm]						Filter Number Quantity and Size Dimensions of Filter
	W	L	H	A	B	T	
GLD - 1400x2400	1400	2400	450	600	200	-	850x465x80 / 2 - Pieces 720x350x80 / 6 - Pieces
GLD - 1600x2400	1600	2400	450	600	200	1192	850x465x80 / 2 - Pieces 720x450x80 / 6 - Pieces
GLD - 1800x2400	1800	2400	450	600	200	1192	850x465x80 / 2 - Pieces 720x550x80 / 6 - Pieces
GLD - 2400x2400	2400	2400	450	600	200	1192	804x530x80 / 10 Pieces
GLD - 2400x3000	2400	3000	450	900	200	1446	1104x530x80 / 2 - Pieces 804x530x80 / 10 - Pieces
GLD - 3000x3000	3000	3000	450	1000	200	1778	1092x532x80 / 12 Pieces
GLD - 3200x3200	3200	3200	450	1000	200	1878	1192x565x80 / 12 Pieces
GLD - 3800x3800	3800	3800	450	1200	200	2180	1470x670x80 / 12 Pieces

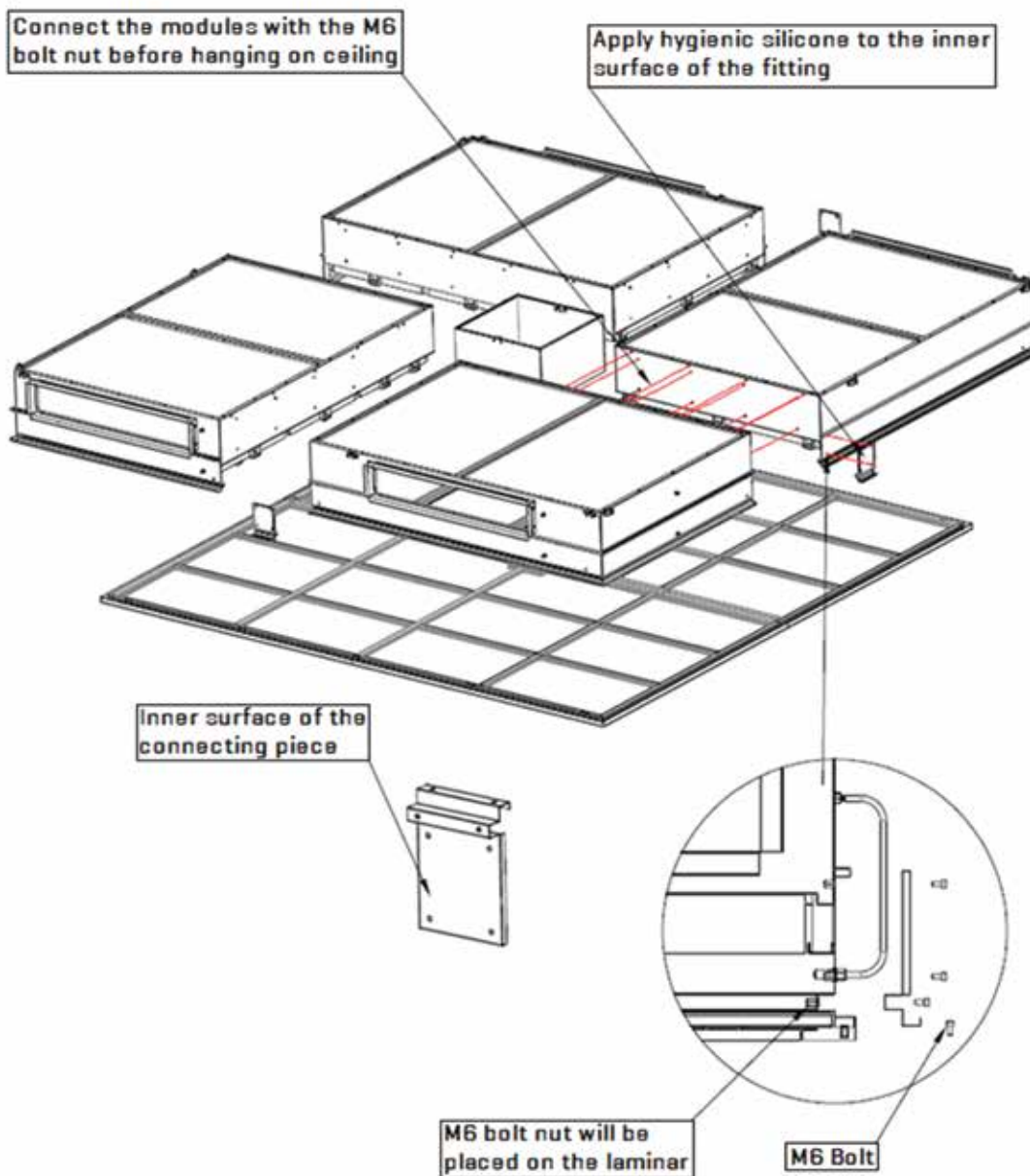
ASSEMBLY

Stage 1: Connect the modules with the M6 bolt nut before hanging on the ceiling. [There is gasket on the module joining surfaces.]

Stage 2: Apply hygienic silicone to the inner surface of the fitting.

Stage 3: Fix the modules connected with the M6 bolt nut to each other with the coupling piece. [2 and 4 laminar flow modules will combined in the same way.]

Stage 4: Before hanging on the ceiling, use the hygienic silicone between the assembled modules.

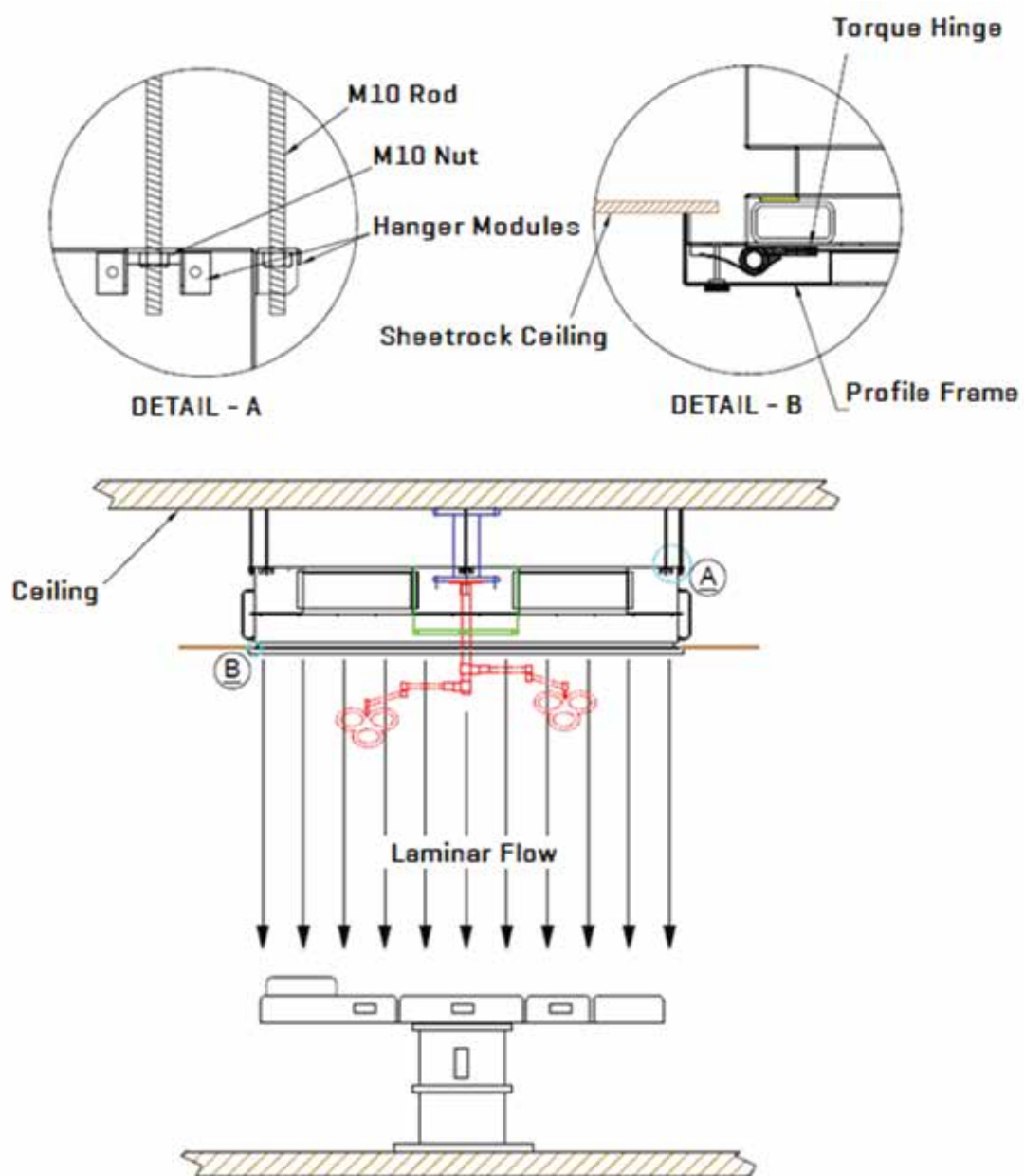


Stage 5: M10 rods that fixed on the ceiling, will be connected to the hanger module, which placed on the case, by M10 nuts with balancing operation.

Stage 6: Attach the laminarizer to the case with torque hinges and clips.

Stage 7: Connect the case with the profile frame which seated on the ceiling, by the fixing bolts.

Stage 8: Before testing, make sure that the ceiling zone is at negative pressure.





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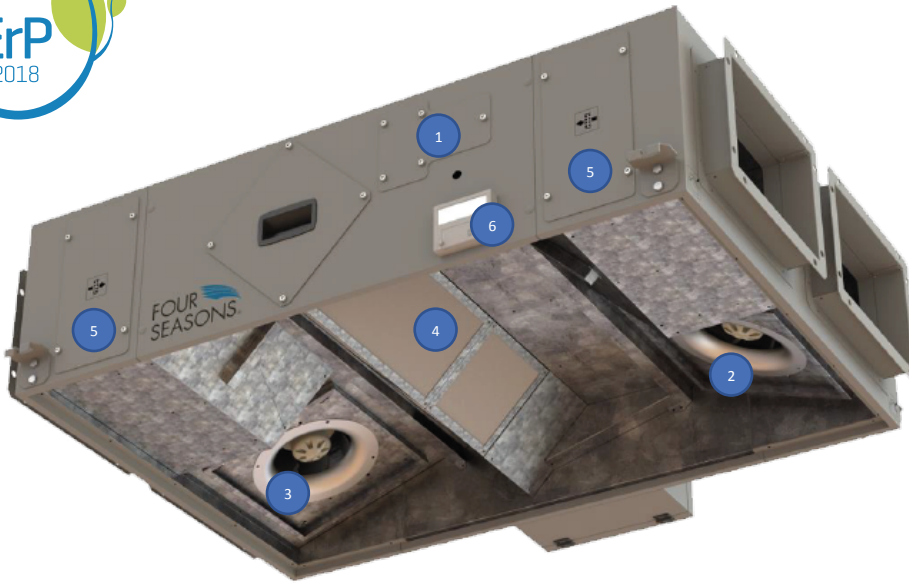
FOUR-CFHR-S
Cross Flow Paper Heat Exchanger
Type Energy Recovery Unit

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- 1- Bypass Damper [%100]
- 2- Extract Fan
- 3- Supply Fan
- 4- Paper Cross-Flow Heat Exchanger
- 5- Filters
- 6- Control Panel

FOUR CFHR-S

- ☞ Double skin
- ☞ 30 mm insulation
- ☞ Low sound level
- ☞ Fully integrated plug & play control system
- ☞ Bypass damper [%100]

Heat Exchanger

- ☞ High efficient paper cross flow heat exchanger
- ☞ Special application for anti-freeze protection

Filters

- ☞ Large filtering area for energy efficiency and long service period
- ☞ ISO ePM Coarse 55% filters , optional high efficiency ISO ePM1 55% filter

Fans

- ☞ New generation EC fans
- ☞ Low sound level
- ☞ 10 years lifetime (40.000 hours)

Options:

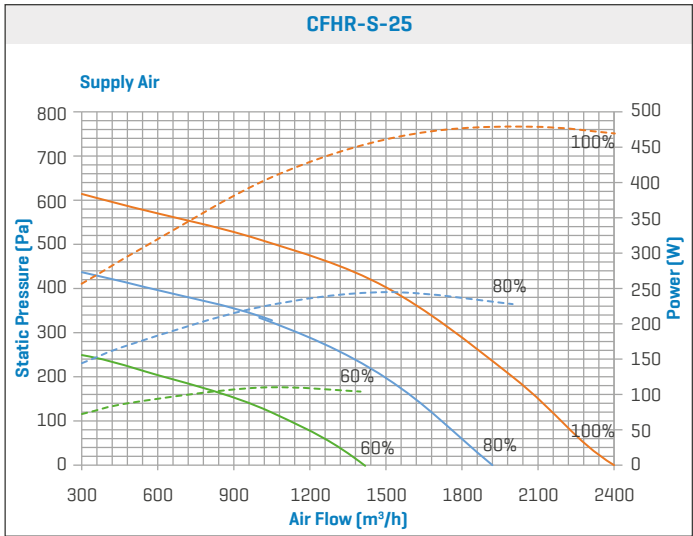
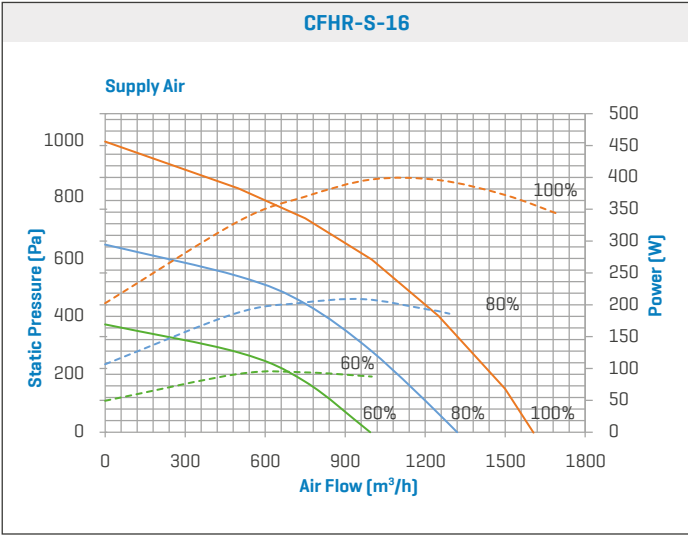
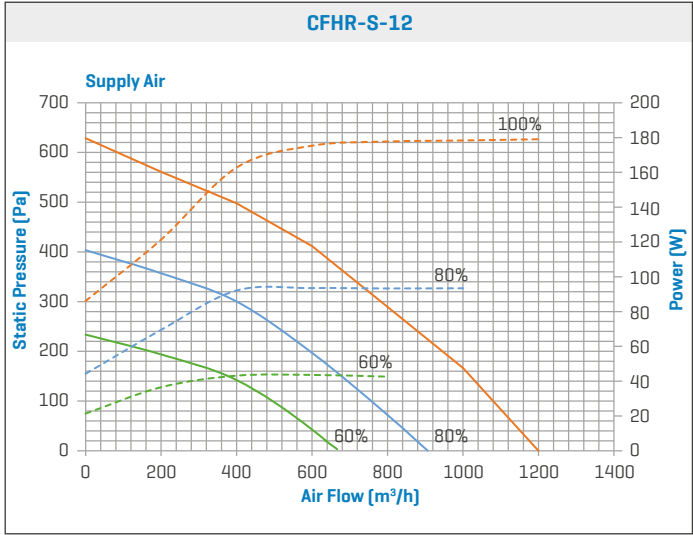
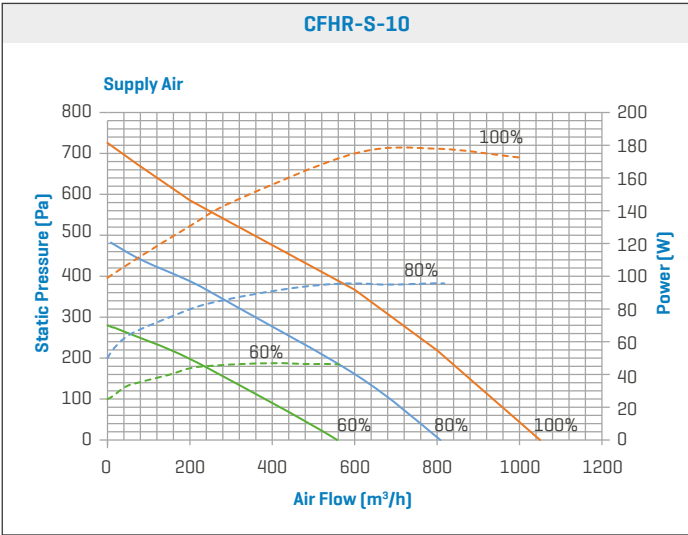
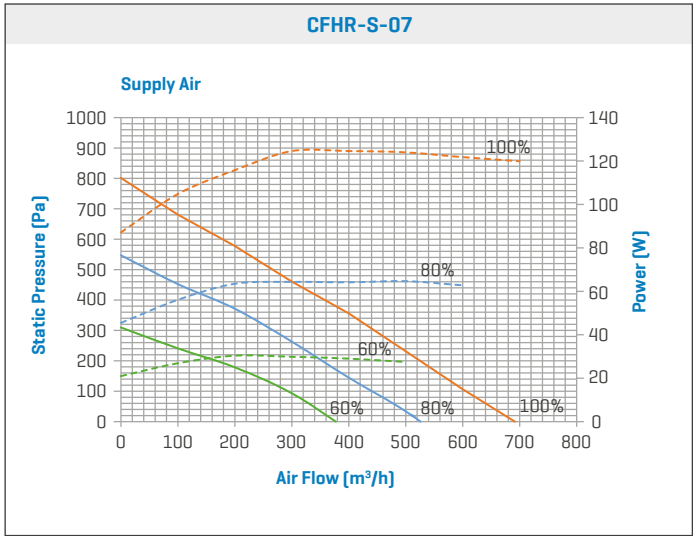
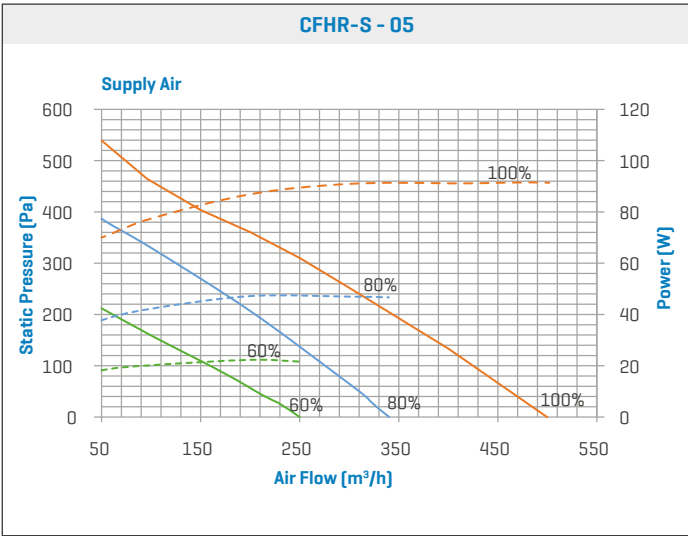
- ☞ Electrical Heater
- ☞ DX/Heating/Cooling coil
- ☞ Attenuator
- ☞ Dampers
- ☞ CO₂ and humidity sensor

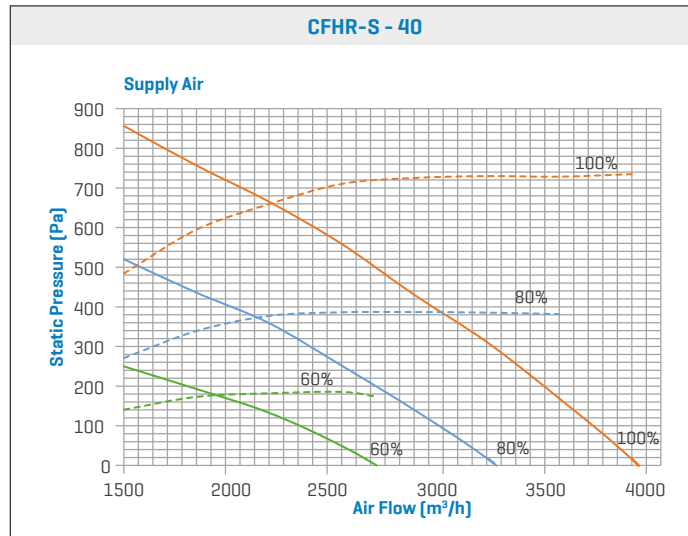
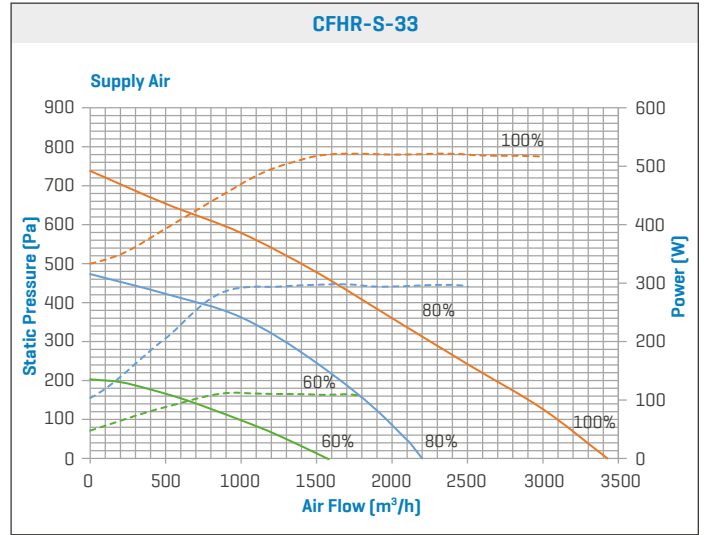
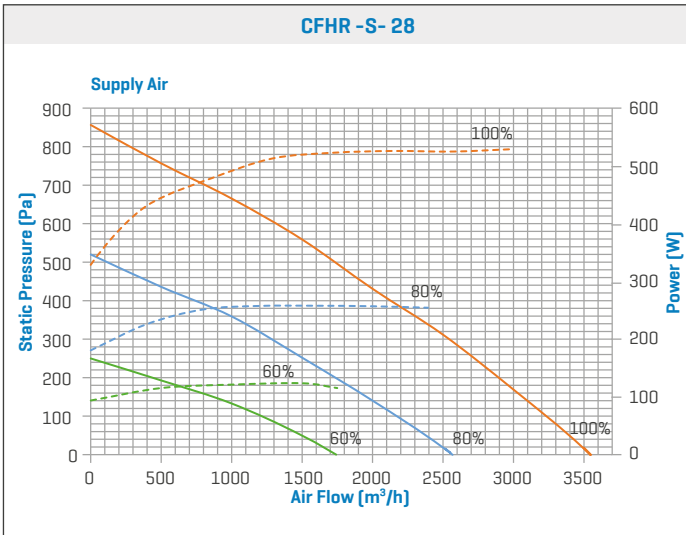
$$SPI = \frac{P_e [W]}{q \cdot h [m^3]}$$

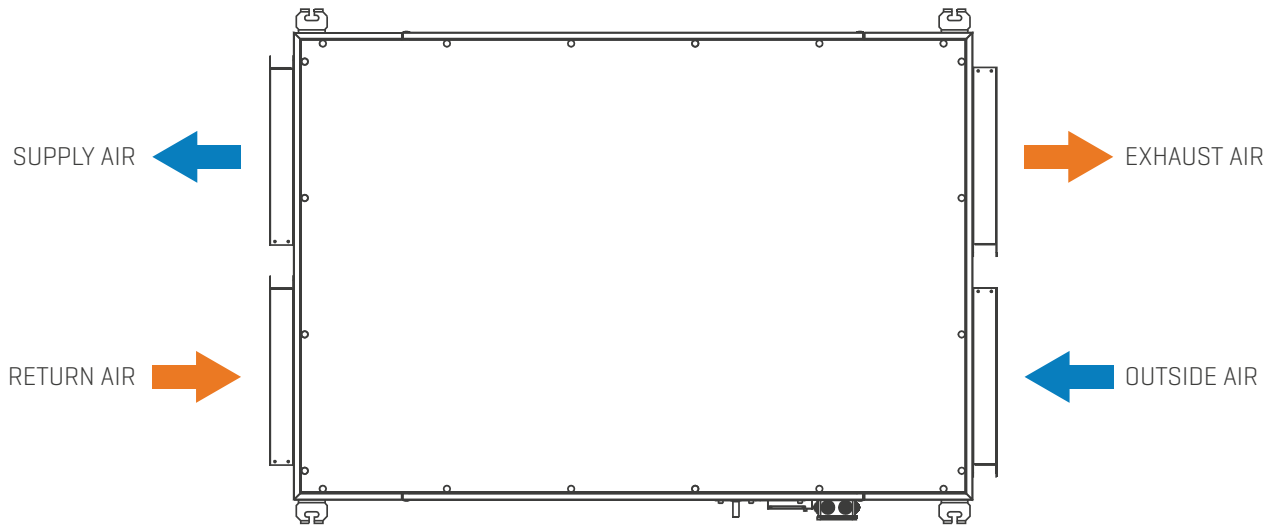
$$SFP = \frac{P_{sfm} + P_{efm} [W]}{q_{max} \cdot s [m^3]}$$

[According to EN 13779]

	SPI [W / m ³ / h]	SFP [W / m ³ / s]	EN 13779 SFP CLASS
CFHR-S-05	0,166	597	CLASS 2
CFHR-S-07	0,164	1180	CLASS 4
CFHR-S-10	0,17	1224	CLASS 3
CFHR-S-12	0,142	1020	CLASS 3
CFHR-S-16	0,24	1732	CLASS 4
CFHR-S-25	0,188	1356	CLASS 4
CFHR-S-28	0,178	1280	CLASS 4
CFHR-S-33	0,15	1090	CLASS 3
CFHR-S-40	0,1875	1350	CLASS 4





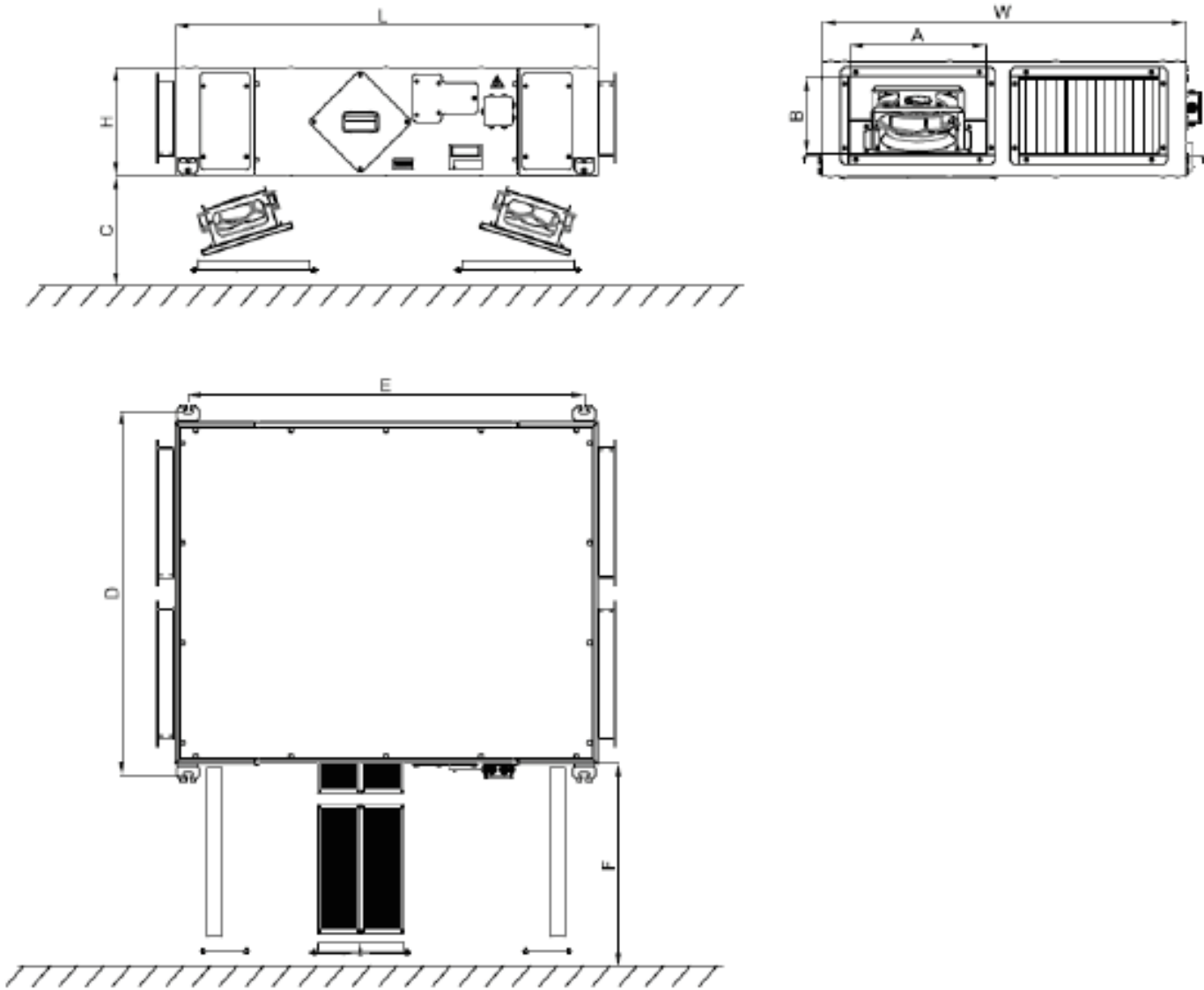


	Power [W]		Voltage [V] / Current [A]		RPM [1/min]	
	Supply Fan	Extract Fan	Supply Fan	Extract Fan	Supply Fan	Extract Fan
CFHR-S - 05	83	83	230/0,75	230/0,75	3200	3200
CFHR-S - 07	119	119	230/0,9	230/0,9	3635	3635
CFHR-S - 10	170	170	230/1,4	230/1,4	2860	2860
CFHR-S - 12	170	170	230/1,4	230/1,4	2510	2510
CFHR-S - 16	385	385	230/2,5	230/2,5	3400	3400
CFHR-S - 25	470	470	230/3,1	230/3,1	2530	2530
CFHR-S - 28	500	500	230/2,2	230/2,2	2700	2700
CFHR-S - 33	500	500	230/2,2	230/2,2	1850	1850
CFHR-S - 40	750	750	230/3,3	230/3,3	2100	2100

	CFHR-S - 05	CFHR-S - 07	CFHR-S - 10	CFHR-S - 12	CFHR-S - 16	CFHR-S - 25	CFHR-S - 28	CFHR-S - 33	CFHR-S - 40
MAX. AIR FLOW [m³/h]	500	700	1040	1200	1580	2400	2650	3450	4010
Pext. [Pa]	0								
NOMINAL AIR FLOW [m³/h]	390	510	845	1000	1440	2100	2200	3000	3510
Pext. [Pa]	150								

dB [A]	CFHR-S-05	CFHR-S-07	CFHR-S-10	CFHR-S-12	CFHR-S-16	CFHR-S-25	CFHR-S-28	CFHR-S-33	CFHR-S-40
SOUND LEVEL*	32	33	37	34	34	42	45	44	47

*Sound pressure level is measured 1,5 m away from the device.



MODEL	L	W	H	A	B	C	D	E	F	WEIGHT
CFHR-S-05	1090	580	335	200	230	230	646	1010	450	80
CFHR-S-07	1090	580	335	200	230	230	646	1010	450	90
CFHR-S-10	1220	840	335	300	230	290	906	1140	450	130
CFHR-S-12	1310	1060	335	400	230	300	1126	1460	550	165
CFHR-S-16	1565	1320	375	450	250	340	1386	1480	600	195
CFHR-S-25	1665	1650	375	600	250	350	1716	1580	600	270
CFHR-S-28	1665	1950	375	800	250	350	2016	1580	600	310
CFHR-S-33	19750	1950	460	800	300	430	2016	1670	600	345
CFHR-S-40	1890	2000	590	850	450	520	2066	1810	600	370

* All units are in mm

Operation	Description	Standart
On / Off	Control panel or external start stop function is available.	Standard
Display	Digital control panel is available.	Standard
Display	Wireless controller is available as option.	Optional
Fan Speed Control	3 steps fan speed control of supply and exhaust fan is available.	Standard
Fan Speed Control	Constant air flow or constant pressure.	Optional
Fan Speed Control	Airflow control based on the air quality sensor is available.	Optional
Bypass Damper Function	Free cooling is available ,by controlling the indoor and outdoor air conditions.	Standard
Frost Protection Function	When outdoor temperature is low, this function will become active by receiving information from humidity and temperature sensors. Unbalanced, pre-heater, by-pass	Standard
ModBus	It controls all functions of unit via PC or central control system board.	Standard
Filter Function	There are 2 alternatives to control filters: 1: It records run time of the unit and when set time expires, control panel gives an alert for filter change. 2: Filter change time can be controlled with pressure switch mechanically. By this way, control panel givesan alert when filter needs to be changed.	Standard
Boost Function	It is used in order to increase fan speed: Alternative1: Via boast button on the control panel. Alternative 2: Via dry contact or light power input [230V] on PCB board.	Standard
Safety	It automatically stops operatingin case of interfering to the unit while it is working.	Standard
Fire Alarm Function	It will be active in case of fire.	Standard
Electrical Heater	Step control	
Heating Coil	Heating coil valves on the device which include optional heating coil, are controlled by proportional valve motors with PID logic and sensitivity.	Optional

ACCESSORIES

Attenuator



Attenuators are designed to remove the noise resulting from the Air-conditioning and Ventilation systems. The flat sound attenuating panel is used to eliminate the fan noise of 250 Hz octave strength.

	CFHR-S-05	CFHR-S-07	CFHR-S-10	CFHR-S-12	CFHR-S-16	CFHR-S-25	CFHR-S-28	CFHR-S-33	CFHR-S-40
Width [mm]	200	310	470	490	800	1130	1290	1390	600
Height [mm]	230	230	230	230	250	250	250	300	450
Length [mm]	600	600	600	600	600	600	600	600	600
De 63 Hz	3	3	2	2	2	2	2	2	2
De 125 Hz	5	4	3	3	3	2	2	2	2
De 250 Hz	9	9	9	6	6	6	6	6	6
De 500 Hz	16	16	16	13	12	12	11	11	12
De 1 kHz	19	19	19	14	14	13	12	13	13
De 2 kHz	16	16	16	14	14	12	11	11	12
De 4 kHz	13	13	13	10	10	7	7	8	9
De 8 kHz	10	10	10	7	7	7	6	6	7
Press [Pa]	26	16	16	15	17	17	17	17	21

	CFHR-S-05	CFHR-S-07	CFHR-S-10	CFHR-S-12	CFHR-S-16	CFHR-S-25	CFHR-S-28	CFHR-S-33	CFHR-S-40
Width [mm]	200	310	470	490	800	1130	1290	1390	600
Height [mm]	230	230	230	230	250	250	250	300	450
Length [mm]	1000	1000	1000	1000	1000	1000	1000	1000	1000
De 63 Hz	3	4	4	4	4	4	4	4	3
De 125 Hz	4	7	7	7	7	7	7	7	4
De 250 Hz	10	15	15	14	14	14	14	15	10
De 500 Hz	18	25	24	23	24	24	24	25	18
De 1 kHz	21	28	28	27	28	27	27	29	21
De 2 kHz	19	26	25	25	25	25	25	26	19
De 4 kHz	13	20	20	19	20	20	20	20	13
De 8 kHz	10	16	16	15	15	15	15	16	10
Press [Pa]	17	17	19	18	19	19	19	30	23

DX / Heating / Cooling Coil



- ☞ Coils are Eurovent certified.
- ☞ Coils are made of copper pipes and aluminum fins.
- ☞ The cassette material is galvanized or stainless steel.
- ☞ The coils were tested at a pressure of at least 20 bar. On request, 30 bars can be tested under pressure.
- ☞ The collectors used in the coils are copper pipes.
- ☞ In hot and cold water coils, the water inlet is from the bottom and the water outlet is at the top.
- ☞ Air and water flows are counter-flowing to increase the heat transfer between them.
- ☞ Under the cooling coil, a condensate pan with a double slope is placed and the accumulated water is discharged through the drain pipe. In the case of a Drip Holder, a high-performance drip holder made of PVC material that can withstand up to 90 ° C is used.

Electrical Heater



Rectangular electric heaters have two thermostats as standard.

The first thermostat is set to 70 ° C, the air in the electric heater cuts off the electric current when it reaches 70 ° C, allowing the device to restart automatically when the temperature drops.

The second thermostat used for safety purposes is activated at 110 ° C and cuts off the electric current.

The thermostat must be reset manually from the red button in order for the appliance to operate again.

	Air Flow [m³/h]	Width [mm]	Length [mm]	ΔT:5	ΔT:10	ΔT:15
				kW	kW	kW
CFHR-S-05	450	230	200	1	1,5	2,5
CFHR-S-07	500	230	200	1	2	3
CFHR-S-10	845	230	300	1,5	3	5
CFHR-S-12	950	230	400	2	4	6
CFHR-S-16	1500	250	450	3	6	9
CFHR-S-25	2200	250	600	4	8	12
CFHR-S-28	2500	250	800	5	9	14
CFHR-S-33	3000	300	800	6	11	16
CFHR-S-40	3500	450	850	7	13	19



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OLY
Slot Diffuser With Plastic Blades [Slim Type]

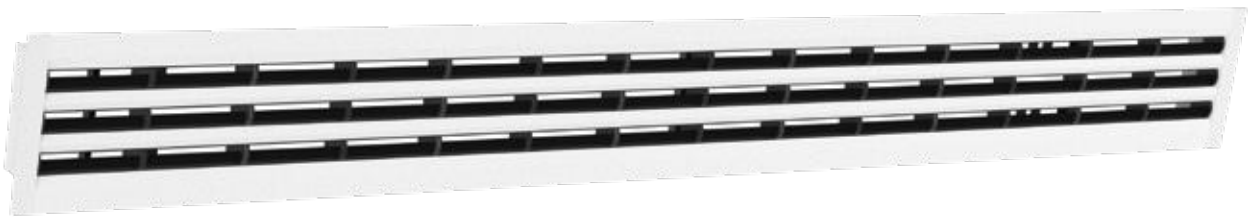
Venues Breathe with DOGU HVAC Systems!

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 standards. 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 standards], 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.



- ☞ OLY - Slot Diffuser With Plastic Blades [Slim Type], thanks to its cylindrical shaped blades and modular structure, is both decorative and ideal for meeting comfort parameters in difficult climatic spaces.
- ☞ It is decorative, can be produced modularly.
- ☞ Its narrow blade and slot inner structure is aerodynamically optimized and has a compact structure. Thus, it saves energy with low pressure drop.
- ☞ They are used as supply or return diffusers in ceiling and wall applications. It is suitable for horizontal throw from ceiling. It creates effective throw geometry in cooling applications with the Coanda effect.
- ☞ It is used in areas with a height of 2-4 m.



MATERIAL

- ☞ Aluminum 6063 extrusion profile production
- ☞ ABS plastic blades that provide air direction inside the frame

SURFACE COATING

- ☞ RAL 9010 or RAL 9016 electrostatic powder paint as standard
- ☞ Optional
 - Different RAL color codes
 - Unpainted manufacturing
 - Matt anodised aluminum

MOUNTING OPTIONS

- ☞ Mounting Bracket

PRODUCT SELECTION

STANDARD DIMENSIONS

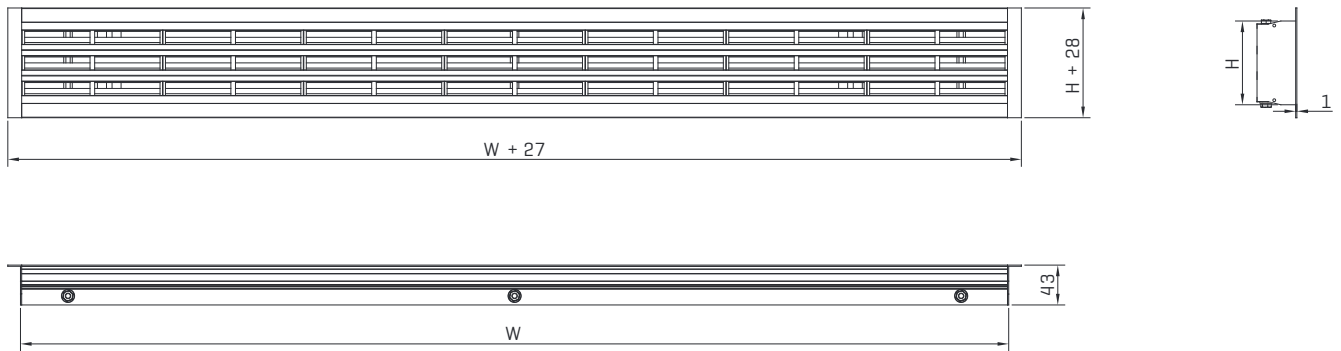


Table 1. Standard Dimension Table

Standard Dimensions		H (Height) [mm]			
		1 Slot	2 Slot	3 Slot	4 Slot
		35	63	91	121
W (Width) [mm]	155	✓	✓	✓	✓
	310	✓	✓	✓	✓
	460	✓	✓	✓	✓
	615	✓	✓	✓	✓
	765	✓	✓	✓	✓
	915	✓	✓	✓	✓
	1070	✓	✓	✓	✓
	1220	✓	✓	✓	✓
	1375	✓	✓	✓	✓
	1525	✓	✓	✓	✓
	1675	✓	✓	✓	✓
	1830	✓	✓	✓	✓
1980	✓	✓	✓	✓	

PERFORMANCE DATA

EFFECTIVE AREA TABLE

Table 2. Effective Area Table

Effective Area [mm ²]		H (Height) [mm]			
		1 Slot	2 Slot	3 Slot	4 Slot
		35	63	91	121
W (Width) [mm]	155	0.0012	0.0022	0.0032	0.0043
	310	0.0025	0.0045	0.0065	0.0086
	460	0.0037	0.0067	0.0096	0.0128
	615	0.0050	0.0089	0.0129	0.0171
	765	0.0062	0.0111	0.0160	0.0213
	915	0.0074	0.0133	0.0192	0.0255
	1070	0.0086	0.0155	0.0224	0.0298
	1220	0.0098	0.0177	0.0255	0.0340
	1375	0.0111	0.0199	0.0286	0.0383
	1525	0.0123	0.0221	0.0319	0.0424
	1675	0.0135	0.0243	0.0351	0.0466
	1830	0.0147	0.0265	0.0383	0.0509
1980	0.0159	0.0287	0.0414	0.0551	

SUPPLY AIR DATA

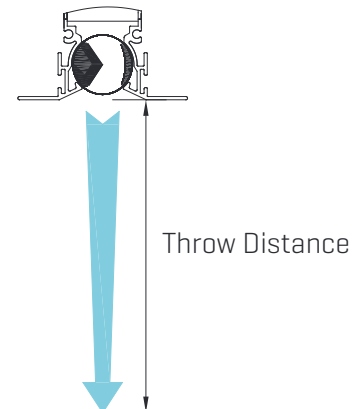
Table 3. Supply Air Data Table

Flow Rate [m³/h]		Effective Velocity [m/s]														
		0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	6.0	7.0	8.0	9.0	10.0
50	Effective Area [m²]	0.0278	0.0139	0.0093	0.0069	0.0056	0.0046	0.0040	0.0035							
	Pressure Drop [Pa]	<1	2	4	6	8	10	13	16							
	Throw Distance [m]	1	1	1	2	2	2	2	3							
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	<15	<15							
100	Effective Area [m²]	0.056	0.028	0.0185	0.0139	0.0111	0.0093	0.0079	0.0069	0.0062	0.0056	0.0046	0.0040	0.0035		
	Pressure Drop [Pa]	<1	2	4	7	9	12	16	19	23	27	36	46	56		
	Throw Distance [m]	1	1	1	2	2	2	3	3	3	3	4	4	5		
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	<15	17	19	22	24	28	31	34	
200	Effective Area [m²]		0.056	0.037	0.0278	0.0222	0.0185	0.0159	0.0139	0.0123	0.0111	0.0093	0.0079	0.0069	0.0062	0.0056
	Pressure Drop [Pa]		3	5	8	11	15	19	23	28	33	43	55	67	81	95
	Throw Distance [m]		1	2	2	2	3	3	3	3	4	4	5	5	6	6
	Sound Power Level [dB(A)]		<15	<15	<15	<15	18	22	24	27	29	33	36	39	42	44
300	Effective Area [m²]			0.0556	0.0417	0.0333	0.0278	0.0238	0.0208	0.0185	0.0167	0.0139	0.0119	0.0104	0.0093	0.0083
	Pressure Drop [Pa]			6	9	13	17	21	26	31	36	48	61	75	90	106
	Throw Distance [m]			2	2	2	3	3	3	4	4	4	5	5	6	6
	Sound Power Level [dB(A)]			<15	<15	18	21	25	27	30	32	36	39	42	45	47
400	Effective Area [m²]				0.0556	0.0444	0.0370	0.0317	0.0278	0.0247	0.0222	0.0185	0.0159	0.0139	0.0123	0.0111
	Pressure Drop [Pa]				10	14	18	23	28	33	39	52	66	81	97	114
	Throw Distance [m]				2	3	3	3	4	4	4	5	5	6	6	7
	Sound Power Level [dB(A)]				<15	20	23	27	30	32	34	38	41	44	47	49
500	Effective Area [m²]					0.0556	0.0463	0.0397	0.0347	0.0309	0.0278	0.0231	0.0198	0.0174	0.0154	0.0139
	Pressure Drop [Pa]					14	19	24	30	35	42	55	70	86	103	121
	Throw Distance [m]					3	3	3	4	4	4	5	5	6	6	7
	Sound Power Level [dB(A)]					21	25	28	31	34	36	40	43	46	48	50
600	Effective Area [m²]						0.0556	0.0476	0.0417	0.0370	0.0333	0.0278	0.0238	0.0208	0.0185	0.0167
	Pressure Drop [Pa]						20	25	31	37	44	58	73	90	108	127
	Throw Distance [m]						3	3	4	4	4	5	6	6	7	7
	Sound Power Level [dB(A)]						26	30	32	35	37	41	44	47	50	52
700	Effective Area [m²]							0.0556	0.0486	0.0432	0.0389	0.0324	0.0278	0.0243	0.0216	0.0194
	Pressure Drop [Pa]							26	32	39	46	60	77	94	113	133
	Throw Distance [m]							4	4	4	5	5	6	6	7	7
	Sound Power Level [dB(A)]							31	34	36	38	42	45	48	51	53
800	Effective Area [m²]								0.0556	0.0494	0.0444	0.0370	0.0317	0.0278	0.0247	0.0222
	Pressure Drop [Pa]								34	40	47	63	79	97	117	138
	Throw Distance [m]								4	4	5	5	6	6	7	7
	Sound Power Level [dB(A)]								35	37	39	43	46	49	52	54
900	Effective Area [m²]									0.0556	0.0500	0.0417	0.0357	0.0313	0.0278	0.0250
	Pressure Drop [Pa]									41	49	65	82	101	121	142
	Throw Distance [m]									4	5	5	6	6	7	8
	Sound Power Level [dB(A)]									38	40	44	47	50	52	55
1000	Effective Area [m²]										0.0556	0.0463	0.0397	0.0347	0.0309	0.0278
	Pressure Drop [Pa]										50	66	84	103	124	146
	Throw Distance [m]										5	5	6	7	7	8
	Sound Power Level [dB(A)]										41	45	48	51	53	55
1250	Effective Area [m²]												0.0496	0.0434	0.0386	
	Pressure Drop [Pa]												89	110	132	
	Throw Distance [m]												6	7	7	
	Sound Power Level [dB(A)]												50	52	55	
1500	Effective Area [m²]													0.0521	0.0463	
	Pressure Drop [Pa]													115	138	
	Throw Distance [m]													7	8	
	Sound Power Level [dB(A)]													54	56	

Quick Selection: Safe Choice Design Upper Limit High Pressure Drop

Note: Data is obtained with blades in a straight position. If the throw is adjusted horizontally, the pressure drop and sound power level data in the table have acceptable variability.

Throw distance: The vertical distance of the air in the comfort zone leaving the air distribution equipment at a speed of 0.25 m/s.



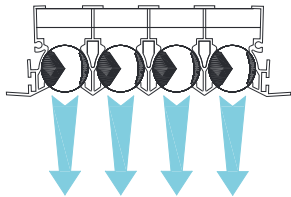
THROW DISTANCE CORRECTION TABLE

Table 4. Throw Distance Correction Chart

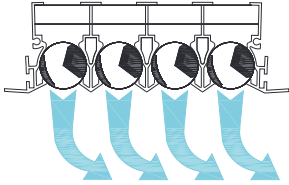
Heating Mode (ΔT)	4	6	8	10	12
Throw Distance Multiplier	1.07	1.02	1	0.90	0.83
Cooling Mode (ΔT)	4	6	8	10	12
Throw Distance Multiplier	1.31	1.36	1.42	1.48	1.54

AIR FLOW DIRECTION

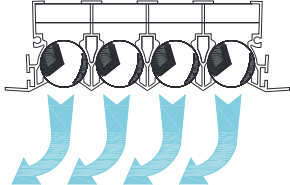
Convenient blade positions for supply and return air.



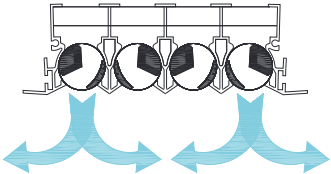
Blades in Straight Position



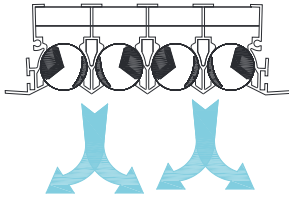
Blades in Right Position



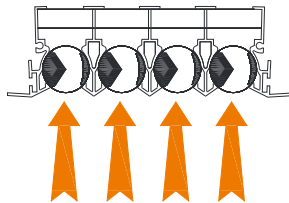
Blades in Left Position



Multi-Directional Distributor 45°



Multi-Directional Distributor 30°



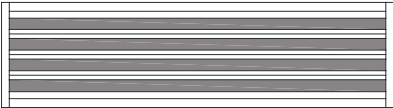
Return Air

Note: OLY - Slot Diffuser With Plastic Blades (Slim Type) is suitable for use in variable flow rate systems and the air throw directing characteristic remains constant between 100% and 25% flow rate.

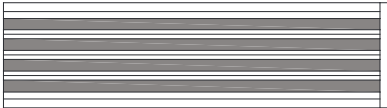
SIDE CAP OPTIONS

If specified in the order, the slot diffuser can be produced in the following ways, with a single cap or without caps. If the caps option is not specified in the order, standard capped production is made.

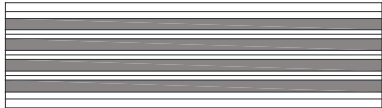
STANDARD CAPS



SINGLE CAPS

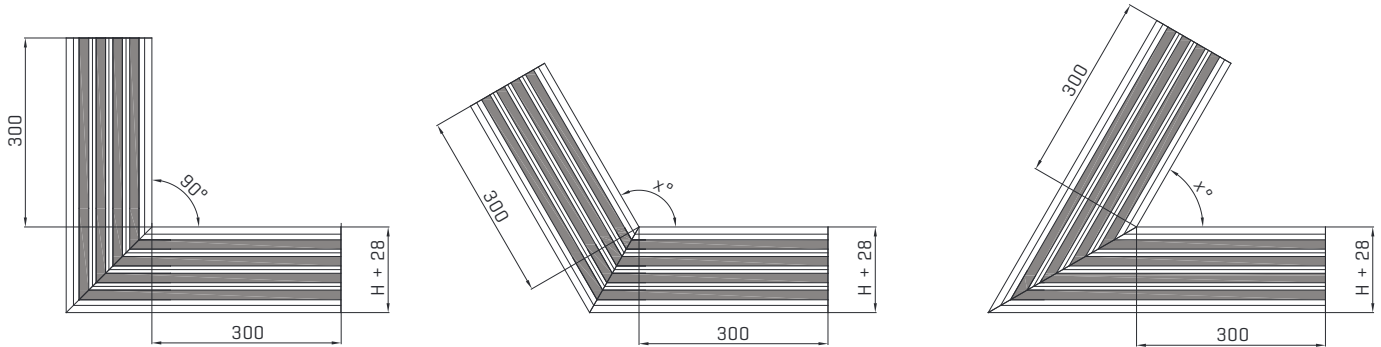


WITHOUT CAPS



CORNER JOINING

In order to ensure the continuity of OLY installation on wall-to-wall applications, a stylish appearance is provided by the corner joining system that allows different angles of transitions.

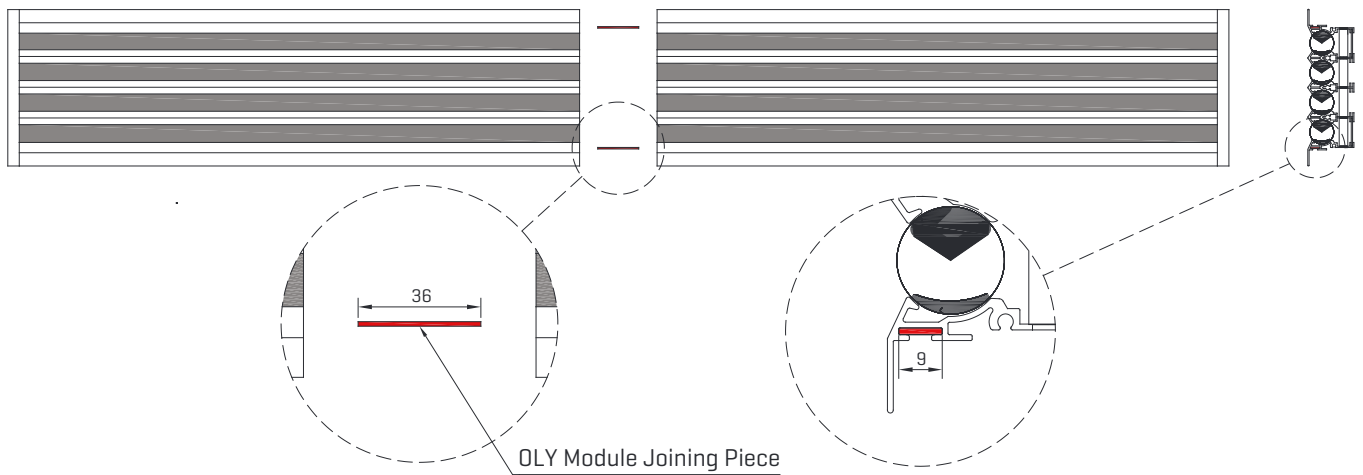


Standard corner joint length is 300 mm.

x: Corner piece angle. The standard corner joint is right angle [90°]. The desired angle dimensions must be specified in the order. Corner piece angle is minimum 45°.

MODULE ASSEMBLY

When the slot length [W] given in orders for OLY - Slot Diffuser With Plastic Blades (Slim Type) is over 2000 mm, the slot profiles are assembled with the module joining piece. In this way, the slot diffuser is seen in one piece as well as preserving its strength.

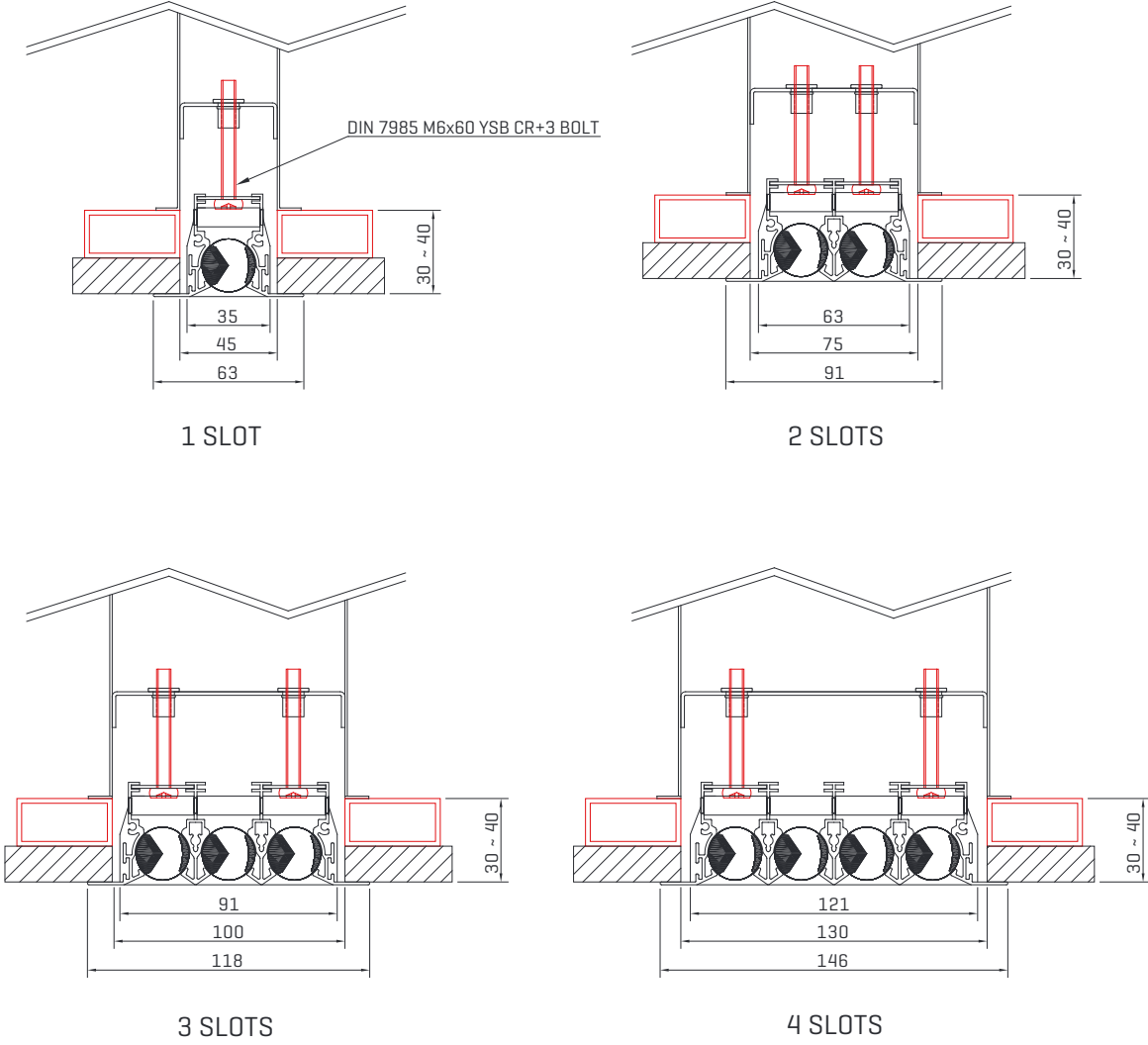


Number of Modules = Round Up [Order Size / 2300]

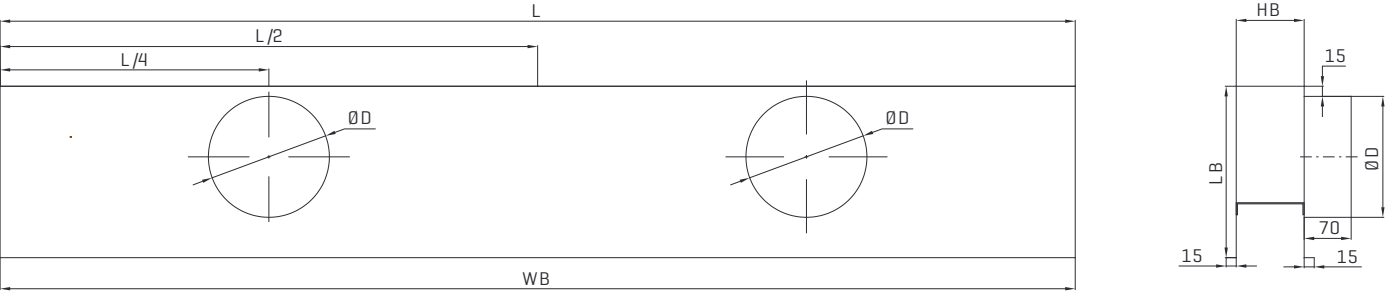
ASSEMBLY

MOUNTING BRACKET

Bracket assembly is made as standard. For each slot module, there are 2 mounting plates on OLY and 2 mounting plates [bracket] on the box. Bolt is screwed into the mounting plate on OLY, a nut is screwed into the mounting plate and the assembly is completed by screwing the bolt with a fillister head screw driver.



BOX DIMENSIONS



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

Table 3. Box Size Table

Number of Slots	Box Size Table									
	Property	Slot Length [mm]								
	400	600	800	1000	1200	1400	1600	1800	2000	
1	Box Neck (ØD) [mm]	Ø100 - 1 Piece	Ø100 - 1 Piece	Ø100 - 1 Piece	Ø100 - 1 Piece	Ø150 - 1 Piece	Ø150 - 1 Piece	Ø150 - 2 Pieces	Ø150 - 2 Pieces	Ø200 - 2 Pieces
	Box Height (LB) [mm]	175	175	175	175	225	225	225	225	275
	Box 1st Size (WB) [mm]	45	45	45	45	45	45	45	45	45
	Box 2nd Size (HB) [mm]	410	610	810	1010	1210	1410	1610	1810	2010
2	Box Neck (ØD) [mm]	Ø100 - 1 Piece	Ø100 - 1 Piece	Ø150 - 1 Piece	Ø150 - 1 Piece	Ø150 - 1 Piece	Ø200 - 1 Piece	Ø200 - 2 Pieces	Ø200 - 2 Pieces	Ø200 - 2 Pieces
	Box Height (LB) [mm]	175	175	175	225	225	225	225	275	275
	Box 1st Size (WB) [mm]	75	75	75	75	75	75	75	75	75
	Box 2nd Size (HB) [mm]	410	610	810	1010	1210	1410	1610	1810	2010
3	Box Neck (ØD) [mm]	Ø100 - 1 Piece	Ø100 - 1 Piece	Ø150 - 1 Piece	Ø150 - 1 Piece	Ø200 - 1 Piece	Ø200 - 1 Piece	Ø200 - 2 Pieces	Ø250 - 2 Pieces	Ø250 - 2 Pieces
	Box Height (LB) [mm]	175	175	225	225	225	225	275	275	275
	Box 1st Size (WB) [mm]	100	100	100	100	100	100	100	100	100
	Box 2nd Size (HB) [mm]	410	610	810	1010	1210	1410	1610	1810	2010
4	Box Neck (ØD) [mm]	Ø100 - 1 Piece	Ø150 - 1 Piece	Ø150 - 1 Piece	Ø200 - 1 Piece	Ø200 - 1 Piece	Ø200 - 1 Piece	Ø250 - 2 Pieces	Ø250 - 2 Pieces	Ø250 - 2 Pieces
	Box Height (LB) [mm]	175	175	225	225	225	225	275	275	275
	Box 1st Size (WB) [mm]	130	130	130	130	130	130	130	130	130
	Box 2nd Size (HB) [mm]	410	610	810	1010	1210	1410	1610	1810	2010

PRODUCT SELECTION

Example: The air flow distributed in the space is determined as 400 m³ / h and the temperature difference is -8K. 4 meter slot diffuser will be used in supply application. Make your product selection.

Solution: From the supply data table (Table 3), the effective areas corresponding to the appropriate pressure drop and flow rate values are selected. The method to be used for the desired lengths of performance data is made by calculating the number of modules. The result is reached by correcting the data found for 1 module.

Number of modules for 4 meters of slot diffuser: Round up (4000/2300)=2 modules.

1 module length=4000/2 (Module)=2000 mm (Length to be used in calculation)

Required flow rate for 1 module=400/2 (Module)=200 m³/h (Flow Rate Used in Calculation)

From the effective area table (Table 2), the effective areas of the 2000 mm wide slot diffusers are selected according to the number of slots. Accordingly, the effective area values are approximately 0.0161 m² (1 slot), 0.0290 m² (2 slot), 0.0419 m² (3 slot) and 0.0557 m² (4 slot) according to the number of slots.

Using the effective area values obtained from the supply data table (Table 3) and the required flow rate for 1 module, the appropriate effective area value is determined. Performance data:

1 slot:

Pressure Drop: 18.4 Pa
 Throw Distance: 3 m
 Sound Power Level: 21 dB(A)

3 slots:

Pressure Drop: 4.21 Pa
 Throw Distance: 1.5 m
 Sound Power Level: <15 dB(A)

2 slots:

Pressure Drop: 7.42 Pa
 Throw Distance: 1.9 m
 Sound Power Level: <15 dB(A)

4 slots:

Pressure Drop: 2.71 Pa
 Throw Distance: 1.2 m
 Sound Power Level: <15 dB(A)

Throw Distance Correction Chart

In the 2-module slot diffuser selection, the throw distance was found to be 1.9 m. For cooling mode -8 K, refer to the Throw Distance Correction Chart (Table 4). The multiplier value is 1.42.

Corrected throw distance=1.9 m x 1.42=2.7 m

PRODUCT ORDER CODE

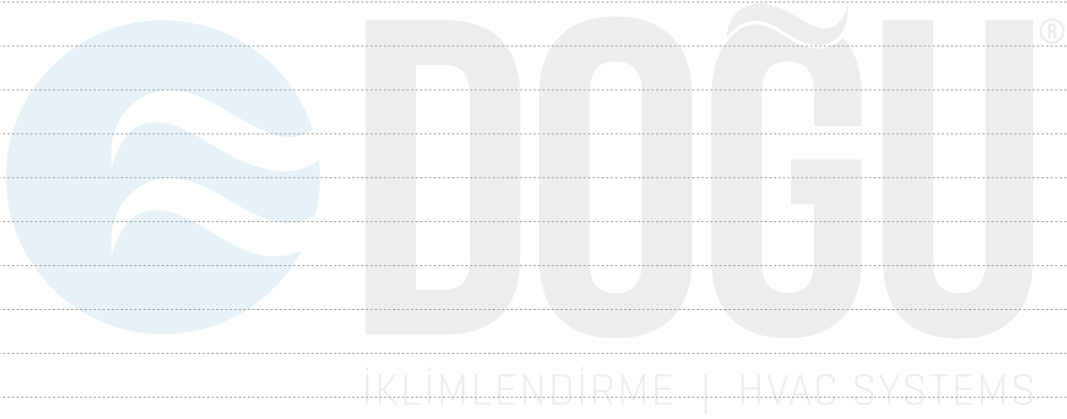
You can place your orders according to the following coding format.

OLY .ALM.KP. < A > . < B > . < C >

A	Slot Width [W] [mm]	
	0000	You can look at the standard sizes.
B	Vertical Size [H] [mm] & Number of Slots	
	035-01	35 mm - 1 Slot
	063-02	63 mm - 2 Slots
	091-03	91 mm - 3 Slots
	121-04	121 mm - 4 Slots
C	Paint	
	00	Unpainted
	S1	Standard Painted - RAL 9010
	S2	Standard Painted - RAL 9016
	XX	Special Painted
	EK	Matt Anodized Coating

Sample Coding; OLY.ALM.KP.01000.091-03.S1

NOTES





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140 different types of products.



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FOUR
SEASONS®

 **DOĞU**
İKLİMLENDİRME | HVAC SYSTEMS





B-FRESH
Air Purifier

FOUR SEASONS[®]
is a registered trademark of
Doğu İklimlendirme A.Ş.

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 4 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 2 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 4 sales offices located in İstanbul, Ankara, Antalya and Adana 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 TSEK, CE and GOST-R quality certifications.



B-FRESH (AC FAN)

- Maximum performance in one unit with 2000 m³/h air flow.
- With its special interior insulation and silencer, the sound levels are within comfort conditions even at maximum flow rate. The sound pressure at the lowest speed is only 35.9 dB.
- It destroys viruses, bacteria and molds with a D99 dose of Ozone free UVC lamp.
- Its specially designed diffuser mixes the filtered air with the ambient air quickly and effectively.
- It can be easily used in areas up to 400 m² such as lobby, meeting room, office, gym, classroom, kindergarten, market, mosque, public building, hairdresser's.
- It has the opportunity to operate at the desired flow rate thanks to its 5-stage speed switch.



B-FRESH (EC FAN)

- € 4 different models between 550-2000 m³/h.
- € 33.9 dB sound level at minimum speed thanks to 30 mm rock wool insulation.
- € High efficiency low noise EC fans.
- € It can be used in areas up to 270 m² such as lobby, meeting room, office, gym, classroom, nursery, market, mosque, public building, hairdresser's.
- € Adjustable 5 level fan speed.
- € Optional D99 dose ozone-free UV-C lamp.



B-FRESH (AC FAN) TECHNICAL SPECIFICATIONS

	B-FRESH 20-AC
Flow Rate Range (Min-Max)	800-2000 m ³ /h
Filters	ISO ePM1 [F7] Filter + UV Lamp + H13 Hepa Filter
Min-Max Fan Power	195-515 W
Operating Voltage	230V~1 50 Hz
Sound Level in Min-Max Operation (from 1 meter away)	35,9 dB[A]-54,8 dB[A] (from 1 m away)
Sizes (LxWxH)	775 mm x 735 mm x 1680 mm
Unit's Weight	105 kg
Recommended Use	160 m ² -400 m ²
UV-C Lamp Life	10.800 hours
Control	Plug & Play

B-FRESH (EC FAN) TECHNICAL SPECIFICATIONS

	B-FRESH 05-EC	B-FRESH 08-EC	B-FRESH 12-EC	B-FRESH 20-EC
Flow Rate Range (Min-Max)	110-550 m ³ /h	160-800 m ³ /h	240-1200 m ³ /h	400-2000 m ³ /h
Filters	ISO ePM1 [F7] Filter + H14 Hepa Filter	ISO ePM1 [F7] Filter + H14 Hepa Filter	ISO ePM1 [F7] Filter + H14 Hepa Filter	ISO ePM1 [F7] Filter + H14 Hepa Filter
Min-Max Fan Power	25-142 W	38-220 W	45-275 W	68-430 W
Operating Voltage	230V~1 50 Hz	230V~1 50 Hz	230V~1 50 Hz	230V~1 50 Hz
Sound Level in Min-Max Operation (from 1 meter away)	34,1 dB[A]-51,4 dB[A]	33,9 dB[A]-52 dB[A]	34,2 dB[A]-51,9 dB[A]	34,9 dB[A]-51,9 dB[A]
Sizes (LxWxH)	480mm x 577 mm x 1114 mm	550mm x 657 mm x 1249 mm	650mm x 657 mm x 1249 mm	780mm x 657mm x 1449 mm
Unit's Weight	55 kg	60 kg	70 kg	75 kg
Recommended Use	15 m ² -80 m ²	21 m ² -120 m ²	32 m ² -200 m ²	55 m ² -270 m ²
Control	Plug & Play	Plug & Play	Plug & Play	Plug & Play

OPERATION

A. FILTRATION WITH HEPA FILTER

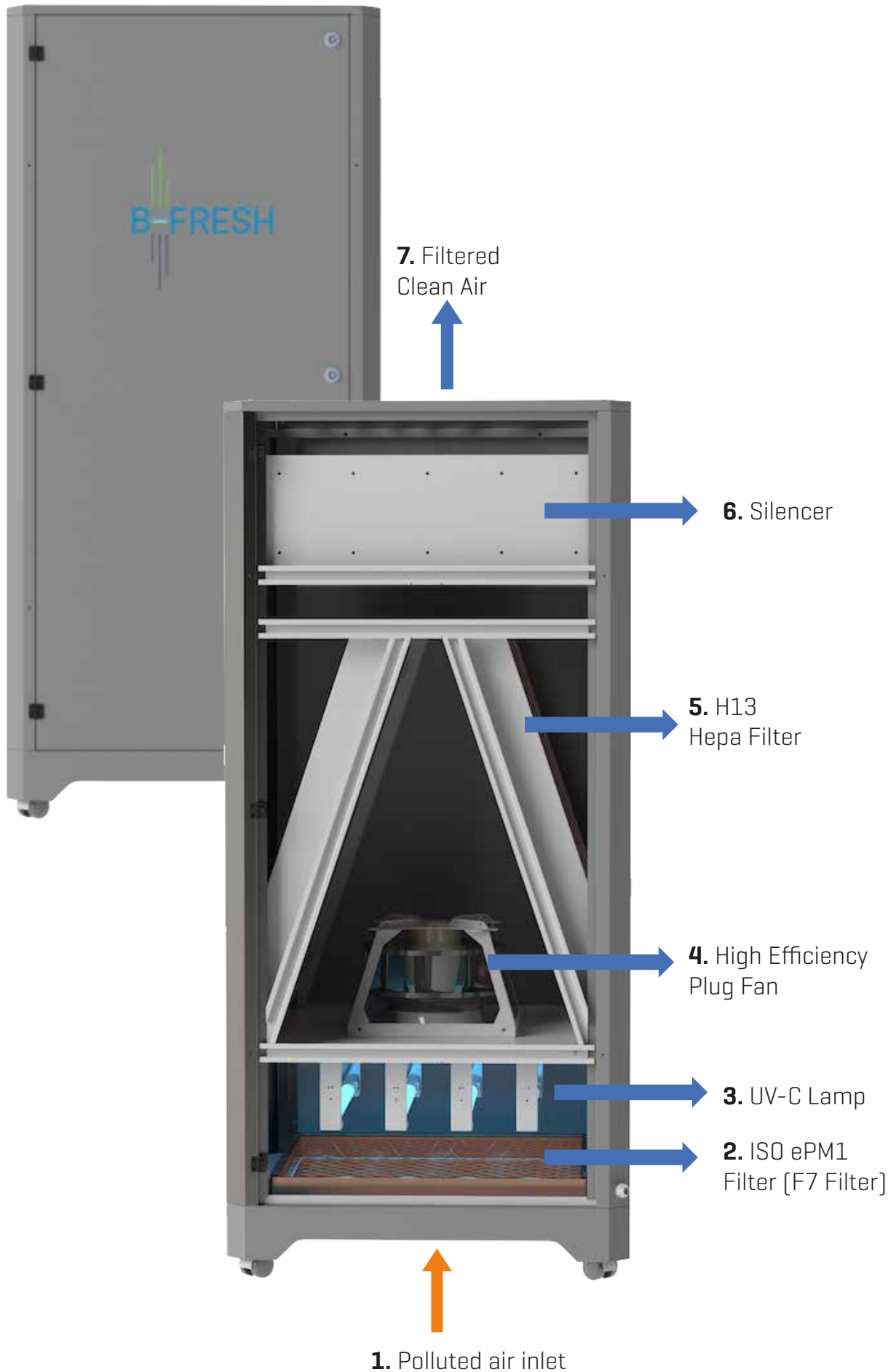
In the air, there are pollutants such as industrial wastes, bacteria, spores - molds, respirable particles, pollen, various smoke-gases and viruses that cause a worldwide pandemic. The COVID-19 pandemic has made air filtration more important than ever. These particles, 1 m and smaller in size, are among the pollutants that pose a higher risk to human health. Viruses range in size from 0.02 to 0.4 microns, Coronavirus in the range of 0.08 to 0.16 microns.

HEPA [High Efficiency Particulate Arresting] filters are capable of holding particles up to 0.10 microns up to 85% to 99.995 depending on efficiency types. In this way, the use of HEPA filters is one of the most effective methods in combating coronavirus in indoor ventilation systems. In the filtration system using a HEPA filter, a H13 class filter passes 50 of every 100 thousand particles through the system. ISO ePM1 Filter [F7 Filter] in accordance with EN 16890 standard is used to prevent the HEPA filters from getting dirty quickly. In this way, operating costs have been reduced.

B. DISINFECTION WITH UV-C LAMP

In the "Air Purifying Unit" produced by DOĞU HVAC, UV-C lamps with a wavelength of 254 nm that do not produce ozone are used. In this way, viruses, bacteria, mold and fungi in the air sucked from the space are destroyed.

B-FRESH (AC FAN)



1. Polluted Air Inlet

It is the section where the unit intake the polluted air from the room.

2. ISO ePM1 FILTER (F7 FILTER)

It provides filtration before UV-C lamp and H13 filter by keeping particles of 0.3-1 micron in the air. Filter life it lasts about 6 months, depending on usage. It is recommended to be changed every 6 months for a cleaner place.

3. UV-C LAMP

Thanks to the UV-C lamp used in the unit, microorganisms in the air are inactivated at a rate of 0.99 (log 2). Its lifespan is 10,800 hours. It should be replaced at the end of this period for effective use. If used 12 hours a day, the lamps work efficiently for about 3 years.

4. HIGH EFFICIENCY AC PLUG FAN

Thanks to the silent and 5-stage controllable fans, you can filtration with the most suitable air flow rate for your needs.

5. H13 HEPA FILTER

Thanks to the H13 class leakproof hepa filter, harmful organisms in the air (0.1-0.3 μm size, which the F7 filter cannot hold) are cleaned by 99.95%. Filter life is 1 year. Its annual replacement is essential for a particle-free space.

6. SILENCER

Thanks to the silencer positioned close to the supply side inside the unit, the unit operates at a low noise level even at 100% fan speed.

7. FILTERED CLEAN AIR SUPPLY

Thanks to the highly effective swirl diffuser in the supply section of the unit, the effective area of the fresh air is increased.

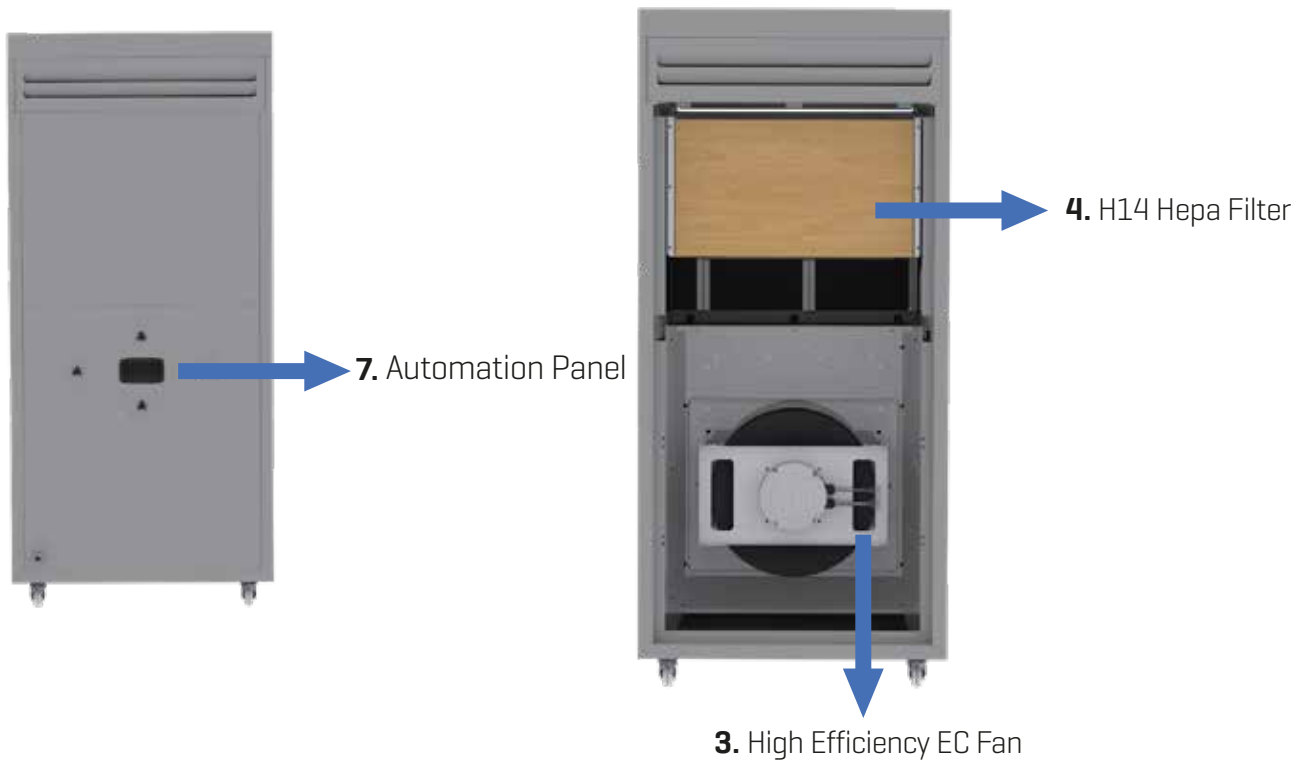
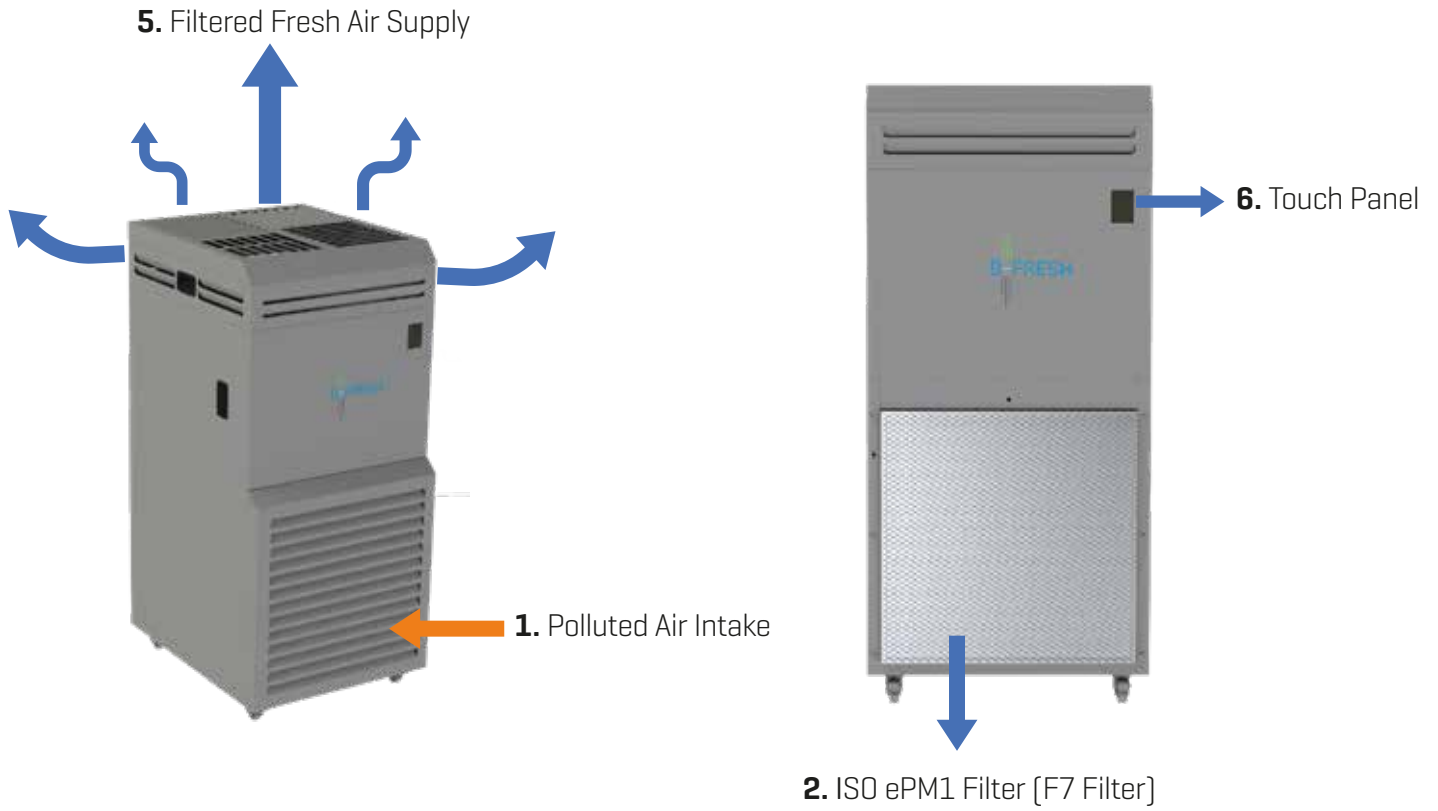
8. FAN SPEED CONTROL

The unit, which has a user-friendly simple control system, performs the ON/OFF function after the unit is plugged in with the fan speed switch on it, and the fan speed can be controlled in order to obtain the air flow rate required by the space.

9. UV-C LAMP ON-OFF

Depending on the need, the UV-C lamp can be activated with the On / Off button, but when the fan is off, the UV-C lamp must also be off. Thanks to the door switch on the service door of the unit, the power of the unit is cut off when the intervention door is opened. By this means users are prevented from contact with UV-C. Thanks to its 230V energy supply, the unit is suitable for plug-and-play use. Thanks to the movable wheels under the device, it can be positioned anywhere.

B-FRESH (EC FAN)



1. Polluted Air Intake

It is the section where the unit intake the polluted air from the room.

2. ISO ePM1 FILTER (F7 FILTER)

It provides filtration before UV-C lamp and H13 filter by keeping particles of 0.3-1 micron in the air. Filter life it lasts about 6 months, depending on usage. It is recommended to be changed every 6 months for a cleaner place.

3. HIGH EFFICIENCY EC PLUG FAN

Thanks to the silent and 5-stage controllable fans, you can filtration with the most suitable air flow rate for your needs.

4. H14 HEPA FILTER

Thanks to the H14 class leakproof hepa filter, harmful organisms in the air (0.1-0.3 μm size, which the F7 filter cannot hold) are cleaned by 99.95%. Filter life is 1 year. Its annual replacement is essential for a particle-free space.

5. FILTERED CLEAN AIR SUPPLY

It is the section where the unit supply the filtered air into the space.

6. AUTOMATION PANEL AND TOUCH PANEL

The unit, which has a user-friendly control system, can be controlled fully automatically thanks to the panel on it.

- 5 stage fan speed control
- Filter contamination alarm
- Ability to read flow rate, temperature and humidity from the touch screen
- Entering the desired flow rate value from the screen with the fixed flow feature
- CO2 control
- Weekly programming

B-FRESH, REFRESHING THE AIR OF EVERY ENVIRONMENT

B-FRESH Air Purifier, thanks to its HEPA filters, can be used in interior spaces such as lobby, meeting room, office, gym, classroom, nursery, market, mosque, public building, hairdresser's and it cleans harmful particles and organisms such as bacteria, viruses, pollen, spores and molds up to 99.99% and maximizes air quality. Thanks to its special internal insulation and its silencer, it works silently even at the highest fan speed. With the UV-C Lamp which is ozone-free, it destroys viruses, bacteria and molds and it provides hygiene and disinfection in spaces.



USAGE AREAS

- House
- Malls
- Markets
- Schools and classrooms
- Offices
- Kindergartens
- Bereaved care homes
- Public buildings
- Mosques
- Waiting rooms
- Gym
- Hotel rooms
- Meeting halls
- Examination rooms
- Hairdressers
- Beauty salons
- Restaurants and cafes
- Hospitals and pharmacies



OFFICE

B-FRESH positively affects the health and performance of your teammates by increasing the indoor air quality in office buildings that do not have windows due to their structure. B-FRESH positively affects the health and performance of your teammates by increasing the indoor air quality in office buildings that do not have windows due to their structure.



SCHOOL

B-FRESH improves the air quality by keeping the pollutants formed in the classroom environment. While it ensures the health of the teachers and students who breathe easily, it also eliminates the focusing problems caused by the polluted air.



RESTAURANT

B-FRESH effectively reduces the number of aerosols in the air and the residence time and density of suspended matter clouds in restaurants. This greatly reduces the risk of infection for guests and staff.



HOUSE

B-FRESH cleans the indoor air so that the air we breathe, which is important not only for asthma patients or those with respiratory diseases, but also for everyone, is beneficial not harmful to us.



HOTEL

In addition to the air quality of the region we choose, the clean air quality should be good in the indoor environments where we will spend time. B-FRESH offers a comfortable and healthy holiday experience to the guests by cleaning the indoor air of the hotels.



CONSULTING ROOM

B-FRESH, located in the waiting rooms of the consulting room, cleans the pollutants in the air that negatively affect the health of the patients, and allows you and your patients to breathe comfortably.









NOTES





**We make the difference with
140 different types of products.**



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İKLİMLENDİRME | HVAC SYSTEMS



DMY, DYM, DMZ, DZM
Circular Duct Grilles



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DMY – SINGLE ROW BLADE CIRCULAR DUCT GRILLE (ALUMINUM)

- ☞ DMY – Single Row Blade Circular Duct Grille is used in circular air ducts and has adjustable blades arranged in a single row.

It is a grille used in blowing or suction lines.



MATERIAL

- ☞ Casing and blades made of aluminum 6063 extruded profile

SURFACE COATING

- ☞ RAL 9010 or RAL 9016 electrostatic powder paint as standard.
- ☞ Optional
 - Different RAL color codes
 - Unpainted manufacturing

MOUNTING TYPES

- ☞ Screw mounting type as standard.

ACCESSORIES

- ☞ Optional,
 - ZKD – Opposed Blade Air Adjustment Damper.

STANDARD DIMENSIONS

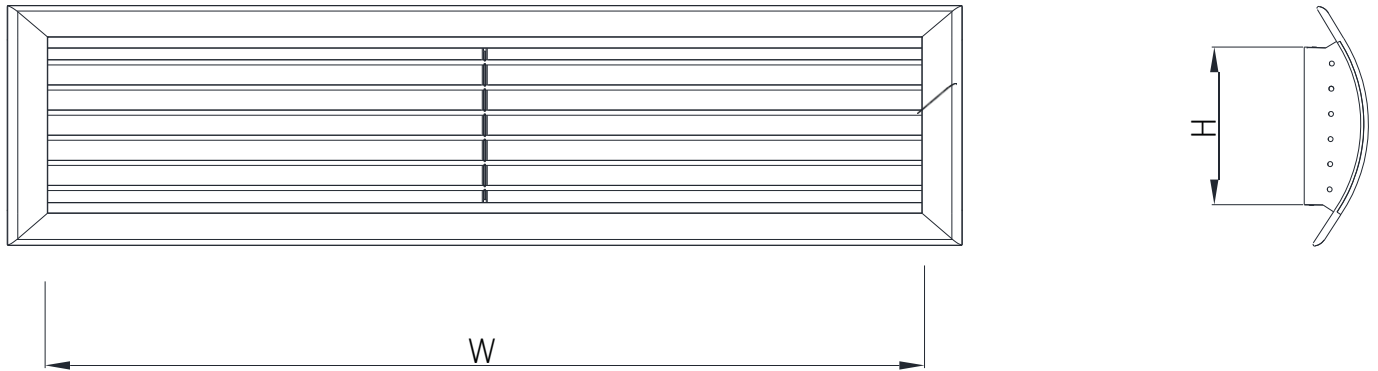


Table 1. Standard Dimensions Table.

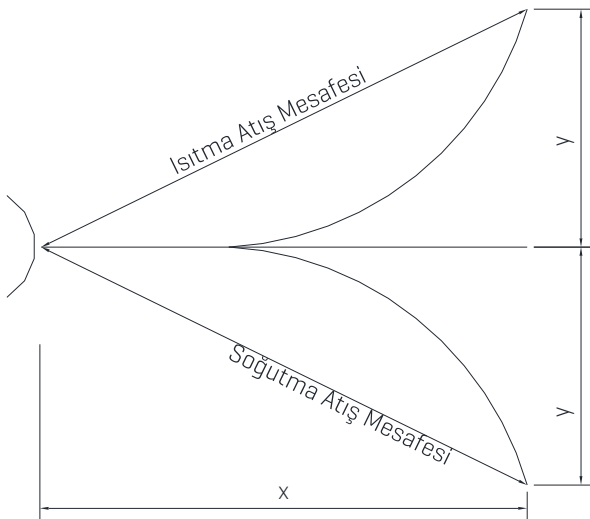
Standard Dimensions		H Height (mm) [Must be Less than Duct Radius]															
		50	75	100	125	150	175	200	250	300	325	350	400	450	500	525	600
W Width (mm)	100	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	125	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	150	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	200	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	225	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	250	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	300	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	325	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	350	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	400	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	425	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	450	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	500	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	525	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	600	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		625	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		825	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		1800	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1025	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	1250	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

PERFORANCE DATA

Table 2. Effective Area Table

Effective Area [m ²]	H Height (mm)																
	50	75	100	125	150	175	200	250	300	325	350	400	450	500	525	600	
W Width (mm)	100	0,003	0,005	0,007	0,008	0,010	0,012	0,013	0,017	0,020	0,022	0,023	0,027	0,030	0,033	0,035	0,040
	125	0,004	0,006	0,008	0,010	0,012	0,015	0,017	0,021	0,025	0,027	0,029	0,033	0,037	0,042	0,044	0,050
	150	0,005	0,007	0,010	0,012	0,015	0,017	0,020	0,025	0,030	0,032	0,035	0,040	0,045	0,050	0,052	0,060
	200	0,007	0,010	0,013	0,017	0,020	0,023	0,027	0,033	0,040	0,043	0,047	0,053	0,060	0,067	0,070	0,080
	225	0,007	0,011	0,015	0,019	0,022	0,026	0,030	0,037	0,045	0,049	0,052	0,060	0,067	0,075	0,079	0,090
	250	0,008	0,012	0,017	0,021	0,025	0,029	0,033	0,042	0,050	0,054	0,058	0,067	0,075	0,083	0,087	0,100
	300	0,010	0,015	0,020	0,025	0,030	0,035	0,040	0,050	0,060	0,065	0,070	0,080	0,090	0,100	0,105	0,120
	325	0,011	0,016	0,022	0,027	0,032	0,038	0,043	0,054	0,065	0,070	0,076	0,087	0,097	0,108	0,114	0,130
	350	0,012	0,017	0,023	0,029	0,035	0,041	0,047	0,058	0,070	0,076	0,082	0,093	0,105	0,116	0,122	0,140
	400	0,013	0,020	0,027	0,033	0,040	0,047	0,053	0,067	0,080	0,087	0,093	0,106	0,120	0,133	0,140	0,160
	425	0,014	0,021	0,028	0,035	0,042	0,049	0,057	0,071	0,085	0,092	0,099	0,113	0,127	0,141	0,148	0,170
	450	0,015	0,022	0,030	0,037	0,045	0,052	0,060	0,075	0,090	0,097	0,105	0,120	0,135	0,150	0,157	0,180
	500	0,017	0,025	0,033	0,042	0,050	0,058	0,067	0,083	0,100	0,108	0,116	0,133	0,150	0,166	0,175	0,200
	525	0,017	0,026	0,035	0,044	0,052	0,061	0,070	0,087	0,105	0,114	0,122	0,140	0,157	0,175	0,183	0,210
	600	0,020	0,030	0,040	0,050	0,060	0,070	0,080	0,100	0,120	0,130	0,140	0,160	0,180	0,200	0,210	0,240
	625	0,021	0,031	0,042	0,052	0,062	0,073	0,083	0,104	0,125	0,135	0,146	0,166	0,187	0,208	0,218	0,250
825	0,027	0,041	0,055	0,069	0,082	0,096	0,110	0,137	0,165	0,178	0,192	0,220	0,247	0,275	0,288	0,329	
1025	0,034	0,051	0,068	0,085	0,102	0,119	0,136	0,171	0,205	0,222	0,239	0,273	0,307	0,341	0,358	0,409	
1250	0,042	0,062	0,083	0,104	0,125	0,146	0,166	0,208	0,250	0,270	0,291	0,333	0,374	0,416	0,437	0,499	

BLOWING DATA



Note:

- ☞ Throw Distance: The distance where the air in the comfort zone reaches a speed of 0.25 m/s with the air distribution equipment.
- ☞ The data are obtained when the duct flow velocity 3 m/s and the room air temperature difference with the air distribution equipment is $T = 8K$.

Table 3. Blow Data Table

Flow Rate [m ³ / h]		Effective Velocity [m / s]									
		0,5	1,0	1,5	2,0	2,5	3,0	3,5	4,0	4,5	5,0
50	Effective Area [m ²]	0,0278	0,0139	0,009	0,007	0,006	0,005	0,0040	0,0035		
	Pressure Drop [Pa]	<1	3	8	14	22	32	45	59		
	Throw Distance [m]	1	2	2	3	3	3	4	4		
	Sound Pressure Level [dB(A)]	<15	<15	<15	<15	16	21	25	29		
100	Effective Area [m ²]	0,0556	0,0278	0,019	0,014	0,011	0,009	0,008	0,007	0,006	0,006
	Pressure Drop [Pa]	<1	3	8	14	22	33	45	59	76	94
	Throw Distance [m]	1	2	2	3	3	4	4	4	4	5
	Sound Pressure Level [dB(A)]	<15	<15	<15	<15	19	24	28	32	35	38
200	Effective Area [m ²]	0,111	0,056	0,037	0,028	0,022	0,019	0,016	0,014	0,012	0,011
	Pressure Drop [Pa]	<1	3	8	14	22	33	45	60	76	95
	Throw Distance [m]	1	2	2	3	3	4	4	4	5	5
	Sound Pressure Level [dB(A)]	<15	<15	<15	16	22	27	31	35	38	41
300	Effective Area [m ²]	0,167	0,083	0,056	0,042	0,033	0,028	0,024	0,021	0,019	0,017
	Pressure Drop [Pa]	<1	3	8	14	23	33	45	60	76	95
	Throw Distance [m]	1	2	3	3	3	4	4	4	5	5
	Sound Pressure Level [dB(A)]	<15	<15	<15	18	24	29	33	37	40	43
400	Effective Area [m ²]	0,222	0,111	0,074	0,056	0,044	0,037	0,032	0,028	0,025	0,022
	Pressure Drop [Pa]	<1	3	8	14	23	33	45	60	77	95
	Throw Distance [m]	1	2	3	3	3	4	4	4	5	5
	Sound Pressure Level [dB(A)]	<15	<15	<15	19	25	30	34	38	41	44
500	Effective Area [m ²]	0,278	0,139	0,093	0,069	0,056	0,046	0,040	0,035	0,031	0,028
	Pressure Drop [Pa]	<1	3	8	14	23	33	46	60	77	95
	Throw Distance [m]	2	2	3	3	3	4	4	4	5	5
	Sound Pressure Level [dB(A)]	<15	<15	<15	20	26	31	35	39	42	45
600	Effective Area [m ²]	0,333	0,167	0,111	0,083	0,067	0,056	0,048	0,042	0,037	0,0333
	Pressure Drop [Pa]	<1	3	8	14	23	33	46	60	77	96
	Throw Distance [m]	2	2	3	3	3	4	4	4	5	5
	Sound Pressure Level [dB(A)]	<15	<15	<15	21	27	32	36	40	43	46
700	Effective Area [m ²]	0,389	0,194	0,130	0,097	0,078	0,065	0,056	0,049	0,043	0,0389
	Pressure Drop [Pa]	<1	3	8	14	23	33	46	60	77	96
	Throw Distance [m]	2	2	3	3	3	4	4	5	5	5
	Sound Pressure Level [dB(A)]	<15	<15	<15	22	28	33	37	40	44	46
800	Effective Area [m ²]	0,444	0,222	0,148	0,111	0,089	0,074	0,064	0,056	0,049	0,0444
	Pressure Drop [Pa]	<1	3	8	14	23	33	46	60	77	96
	Throw Distance [m]	2	2	3	3	3	4	4	4	5	5
	Sound Pressure Level [dB(A)]	<15	<15	<15	22	28	33	37	41	44	47
900	Effective Area [m ²]		0,250	0,167	0,125	0,100	0,083	0,071	0,063	0,056	0,0500
	Pressure Drop [Pa]		3	8	14	23	33	46	60	77	96
	Throw Distance [m]		2	3	3	3	4	4	5	5	5,1
	Sound Pressure Level [dB(A)]		<15	15	23	29	34	38	41	45	47
1000	Effective Area [m ²]		0,278	0,185	0,139	0,111	0,093	0,079	0,069	0,062	0,0556
	Pressure Drop [Pa]		3	8	14	23	33	46	60	77	96
	Throw Distance [m]		2	3	3	3	4	4	5	5	5,1
	Sound Pressure Level [dB(A)]		<15	16	23	29	34	38	42	45	48
1250	Effective Area [m ²]		0,347	0,232	0,174	0,139	0,116	0,099	0,087	0,077	0,0694
	Pressure Drop [Pa]		3	8	14	23	33	46	61	77	96
	Throw Distance [m]		2	3	3	4	4	4	5	5	5,1
	Sound Pressure Level [dB(A)]		<15	17	24	30	35	39	43	46	48
1500	Effective Area [m ²]		0,417	0,278	0,208	0,167	0,139	0,119	0,104	0,0926	0,0833
	Pressure Drop [Pa]		3	8	14	23	33	46	61	77	96
	Throw Distance [m]		2	3	3	4	4	4	5	4,9	5,1
	Sound Pressure Level [dB(A)]		<15	17	25	31	36	40	44	47	50
1750	Effective Area [m ²]		0,486	0,324	0,243	0,194	0,162	0,139	0,122	0,1080	0,0972
	Pressure Drop [Pa]		3	8	14	23	33	46	61	78	97
	Throw Distance [m]		2	3	3	4	4	4	5	5	5
	Sound Pressure Level [dB(A)]		<15	18	26	32	37	41	44	48	50

SUCTION DATA

Table 4. Suction Data Table

Flow Rate [m ³ /h]		Effective Velocity [m/s]									
		0,5	1,0	1,5	2,0	2,5	3,0	3,5	4,0	4,5	5,0
50	Effective Area [m ²]	0,0278	0,0139	0,0093	0,0069	0,006	0,005	0,004	0,003		
	Pressure Drop [Pa]	<1	3	6	12	19	27	38	50		
	Sound Pressure Level [dB(A)]	<15	<15	<15	<15	<15	19	23	27		
100	Effective Area [m ²]	0,0556	0,0278	0,019	0,014	0,011	0,009	0,008	0,007	0,006	0,006
	Pressure Drop [Pa]	<1	3	7	12	19	28	39	52	66	83
	Sound Pressure Level [dB(A)]	<15	<15	<15	<15	17	22	27	27	33	36
200	Effective Area [m ²]	0,111	0,056	0,037	0,028	0,022	0,019	0,016	0,014	0,012	0,011
	Pressure Drop [Pa]	<1	3	7	12	20	29	40	53	68	85
	Sound Pressure Level [dB(A)]	<15	<15	<15	<15	21	26	30	34	37	40
300	Effective Area [m ²]	0,167	0,083	0,056	0,042	0,033	0,028	0,024	0,021	0,019	0,017
	Pressure Drop [Pa]	<1	3	7	13	20	29	41	54	69	86
	Sound Pressure Level [dB(A)]	<15	<15	<15	17	23	28	32	35	39	42
400	Effective Area [m ²]	0,222	0,111	0,074	0,056	0,044	0,037	0,032	0,028	0,025	0,022
	Pressure Drop [Pa]	<1	3	7	13	20	30	41	55	70	87
	Sound Pressure Level [dB(A)]	<15	<15	<15	18	24	29	33	37	40	43
500	Effective Area [m ²]	0,278	0,139	0,093	0,069	0,056	0,046	0,040	0,035	0,031	0,028
	Pressure Drop [Pa]	<1	3	7	13	21	30	42	55	71	88
	Sound Pressure Level [dB(A)]	<15	<15	<15	19	25	30	34	38	41	44
600	Effective Area [m ²]	0,333	0,167	0,111	0,083	0,067	0,056	0,048	0,042	0,037	0,0333
	Pressure Drop [Pa]	<1	3	7	13	21	30	42	56	71	89
	Sound Pressure Level [dB(A)]	<15	<15	<15	20	26	31	35	39	42	45
700	Effective Area [m ²]	0,389	0,194	0,130	0,097	0,078	0,065	0,056	0,049	0,043	0,0389
	Pressure Drop [Pa]	<1	3	7	13	21	31	42	56	72	89
	Sound Pressure Level [dB(A)]	<15	<15	<15	21	27	32	36	40	43	46
800	Effective Area [m ²]	0,444	0,222	0,148	0,111	0,089	0,074	0,063	0,056	0,049	0,0444
	Pressure Drop [Pa]	<1	3	7	13	21	31	42	56	72	90
	Sound Pressure Level [dB(A)]	<15	<15	<15	21	27	32	37	40	43	46
900	Effective Area [m ²]		0,250	0,167	0,125	0,100	0,083	0,071	0,063	0,056	0,0500
	Pressure Drop [Pa]		3	7	13	21	31	43	56	72	90
	Sound Pressure Level [dB(A)]		<15	<15	22	28	33	37	41	44	47
1000	Effective Area [m ²]		0,278	0,185	0,139	0,111	0,093	0,079	0,069	0,062	0,0556
	Pressure Drop [Pa]		3	7	13	21	31	43	57	73	91
	Sound Pressure Level [dB(A)]		<15	<15	22	28	33	38	41	44	47
1250	Effective Area [m ²]		0,347	0,231	0,174	0,139	0,116	0,099	0,087	0,077	0,0694
	Pressure Drop [Pa]		3	7	13	21	31	43	57	73	91
	Sound Pressure Level [dB(A)]		<15	16	23	30	34	39	42	45	48
1500	Effective Area [m ²]		0,417	0,278	0,208	0,167	0,139	0,119	0,104	0,0926	0,0833
	Pressure Drop [Pa]		3	7	13	21	31	43	58	74	92
	Sound Pressure Level [dB(A)]		<15	16	24	30	35	40	43	46	49
1750	Effective Area [m ²]		0,486	0,324	0,243	0,194	0,162	0,139	0,122	0,1080	0,0972
	Pressure Drop [Pa]		3	7	14	22	32	44	58	74	93
	Sound Pressure Level [dB(A)]		<15	17	25	31	36	40	44	47	50
2000	Effective Area [m ²]			0,370	0,278	0,222	0,185	0,159	0,139	0,1235	0,1111
	Pressure Drop [Pa]			7	14	22	32	44	58	75	93
	Sound Pressure Level [dB(A)]			18	26	32	37	41	45	48	51

DUCT FLOW AND DAMPER CORRECTION TABLE

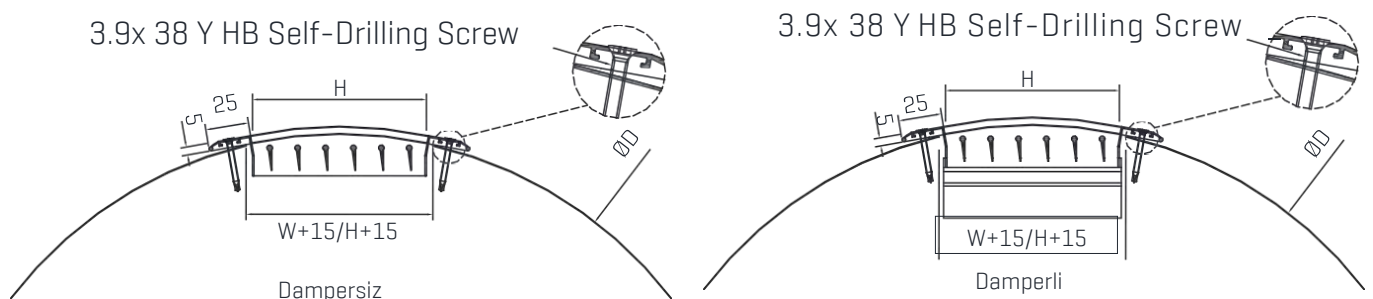
Table 5. Duct Flow and Damper Correction Table

Duct Velocity [m/s]		Amount to Add		Multiplier According to Damper Position							
				Full Open		25% Closed		50% Closed		75% Closed	
		Pressure Multiplier	Sound Multiplier	Pressure Multiplier	Sound Multiplier	Pressure Multiplier	Sound Multiplier	Pressure Multiplier	Sound Multiplier		
0,5	Pressure Drop [Pa]	-6									
	Sound Generation [dB(A)]	-6									
1	Pressure Drop [Pa]	-5									
	Sound Generation [dB(A)]	-5									
2	Pressure Drop [Pa]	-3									
	Sound Generation [dB(A)]	-2									
3	Pressure Drop [Pa]	0									
	Sound Generation [dB(A)]	0									
4	Pressure Drop [Pa]	4									
	Sound Generation [dB(A)]	2									
5	Pressure Drop [Pa]	10									
	Sound Generation [dB(A)]	4									
6	Pressure Drop [Pa]	17	1,09	1,05	1,86	1,21	2,76	1,46	3,67		
	Sound Generation [dB(A)]	6									
7	Pressure Drop [Pa]	25									
	Sound Generation [dB(A)]	9									
8	Pressure Drop [Pa]	35									
	Sound Generation [dB(A)]	11									
9	Pressure Drop [Pa]	46									
	Sound Generation [dB(A)]	13									
10	Pressure Drop [Pa]	60									
	Sound Generation [dB(A)]	15									
11	Pressure Drop [Pa]	75									
	Sound Generation [dB(A)]	18									
12	Pressure Drop [Pa]	92									
	Sound Generation [dB(A)]	20									

Note: As the air velocity in the duct increases and the damper position changes, the pressure loss and sound pressure level created by the grill increase. Accordingly, the blowing or suction data in the selected grille must first be multiplied by the damper coefficient if there is a damper. Then the correct result is achieved by adding sound production and pressure loss values according to the channel speed.

DUCT FLOW AND DAMPER CORRECTION TABLE

1. SCREWED SYSTEM



OPPOSITE BLADE DAMPER

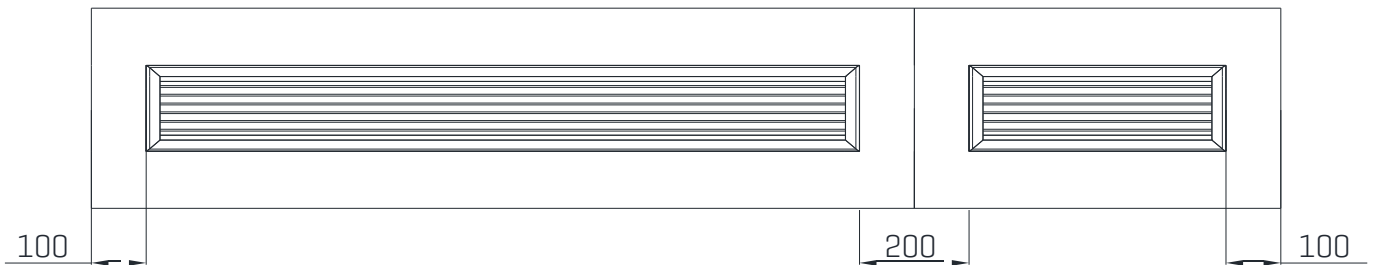


When air adjustment is requested, the opposite blade air adjustment damper is delivered with a special damper switch. It is suitable to use for blowing and suction. Thanks to its aerodynamic wing structure and mechanical design, it enables to adjust the air flow with low pressure loss.

DUCT FLOW AND DAMPER CORRECTION TABLE

MAXIMUM MODULE SIZE

The standard size of a single piece product is within the limits of 100 x 50 to 1250x600. If the order is placed over standard sizes, the grilles will be produced more than once in full pieces. Recommended mounting method is shown below.



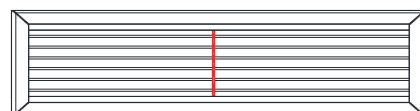
SUPPORT NUMBER PARAMETER

Support is used when $W > 600$ in order to maintain the strength according to the height increase in the product.

$W \leq 600$ without support



$600 < W \leq 1200$ 1 support



PRODUCT SELECTION

Example: It is expected to blow 300 m³ / h from a circular duct grille connected to a circular duct with an air velocity of 5 m / s. Opposite blade damper will be used. The diameter of the channel which the grille is connected will be 250 mm. The maximum pressure loss should be 100 Pa. Make the selection.

Solution: Required correction coefficients for 5 m / s duct air velocity are obtained from Duct Flow and Damper Correction Table.

When the damper in the 25% closed position:

Pressure multiplier 1.86

Sound multiplier 1.21

Values to be added for 5 m / s channel air velocity

Pressure Drop +10 Pa

Sound Generation +4 dB[A].

From the blow data table [Table 3] the required values for a 300 m³ / h blowing flow and the corresponding effective area are obtained. For 0.033 m² effective area, 23 Pa pressure drop, 3 m throw distance and 24 dB [A] sound pressure level and 2.5 m / s effective velocity values are obtained.

Corrected pressure drop and sound pressure level are calculated. Pressure Drop = 23 x 1,86 + 10 = 52,8 Pa

Sound Pressure Level = 26 x 1,21 + 4 = 35,5 dB[A]

The selected dimension must meet the $H \leq R$ constraint since the duct radius [R] = 100 mm.

After confirming the conformity of the obtained values, the grille size corresponding to 0.033 m² effective area is selected as W [Width] 500 mm x H [Height] 100 mm on the Effective Area Table [Table 2].

PRODUCT ORDER CODE

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

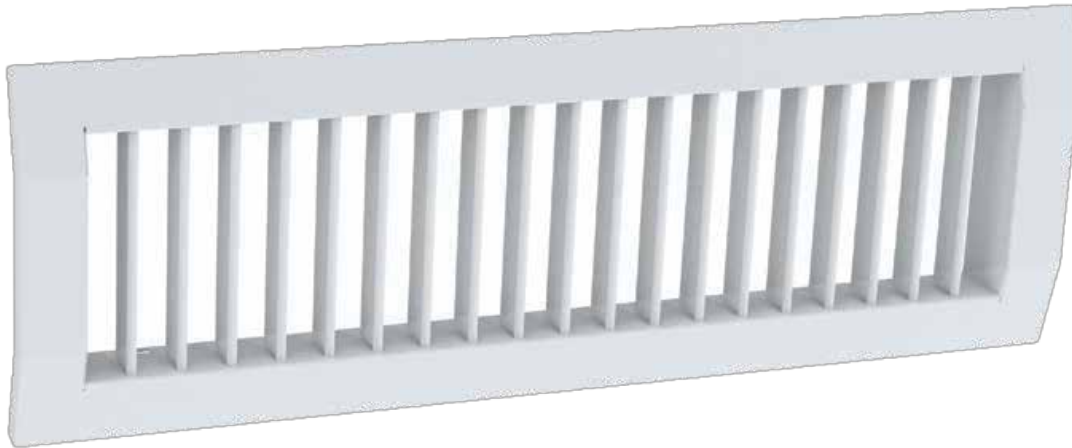
DMY.<A>..<C>.<D>.<E>.<F>.<G>

A	Raw Material Type	
	ALM	Aluminum
B	Damper	
	ZD	Opposite Blade Damper
	DZ	Without Damper
C	Mounting Type	
	VD	Screwed System
D	Width [W] [mm]	
	0000	You can view it from standard dimensions.
E	Height [H] [mm]	
	0000	You can view it from standard dimensions.
F	Radius of Duct [D] [mm]	
	0000	You can view it from standard dimensions.
G	Paint	
	00	Paintless
	S1	Standard Painted - RAL 9010
	S2	Standard Painted - RAL 9016
	XX	Special Painted

Sample Coding: DMY.AL.M.ZD.VD.0600.0300.0600.S1

DYM - SINGLE ROW BLADE CIRCULAR DUCT GRILLE (GALVANIZED)

- ☞ DYM – Single Row Blade Circular Duct Galvanized Grille is a blowing grille that is used in circular air ducts and can be used for suction with the blades arranged in a single row.



MATERIAL

- ☞ As a standard, the casing of the product is galvanized sheet, its wings are made of 6063 extruded aluminum.

SURFACE COATING

- ☞ RAL 9010 or RAL 9016 electrostatic powder paint.
- ☞ Optional
 - Different RAL color codes
 - Unpainted manufacturing

MOUNTING TYPES

- ☞ Screw mounting type as standard.

ACCESSORIES

- ☞ Optional
 - Special Slide Galvanized Damper
 - Sponge Gasket

STANDARD DIMENSIONS

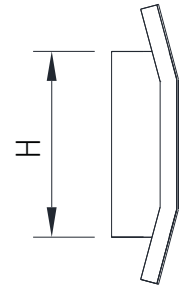
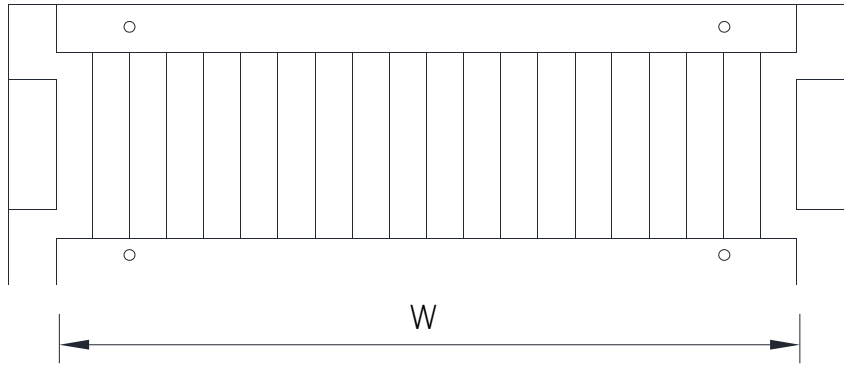


Table 1. Standard Dimensions Table.

Standard Dimensions		H Height (mm) (Must be Less than Duct Radius)		
		50	100	150
W Width (mm)	100	✓	✓	✓
	200	✓	✓	✓
	225	✓	✓	✓
	300	✓	✓	✓
	325	✓	✓	✓
	400	✓	✓	✓
	425	✓	✓	✓
	500	✓	✓	✓
	525	✓	✓	✓
	600	✓	✓	✓
	625	✓	✓	✓
	700	✓	✓	✓
	800	✓	✓	✓
	825	✓	✓	✓
	900	✓	✓	✓
	1000	✓	✓	✓
1100	✓	✓	✓	
1200	✓	✓	✓	

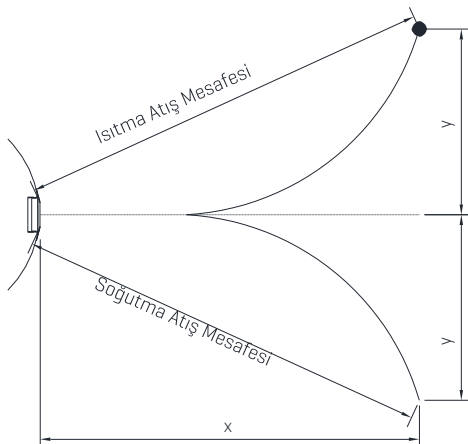
PERFORMANCE DATA

EFFECTIVE AREA TABLE

Table 2. Standard Dimensions Table.

Effective Area [m ²]	H Height [mm]		
	50	100	150
100	0,003	0,007	0,011
200	0,007	0,014	0,022
225	0,008	0,016	0,025
300	0,011	0,022	0,033
325	0,012	0,024	0,036
400	0,014	0,029	0,045
425	0,015	0,031	0,048
500	0,018	0,037	0,056
525	0,019	0,039	0,059
600	0,022	0,045	0,068
625	0,023	0,047	0,071
700	0,026	0,052	0,079
800	0,029	0,060	0,091
825	0,030	0,062	0,094
900	0,033	0,068	0,103
1000	0,037	0,076	0,115
1100	0,041	0,083	0,127
1200	0,045	0,091	0,139

BLOWING TABLE

**Note:**

Throw Distance: Hava dağıtıcı ekipman ile konfor zonundaki havanın 0,25 m/s hızına ulaştığı mesafe

Veriler kanal akış hızının 3 m/s ve hava dağıtıcı ekipman ile mahal hava sıcaklık farkının $T = 8K$ olduğu durumda elde edilmiştir.

Table 3. Blowing Data

		Effective Velocity (m / s)							
Flow Rate (m ³ / h)		0,5	1,0	1,5	2,0	2,5	3,0	3,5	4,0
50	Effective Area [m ²]	0,0278	0,0139	0,009	0,007	0,006	0,005	0,004	0,004
	Pressure Drop [Pa]	6	18	33	51	71	94	119	145
	Throw Distance [m]	1	2	2	2	3	3	3	3
	Sound Pressure Level [dB(A)]	<15	<15	18	24	29	32	36	38
100	Effective Area [m ²]	0,0556	0,0278	0,019	0,014	0,011	0,009	0,008	0,007
	Pressure Drop [Pa]	6	18	33	51	71	94	119	145
	Throw Distance [m]	1	2	2	3	3	3	3	4
	Sound Pressure Level [dB(A)]	<15	<15	21	27	32	35	39	41
200	Effective Area [m ²]	0,111	0,056	0,037	0,028	0,022	0,019	0,016	0,014
	Pressure Drop [Pa]	6	18	33	51	71	94	119	145
	Throw Distance [m]	1	2	2	3	3	3	4	4
	Sound Pressure Level [dB(A)]	<15	16	24	30	35	38	42	44
300	Effective Area [m ²]		0,083	0,056	0,042	0,033	0,028	0,024	0,021
	Pressure Drop [Pa]		18	33	51	71	94	119	145
	Throw Distance [m]		2	3	3	3	4	4	4
	Sound Pressure Level [dB(A)]		17	26	32	36	40	43	46
400	Effective Area [m ²]		0,111	0,074	0,056	0,044	0,037	0,032	0,028
	Pressure Drop [Pa]		18	33	51	71	94	119	145
	Throw Distance [m]		2	3	3	3	4	4	4
	Sound Pressure Level [dB(A)]		19	27	33	38	41	45	47
500	Effective Area [m ²]			0,093	0,069	0,056	0,046	0,040	0,035
	Pressure Drop [Pa]			33	51	71	94	119	145
	Throw Distance [m]			3	3	4	4	4	5
	Sound Pressure Level [dB(A)]			28	34	39	42	46	48
600	Effective Area [m ²]			0,111	0,083	0,067	0,056	0,048	0,042
	Pressure Drop [Pa]			33	51	71	94	119	145
	Throw Distance [m]			3	3	4	4	4	5
	Sound Pressure Level [dB(A)]			29	35	39	43	46	49
700	Effective Area [m ²]			0,130	0,097	0,078	0,065	0,056	0,049
	Pressure Drop [Pa]			33	51	71	94	119	145
	Throw Distance [m]			3	3	4	4	4	5
	Sound Pressure Level [dB(A)]			29	35	40	44	47	50
800	Effective Area [m ²]				0,111	0,089	0,074	0,064	0,056
	Pressure Drop [Pa]				51	71	94	119	145
	Throw Distance [m]				3	4	4	4	5
	Sound Pressure Level [dB(A)]				38	41	44	48	50
900	Effective Area [m ²]				0,125	0,100	0,083	0,071	0,063
	Pressure Drop [Pa]				51	71	94	119	145
	Throw Distance [m]				3	4	4	5	5
	Sound Pressure Level [dB(A)]				37	41	45	48	51
1000	Effective Area [m ²]					0,111	0,093	0,079	0,069
	Pressure Drop [Pa]					71	94	119	145
	Throw Distance [m]					4	4	5	5
	Sound Pressure Level [dB(A)]					42	45	49	51
1250	Effective Area [m ²]						0,116	0,099	0,087
	Pressure Drop [Pa]						94	119	145
	Throw Distance [m]						4	5	5
	Sound Pressure Level [dB(A)]						46	50	52
1500	Effective Area [m ²]							0,119	0,104
	Pressure Drop [Pa]							119	145
	Throw Distance [m]							5	5
	Sound Pressure Level [dB(A)]							50	53
	Effective Area [m ²]								0,122

SUCTION DATA

Table 4. Suction Data Table

Flow Rate [m ³ /h]		Effective Velocity (m/s)									
		0,5	1,0	1,5	2,0	2,5	3,0	3,5	4,0	4,5	5,0
50	Effective Area [m ²]	0,0278	0,0139	0,0093	0,0069	0,006	0,005	0,004	0,003		
	Pressure Drop [Pa]	<1	2	5	12	24	42	67	100		
	Sound Pressure Level [dB(A)]	<15	<15	<15	<15	17	24	29	34		
100	Effective Area [m ²]	0,0556	0,0278	0,019	0,014	0,011	0,009	0,008	0,007	0,006	0,006
	Pressure Drop [Pa]	<1	2	5	12	24	42	67	100	143	197
	Sound Pressure Level [dB(A)]	<15	<15	<15	<15	20	27	32	37	42	46
200	Effective Area [m ²]	0,111	0,056	0,037	0,028	0,022	0,019	0,016	0,014	0,012	0,011
	Pressure Drop [Pa]	<1	2	5	12	24	42	67	100	143	197
	Sound Pressure Level [dB(A)]	<15	<15	<15	<15	23	30	35	40	45	49
300	Effective Area [m ²]		0,083	0,056	0,042	0,033	0,028	0,024	0,021	0,019	0,017
	Pressure Drop [Pa]		2	5	12	24	42	67	100	143	197
	Sound Pressure Level [dB(A)]		<15	<15	16	25	31	37	42	47	50
400	Effective Area [m ²]		0,111	0,074	0,056	0,044	0,037	0,032	0,028	0,025	0,022
	Pressure Drop [Pa]		2	5	12	24	42	67	100	143	197
	Sound Pressure Level [dB(A)]		<15	<15	18	26	33	38	43	48	52
500	Effective Area [m ²]			0,093	0,069	0,056	0,046	0,040	0,035	0,031	0,028
	Pressure Drop [Pa]			5	12	24	42	67	100	143	197
	Sound Pressure Level [dB(A)]			<15	19	27	34	34	44	49	53
600	Effective Area [m ²]			0,111	0,083	0,067	0,056	0,048	0,042	0,037	0,0333
	Pressure Drop [Pa]			5	12	24	42	67	100	143	197
	Sound Pressure Level [dB(A)]			<15	19	26	34	40	45	50	53
700	Effective Area [m ²]			0,130	0,097	0,078	0,065	0,056	0,049	0,043	0,0389
	Pressure Drop [Pa]			5	12	24	42	67	100	143	197
	Sound Pressure Level [dB(A)]			<15	20	28	35	41	46	50	54
800	Effective Area [m ²]				0,111	0,089	0,074	0,063	0,056	0,049	0,0444
	Pressure Drop [Pa]				12	24	42	67	100	143	197
	Sound Pressure Level [dB(A)]				21	29	36	41	46	51	55
900	Effective Area [m ²]				0,125	0,100	0,083	0,071	0,063	0,056	0,0500
	Pressure Drop [Pa]				12	24	42	67	100	143	197
	Sound Pressure Level [dB(A)]				21	29	36	42	47	51	55
1000	Effective Area [m ²]					0,111	0,093	0,079	0,069	0,062	0,0556
	Pressure Drop [Pa]					24	42	67	100	143	197
	Sound Pressure Level [dB(A)]					30	37	42	47	52	56
1250	Effective Area [m ²]						0,116	0,099	0,087	0,077	0,0694
	Pressure Drop [Pa]						42	67	100	143	197
	Sound Pressure Level [dB(A)]						38	43	48	53	57
1500	Effective Area [m ²]							0,119	0,104	0,0926	0,0833
	Pressure Drop [Pa]							67	100	143	197
	Sound Pressure Level [dB(A)]							44	49	54	57
1750	Effective Area [m ²]								0,122	0,1080	0,0972
	Pressure Drop [Pa]								100	143	197
	Sound Pressure Level [dB(A)]								50	54	58
2000	Effective Area [m ²]									0,1235	0,1111
	Pressure Drop [Pa]									143	197
	Sound Pressure Level [dB(A)]									55	59

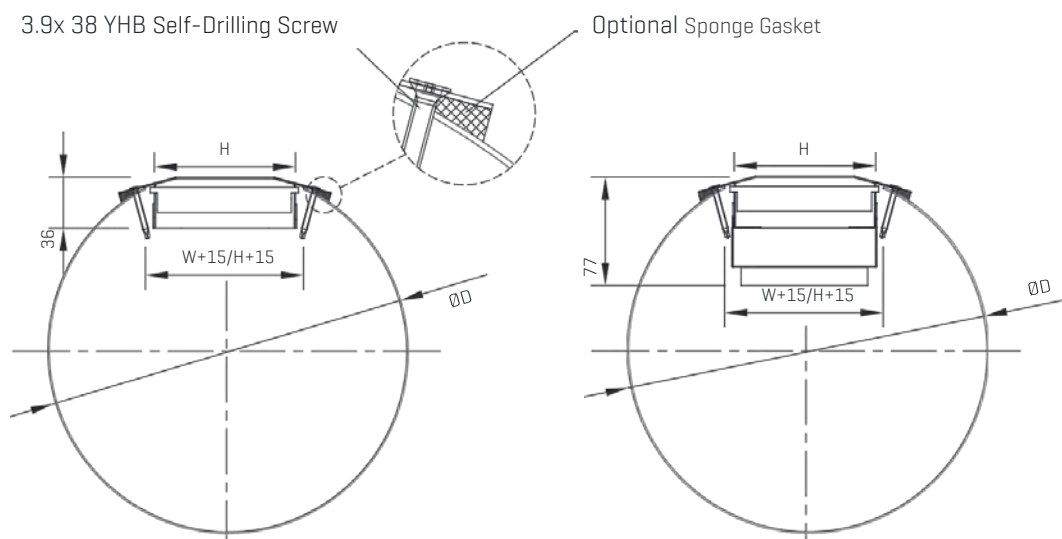
DUCT FLOW AND DAMPER CORRECTION TABLE

Table 5. Duct Flow and Damper Correction Table

Duct Velocity (m/s)		Amount to Add		Multiplier According to Damper Position					
				Full Open		25% Closed		50% Closed	
Pressure Drop [Pa]	Sound Generation [dB(A)]	Pressure Multiplier	Sound Multiplier	Pressure Multiplier	Sound Multiplier	Pressure Multiplier	Sound Multiplier	Pressure Multiplier	Sound Multiplier
0,5	Pressure Drop [Pa]	-6							
	Sound Generation [dB(A)]	-6							
1	Pressure Drop [Pa]	-5							
	Sound Generation [dB(A)]	-5							
2	Pressure Drop [Pa]	-3							
	Sound Generation [dB(A)]	-2							
3	Pressure Drop [Pa]	0							
	Sound Generation [dB(A)]	0							
4	Pressure Drop [Pa]	4							
	Sound Generation [dB(A)]	2							
5	Pressure Drop [Pa]	10							
	Sound Generation [dB(A)]	4							
6	Pressure Drop [Pa]	17	1,2	1,1	2,0	1,3	2,9	1,5	3,9
	Sound Generation [dB(A)]	6							
7	Pressure Drop [Pa]	25							
	Sound Generation [dB(A)]	9							
8	Pressure Drop [Pa]	35							
	Sound Generation [dB(A)]	11							
9	Pressure Drop [Pa]	46							
	Sound Generation [dB(A)]	13							
10	Pressure Drop [Pa]	60							
	Sound Generation [dB(A)]	15							
11	Pressure Drop [Pa]	75							
	Sound Generation [dB(A)]	18							
12	Pressure Drop [Pa]	92							
	Sound Generation [dB(A)]	20							

Note: As the air velocity in the duct increases and the damper position changes, the pressure loss and sound pressure level created by the grill increase. Accordingly, the blowing or suction data in the selected grille must first be multiplied by the damper coefficient if there is a damper. Then the correct result is achieved by adding sound production and pressure loss values according to the channel speed.

STANDARD DIMENSIONS

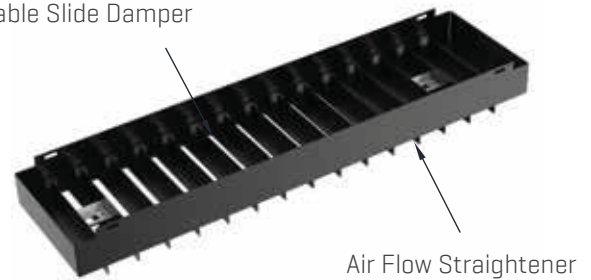


OPTIONAL SLIDE DAMPER

It has sliding blades that provide air flow adjustment. It is suitable to be used for blowing and suction.

With the air flow straightener, the circular duct grilles provide homogeneous air distribution

Adjustable Slide Damper



Air Flow Straightener

SIZE PARAMETERS

Recommended mounting method in case more than one circular duct grille is placed side by side.

STANDARD DIMENSIONS

Example: 500 m³ / h blowing is expected from a circular duct grille connected to a circular duct with an air velocity of 6 m / s. A slide damper will be used. The diameter of the channel which the grille is connected will be 250 mm. The maximum pressure loss should be 100 Pa. Make the selection.

Solution: The necessary correction coefficients for 6 m / s duct air velocity are obtained from the Duct Flow and Damper Correction Table [Table 5].

When the damper in the full open position:

Pressure multiplier 1.2

Sound multiplier 1.1

Values to be added for 6 m / s channel air velocity

Pressure Drop +17 Pa

Sound Generation +6 dB[A].

From the blow data table [Table 3] the required values for 500 m³ / h blowing flow and the corresponding effective area are obtained. For 0.069 m² effective area, 51 Pa pressure loss, 3 m firing distance and 34 dB [A] sound pressure level and 2 m / s effective velocity values are obtained.

Corrected pressure drop and sound pressure level are

calculated. Pressure Drop = $51 \times 1,2 + 17 = 78,2$ Pa

Sound Pressure Level = $34 \times 1,2 + 6 = 46,8$ dB [A]

The selected dimension must meet the $H \leq R$ constraint since the channel radius [R] = 100 mm.

After confirming the conformity of the obtained values, the grille size corresponding to 0.069 m² effective area is selected as W [Width] 900 mm x H [Height] 100 mm on the Effective Area Table [Table 2].

SIZE PARAMETERS

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

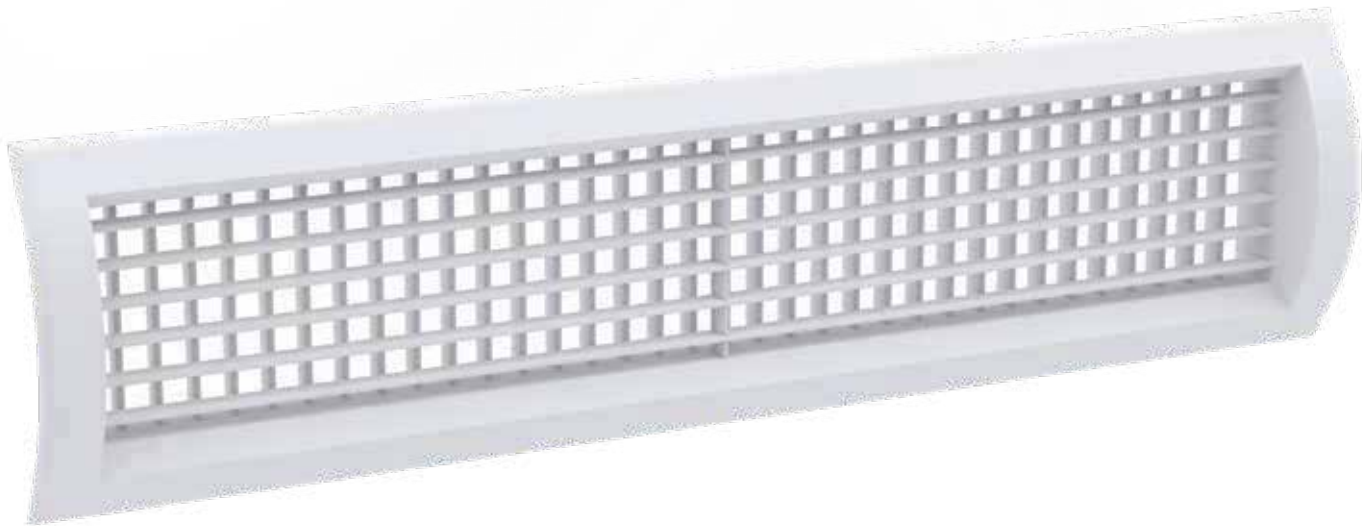
DYM.<A>..<C>.<D>.<E>.<F>.<G>

A	Raw Material Type	
	GAL	Galvanized
B	Damper	
	OD	Slide Damper
	DZ	Without Damper
C	Mounting Type	
	VD	Screwed System
	MD	Without Mounting Hole
D	Accessories	
	CO	Sponge Gasket
	OO	Without Accessories
E	Width [W] [mm]	
	0000	You can view it from standard dimensions.
F	Height [H] [mm]	
	0000	You can view it from standard dimensions.
G	Paint	
	OO	Paintless
	S1	Standard Paint - RAL 9010
	S2	Standard Paint - RAL 9016
	XX	Special Paint

Sample Coding; DYM.GAL.DZ.OO.0600.0150.S1

DMZ - DOUBLE ROW BLADED CIRCULAR DUCT GRILLE (ALUMINUM)

- DMZ – Double Row Blade Circular Duct Grill is used in circular air ducts and has adjustable blades arranged in double rows.
- It is a grille used in blowing or suction lines.



MATERIAL

- Casing and blades made of aluminum 6063 extruded profile.

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 TYPES

- Screw mounting type as standard.

ACCESSORIES

- Optional
 - ZKD – Opposite Blade Air Adjustment Damper

SIZE PARAMETERS

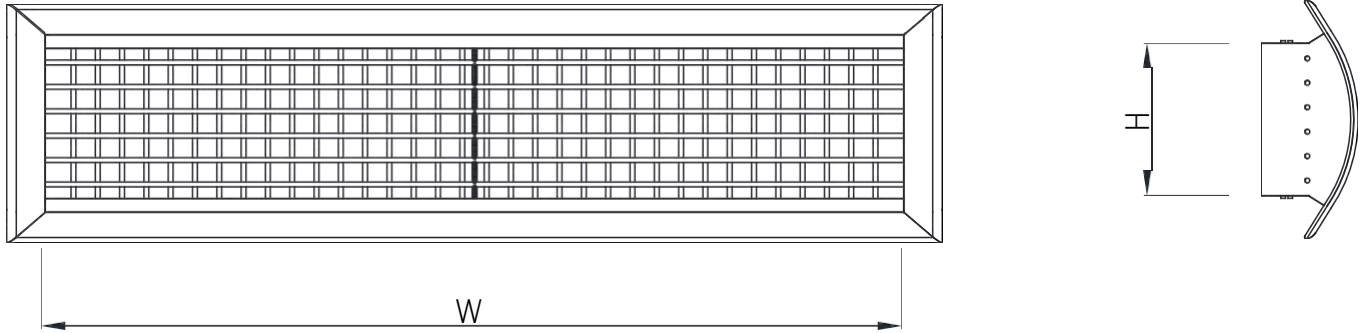


Table 1. Standard Dimensions Table.

Standard Dimensions	H Height (mm) (Must be Less than Duct Radius)																
	50	75	100	125	150	175	200	250	300	325	350	400	450	500	525	600	
W Width (mm)	100	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	125	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	150	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	200	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	225	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	250	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	300	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	325	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	350	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	400	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	425	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	450	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	500	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	525	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	600	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	625	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	825	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1800	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
1025	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
1250	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

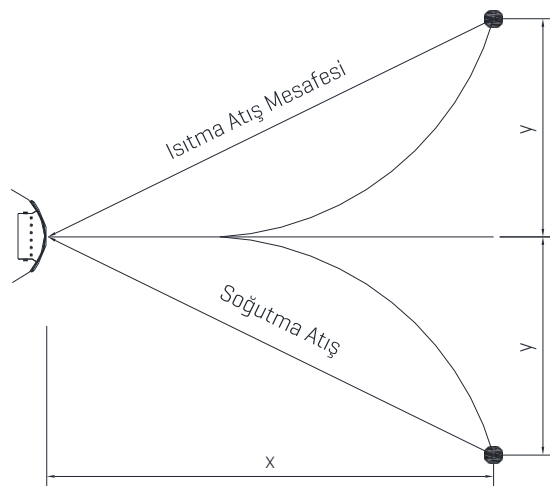
PERFORMANCE DATA

EFFECTIVE AREA

Table 2. Effective Area Table

Effective Area [m ²]	H Height (mm)																
	50	75	100	125	150	175	200	250	300	325	350	400	450	500	525	600	
W Width (mm)	100	0,003	0,004	0,006	0,007	0,009	0,010	0,012	0,015	0,018	0,019	0,021	0,024	0,027	0,030	0,031	0,036
	125	0,004	0,006	0,007	0,009	0,011	0,013	0,015	0,019	0,022	0,024	0,026	0,030	0,034	0,037	0,039	0,045
	150	0,004	0,007	0,009	0,011	0,013	0,016	0,018	0,022	0,027	0,029	0,031	0,036	0,040	0,045	0,047	0,054
	200	0,006	0,009	0,012	0,015	0,018	0,021	0,024	0,030	0,036	0,039	0,042	0,048	0,054	0,060	0,063	0,072
	225	0,007	0,010	0,013	0,017	0,020	0,024	0,027	0,034	0,040	0,044	0,047	0,054	0,061	0,067	0,071	0,081
	250	0,007	0,011	0,015	0,019	0,022	0,026	0,030	0,037	0,045	0,049	0,052	0,060	0,067	0,075	0,079	0,090
	300	0,009	0,013	0,018	0,022	0,027	0,031	0,036	0,045	0,054	0,058	0,063	0,072	0,081	0,090	0,094	0,108
	325	0,010	0,015	0,019	0,024	0,029	0,034	0,039	0,049	0,058	0,063	0,068	0,078	0,088	0,097	0,102	0,117
	350	0,010	0,016	0,021	0,026	0,031	0,037	0,042	0,052	0,063	0,068	0,073	0,084	0,094	0,105	0,110	0,126
	400	0,012	0,018	0,024	0,030	0,036	0,042	0,048	0,060	0,072	0,078	0,084	0,096	0,108	0,120	0,126	0,144
	425	0,013	0,019	0,025	0,032	0,038	0,045	0,051	0,064	0,076	0,083	0,089	0,102	0,115	0,127	0,134	0,153
	450	0,013	0,020	0,027	0,034	0,040	0,047	0,054	0,067	0,081	0,088	0,094	0,108	0,121	0,135	0,142	0,162
	500	0,015	0,022	0,030	0,037	0,045	0,052	0,060	0,075	0,090	0,097	0,105	0,120	0,135	0,150	0,157	0,180
	525	0,016	0,024	0,031	0,039	0,047	0,055	0,063	0,079	0,094	0,102	0,110	0,126	0,142	0,157	0,165	0,189
	600	0,018	0,027	0,036	0,045	0,054	0,063	0,072	0,090	0,108	0,117	0,126	0,144	0,162	0,180	0,189	0,216
	625	0,019	0,028	0,037	0,047	0,056	0,066	0,075	0,094	0,112	0,122	0,131	0,150	0,168	0,187	0,197	0,225
	825	0,025	0,037	0,049	0,062	0,074	0,086	0,099	0,124	0,148	0,161	0,173	0,198	0,222	0,247	0,259	0,296
1025	0,031	0,046	0,061	0,077	0,092	0,107	0,123	0,153	0,184	0,200	0,215	0,246	0,276	0,307	0,322	0,368	
1250	0,037	0,056	0,075	0,094	0,112	0,131	0,150	0,187	0,225	0,243	0,262	0,299	0,337	0,374	0,393	0,449	

BLOWING DATA



Note:

Throw Distance: The distance where the air in the comfort zone reaches a speed of 0,25 m / s with the air distribution equipment.

The data are obtained when the duct flow velocity is 3 m / s and the room air temperature difference with the air distribution equipment is $\Delta T = 8K$.

Table 3. Supply Data Table

Flow Rate [m ³ / h]		Effective Velocity [m / s]									
		0,5	1,0	1,5	2,0	2,5	3,0	3,5	4,0	4,5	5,0
50	Effective Area [m ²]	0,0278	0,0139	0,009	0,007	0,006	0,005	0,0040	0,0035	0,003	
	Pressure Drop [Pa]	<1	3	7	12	20	29	39	52	66	
	Throw Distance [m]	1	2	2	3	3	3	4	4	4	
	Sound Pressure Level [dB(A)]	<15	<15	<15	<15	<15	20	24	27	30	
100	Effective Area [m ²]	0,0556	0,0278	0,019	0,014	0,011	0,009	0,008	0,007	0,006	0,0056
	Pressure Drop [Pa]	<1	3	7	12	20	29	40	52	67	83
	Throw Distance [m]	1	2	2	3	3	4	4	4	4	5
	Sound Pressure Level [dB(A)]	<15	<15	<15	<15	18	23	27	30	34	36
200	Effective Area [m ²]	0,111	0,056	0,037	0,028	0,022	0,019	0,016	0,014	0,012	0,011
	Pressure Drop [Pa]	<1	3	7	13	20	29	40	53	67	84
	Throw Distance [m]	1	2	2	3	3	4	4	4	5	5
	Sound Pressure Level [dB(A)]	<15	<15	<15	<15	21	26	30	33	37	39
300	Effective Area [m ²]	0,167	0,083	0,056	0,042	0,033	0,028	0,024	0,021	0,019	0,017
	Pressure Drop [Pa]	<1	3	7	13	20	29	40	53	68	84
	Throw Distance [m]	1	2	3	3	3	4	4	4	5	5
	Sound Pressure Level [dB(A)]	<15	<15	<15	17	23	28	32	35	38	41
400	Effective Area [m ²]	0,222	0,111	0,074	0,056	0,044	0,037	0,032	0,028	0,025	0,022
	Pressure Drop [Pa]	<1	3	7	13	20	29	40	53	68	84
	Throw Distance [m]	1	2	3	3	3	4	4	4	5	5
	Sound Pressure Level [dB(A)]	<15	<15	<15	18	24	29	33	37	40	43
500	Effective Area [m ²]	0,278	0,139	0,093	0,069	0,056	0,046	0,040	0,035	0,031	0,028
	Pressure Drop [Pa]	<1	3	7	13	20	29	40	53	68	84
	Throw Distance [m]	1	2	3	3	3	4	4	4	5	5
	Sound Pressure Level [dB(A)]	<15	<15	<15	19	25	30	34	38	41	44
600	Effective Area [m ²]	0,333	0,167	0,111	0,083	0,067	0,056	0,048	0,042	0,037	0,0333
	Pressure Drop [Pa]	<1	3	7	14	20	29	40	53	68	85
	Throw Distance [m]	1	2	3	3	3	4	4	4	5	4,9
	Sound Pressure Level [dB(A)]	<15	<15	<15	20	26	31	35	38	41	44
700	Effective Area [m ²]	0,389	0,194	0,130	0,097	0,078	0,065	0,056	0,049	0,043	0,0389
	Pressure Drop [Pa]	<1	3	7	13	20	29	40	53	68	85
	Throw Distance [m]	1	2	3	3	3	4	4	4	5	5
	Sound Pressure Level [dB(A)]	<15	<15	<15	20	26	31	35	39	42	45
800	Effective Area [m ²]	0,444	0,222	0,148	0,111	0,089	0,074	0,064	0,056	0,049	0,0444
	Pressure Drop [Pa]	<1	3	7	13	20	29	40	53	68	85
	Throw Distance [m]	1	2	3	3	3	4	4	4	5	5
	Sound Pressure Level [dB(A)]	<15	<15	<15	21	27	32	36	40	43	46
900	Effective Area [m ²]		0,250	0,167	0,125	0,100	0,083	0,071	0,063	0,056	0,0500
	Pressure Drop [Pa]		3	7	13	20	29	40	53	68	85
	Throw Distance [m]		2	3	3	3	4	4	4	5	5
	Sound Pressure Level [dB(A)]		<15	<15	21	27	32	37	40	43	46
1000	Effective Area [m ²]		0,278	0,185	0,139	0,111	0,093	0,079	0,069	0,062	0,0556
	Pressure Drop [Pa]		3	7	13	20	29	41	53	68	85
	Throw Distance [m]		2	3	3	3	4	4	4	5	5
	Sound Pressure Level [dB(A)]		<15	<15	22	28	33	37	41	44	47
1250	Effective Area [m ²]		0,347	0,232	0,174	0,139	0,116	0,099	0,087	0,077	0,0694
	Pressure Drop [Pa]		3	7	13	20	29	41	54	68	85
	Throw Distance [m]		2	3	3	3	4	4	5	5	5,1
	Sound Pressure Level [dB(A)]		<15	15	23	29	34	38	42	45	48
1500	Effective Area [m ²]		0,417	0,278	0,208	0,167	0,139	0,119	0,104	0,0926	0,0833
	Pressure Drop [Pa]		3	7	13	20	30	41	54	68	85
	Throw Distance [m]		2	3	3	4	4	4	5	4,8	5,1
	Sound Pressure Level [dB(A)]		<15	16	24	30	35	39	42	46	48
1750	Effective Area [m ²]			0,324	0,243	0,194	0,162	0,139	0,122	0,1080	0,0972
	Pressure Drop [Pa]			7	13	20	30	41	54	69	85
	Throw Distance [m]			3	3	4	4	4	5	5	5
	Sound Pressure Level [dB(A)]			17	24	30	35	39	43	46	49

Table 4. Exhaust Data Table

Flow Rate [m ³ /h]		Effective Velocity [m/s]									
		0,5	1,0	1,5	2,0	2,5	3,0	3,5	4,0	4,5	5,0
50	Effective Area [m ²]	0,0278	0,0139	0,0093	0,0069	0,006	0,005	0,004	0,003	0,0031	
	Pressure Drop [Pa]	<1	4	8	15	24	35	48	63	80	
	Sound Pressure Level [dB(A)]	<15	<15	<15	<15	17	22	26	29	32	
100	Effective Area [m ²]	0,0556	0,0278	0,019	0,014	0,011	0,009	0,008	0,007	0,006	0,0056
	Pressure Drop [Pa]	<1	4	8	15	24	35	48	63	81	100
	Sound Pressure Level [dB(A)]	<15	<15	<15	<15	20	25	29	32	36	38
200	Effective Area [m ²]	0,111	0,056	0,037	0,028	0,022	0,019	0,016	0,014	0,012	0,011
	Pressure Drop [Pa]	<1	4	8	15	24	35	48	64	81	101
	Sound Pressure Level [dB(A)]	<15	<15	<15	17	23	28	32	35	39	41
300	Effective Area [m ²]	0,167	0,083	0,056	0,042	0,033	0,028	0,024	0,021	0,019	0,017
	Pressure Drop [Pa]	<1	4	8	15	24	35	48	64	82	101
	Sound Pressure Level [dB(A)]	<15	<15	<15	19	25	30	34	37	40	43
400	Effective Area [m ²]	0,222	0,111	0,074	0,056	0,044	0,037	0,032	0,028	0,025	0,022
	Pressure Drop [Pa]	<1	4	8	15	24	35	49	64	82	102
	Sound Pressure Level [dB(A)]	<15	<15	<15	20	26	31	35	39	42	45
500	Effective Area [m ²]	0,278	0,139	0,093	0,069	0,056	0,046	0,040	0,035	0,031	0,028
	Pressure Drop [Pa]	<1	4	8	15	24	35	49	64	82	102
	Sound Pressure Level [dB(A)]	<15	<15	<15	21	27	32	36	40	43	46
600	Effective Area [m ²]	0,333	0,167	0,111	0,083	0,067	0,056	0,048	0,042	0,037	0,0333
	Pressure Drop [Pa]	<1	4	8	15	24	35	49	64	82	102
	Sound Pressure Level [dB(A)]	<15	<15	<15	22	28	33	37	40	44	46
700	Effective Area [m ²]	0,389	0,194	0,130	0,097	0,078	0,065	0,056	0,049	0,043	0,0389
	Pressure Drop [Pa]	<1	4	8	15	24	35	49	64	82	102
	Sound Pressure Level [dB(A)]	<15	<15	<15	22	28	33	37	41	44	47
800	Effective Area [m ²]	0,444	0,222	0,148	0,111	0,089	0,074	0,063	0,056	0,049	0,0444
	Pressure Drop [Pa]	<1	4	8	15	24	35	49	64	82	102
	Sound Pressure Level [dB(A)]	<15	<15	15	23	29	34	38	42	45	48
900	Effective Area [m ²]		0,250	0,167	0,125	0,100	0,083	0,071	0,063	0,056	0,0500
	Pressure Drop [Pa]		4	8	15	24	35	49	64	82	102
	Sound Pressure Level [dB(A)]		<15	16	24	20	34	39	42	45	48
1000	Effective Area [m ²]		0,278	0,185	0,139	0,111	0,093	0,079	0,069	0,062	0,0556
	Pressure Drop [Pa]		4	8	15	24	36	49	65	82	103
	Sound Pressure Level [dB(A)]		<15	16	24	30	35	39	43	46	49
1250	Effective Area [m ²]		0,347	0,231	0,174	0,139	0,116	0,099	0,087	0,077	0,0694
	Pressure Drop [Pa]		4	8	15	24	36	49	65	83	103
	Sound Pressure Level [dB(A)]		<15	17	25	31	36	30	44	47	50
1500	Effective Area [m ²]		0,417	0,278	0,208	0,167	0,139	0,119	0,104	0,0926	0,0833
	Pressure Drop [Pa]		4	8	15	24	36	49	65	83	103
	Sound Pressure Level [dB(A)]		<15	18	26	32	37	41	44	48	50
1750	Effective Area [m ²]			0,324	0,243	0,194	0,162	0,139	0,122	0,1080	0,0972
	Pressure Drop [Pa]			9	16	24	36	49	65	83	103
	Sound Pressure Level [dB(A)]			19	26	32	37	42	45	48	51
2000	Effective Area [m ²]			0,370	0,278	0,222	0,185	0,159	0,139	0,1235	0,1111
	Pressure Drop [Pa]			8	15	24	36	49	65	83	103
	Sound Pressure Level [dB(A)]			19	27	33	38	42	46	49	52

DUCT FLOW AND DAMPER CORRECTION TABLE

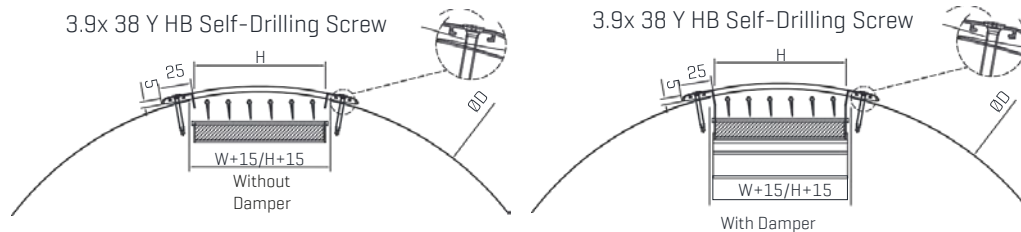
Table 5. Duct Flow and Damper Correction Table

			Multiplier According to Damper Position							
Duct Velocity [m/s]	Amount to Add		Full Open		25% Closed		50% Closed		75% Closed	
			Pressure Multiplier	Sound Multiplier	Pressure Multiplier	Sound Multiplier	Pressure Multiplier	Sound Multiplier	Pressure Multiplier	Sound Multiplier
0,5	Pressure Drop [Pa]	-6	1,09	1,05	1,86	1,21	2,76	1,46	3,67	1,71
	Sound Generation [dB(A)]	-6								
1	Pressure Drop [Pa]	-5								
	Sound Generation [dB(A)]	-5								
2	Pressure Drop [Pa]	-3								
	Sound Generation [dB(A)]	-2								
3	Pressure Drop [Pa]	0								
	Sound Generation [dB(A)]	0								
4	Pressure Drop [Pa]	4								
	Sound Generation [dB(A)]	2								
5	Pressure Drop [Pa]	10								
	Sound Generation [dB(A)]	4								
6	Pressure Drop [Pa]	17								
	Sound Generation [dB(A)]	6								
7	Pressure Drop [Pa]	25								
	Sound Generation [dB(A)]	9								
8	Pressure Drop [Pa]	35								
	Sound Generation [dB(A)]	11								
9	Pressure Drop [Pa]	46								
	Sound Generation [dB(A)]	13								
10	Pressure Drop [Pa]	60								
	Sound Generation [dB(A)]	15								
11	Pressure Drop [Pa]	75								
	Sound Generation [dB(A)]	18								
12	Pressure Drop [Pa]	92								
	Sound Generation [dB(A)]	20								

Note: As the air velocity in the duct increases and the damper position changes, the pressure loss and sound pressure level created by the grille increase. Accordingly, the blowing or suction data in the selected grille must first be multiplied by the damper coefficient if there is a damper. Then the correct result is achieved by adding sound production and pressure loss values according to the channel speed.

PERFORMANCE DATA

1. SCREWED SYSTEM



OPPOSITE BLADE DAMPER



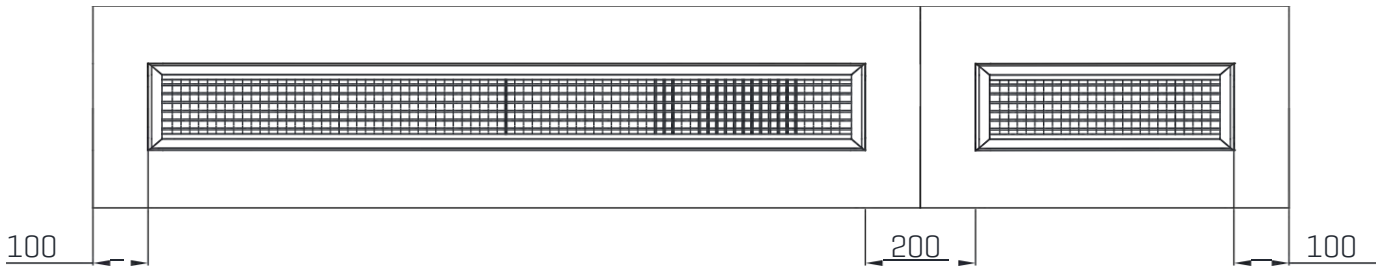
When air adjustment is requested, the opposite blade air adjustment damper is shipped with a special damper switch..

It is suitable to be used for blowing and suction.

SIZE PARAMETERS

MAXIMUM MODULE SIZE

The standard size of a single piece product is within the limits of 100x50 and 1250x600. If the order is placed over standard sizes, the culverts will be produced more than once in full pieces. Recommended mounting method is shown below.



MAXIMUM MODULE SIZE

Support is used in dimensions of $W > 600$ in order to protect the strength according to the increase in length.

PRODUCT SELECTION

Example: $300 \text{ m}^3 / \text{h}$ blowing is expected from a circular duct vent connected to a circular duct with an air velocity of $5 \text{ m} / \text{s}$. Opposite blade damper will be used. The diameter of the duct to which the grille is connected will be 250 mm . The maximum pressure loss should be 100 Pa . Make the selection.

Solution: The necessary correction coefficients for $6 \text{ m} / \text{s}$ duct air velocity are obtained from the Duct Flow and Damper Correction Table [Table 5].

With the damper in the 25% closed position:

Pressure multiplier 1.86

Sound multiplier 1.21

Values to be added for $5 \text{ m} / \text{s}$ duct air velocity, Pressure loss $+10 \text{ Pa}$

Sound production is $+4 \text{ dB [A]}$.

From the blow data table [Table 3] the required values for a $300 \text{ m}^3 / \text{h}$ blowing flow and the corresponding effective area are obtained. For 0.028 m^2 effective area, 29 Pa pressure loss, 4 m shooting distance and 28 dB [A] sound pressure level and $3 \text{ m} / \text{s}$ effective velocity values are obtained.

Corrected pressure loss and sound pressure level are calculated. Pressure Loss = $29 \times 1.86 + 10 = 64 \text{ Pa}$

Sound Pressure Level = $26 \times 1.21 + 4 = 37.9 \text{ dB [A]}$

The selected dimension must meet the $H \leq R$ constraint, since the duct radius $[R] = 100 \text{ mm}$.

After confirming the conformity of the obtained values, the aperture size corresponding to 0.028 m^2 effective area is selected as W [Width] 625 mm x H [Height] 75 mm on the Effective Area Table [Table 2].

PRODUCT ORDER CODES

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

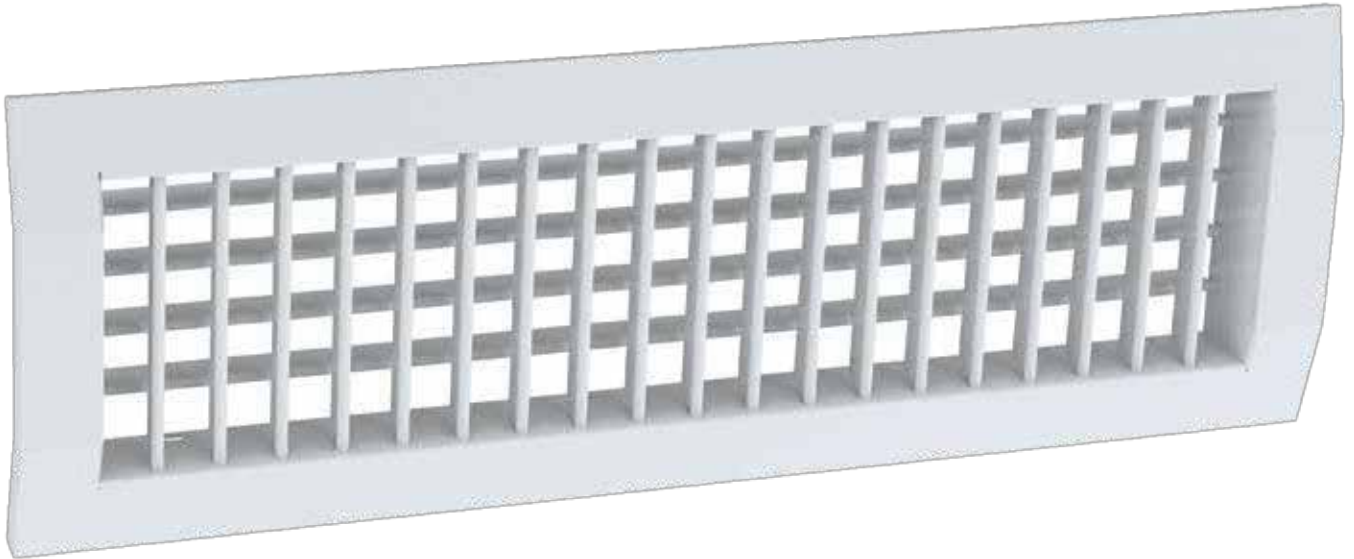
DMZ.<A>..<C>.<D>.<E>.<F>.<G>

A	Raw Material Type	
	ALM	Aluminum
B	Damper	
	ZD	Opposite Blade Damper
	DZ	Without Damper
C	Mounting Type	
	VD	Screwed System
D	Width(W) (mm)	
	0000	You can view it from Standard Sizes.
E	Height (H) (mm)	
	0000	You can view it from Standard Sizes.
F	Kanal Çapı (D) (mm)	
	0000	You can view it from Standard Sizes.
G	Paint	
	00	Unpainted
	S1	Standard Paint - RAL 9010
	S2	Standard Paint - RAL 9016
	XX	Special Paint

Sample Coding: DMZ.ALM.ZD.VD.0600.0300.0600.S1

DZM – DOUBLE ROW BLADE CIRCULAR DUCT GRILLE (GALVANIZED)

- ☞ DZM – Double Row Blade Circular Duct Galvanized Grill is a blowing grille that is used in circular air ducts and can also be used for suction with double rows of blades.



MATERIAL

- ☞ As a standard, the product's casing is galvanized sheet, its blades are made of 6063 extruded aluminum.

SURFACE COATING

- ☞ RAL 9010 or RAL 9016 electrostatic powder paint as standard for aluminum case.
- ☞ The blades are galvanized.
- ☞ Optional
 - Different RAL color codes
 - Matt aluminum anodized finish for a matte and metallic look
 - Unpainted manufacturing

MOUNTING TYPES

- ☞ Screw mounting as standard.
- ☞ Without mounting hole.

ACCESSORIES

- ☞ Optional
 - Special Slide Galvanized Damper
 - With Gasket

STANDARD DIMENSIONS

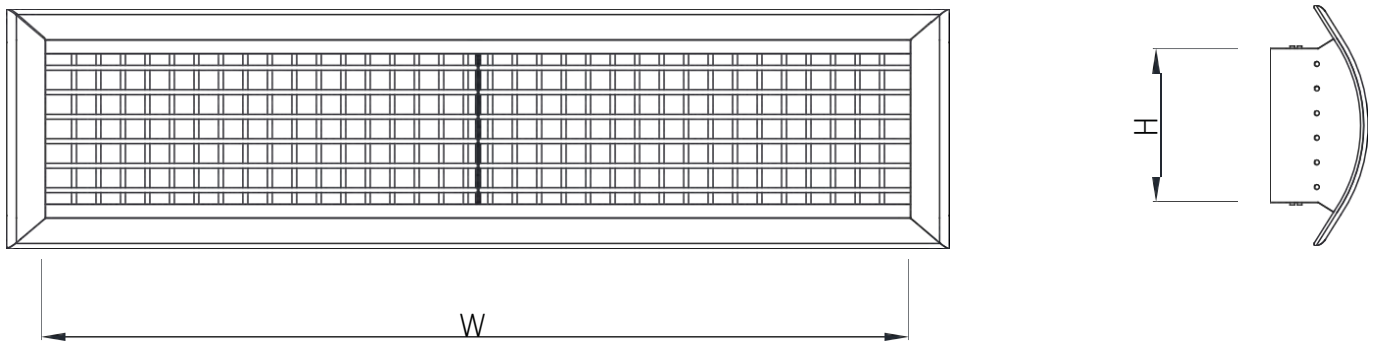


Table 1. Selection Table

Effective Area [m ²]	H Height (mm) (Must be Less than Duct Radius)			
	50	100	150	
W Width (mm)	100	✓	✓	✓
	200	✓	✓	✓
	225	✓	✓	✓
	300	✓	✓	✓
	325	✓	✓	✓
	400	✓	✓	✓
	425	✓	✓	✓
	500	✓	✓	✓
	525	✓	✓	✓
	600	✓	✓	✓
	625	✓	✓	✓
	700	✓	✓	✓
	800	✓	✓	✓
	825	✓	✓	✓
	900	✓	✓	✓
	1000	✓	✓	✓
1100	✓	✓	✓	
1200	✓	✓	✓	

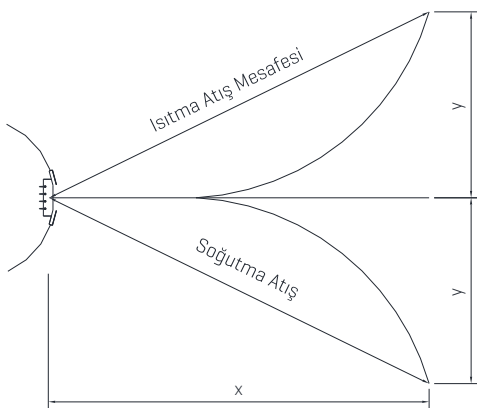
PERFORMANCE DATA

EFFECTIVE AREA TABLE

Table 2. Effective Area Table

Effective Area [m ²]	H Height (mm)		
	50	100	150
100	0,003	0,006	0,010
200	0,006	0,013	0,020
225	0,007	0,015	0,022
300	0,010	0,020	0,030
325	0,010	0,021	0,032
400	0,013	0,026	0,040
425	0,014	0,028	0,043
500	0,016	0,033	0,051
525	0,017	0,035	0,053
600	0,020	0,040	0,061
625	0,020	0,042	0,064
700	0,023	0,047	0,072
800	0,026	0,054	0,082
825	0,027	0,056	0,085
900	0,030	0,061	0,93
1000	0,033	0,068	0,103
1100	0,037	0,075	0,114
1200	0,040	0,082	0,125

SUPPLY DATA

**Note:**

Atış Mesafesi: Hava dağıtıcı ekipman ile konfor zonundaki havanın 0,25 m/s hızına ulaştığı mesafe

Veriler kanal akış hızının 3 m/s ve hava dağıtıcı ekipman ile mahal hava sıcaklık farkının $T = 8K$ olduğu durumda elde edilmiştir.

Table 3. Supply Data Table

Flow Rate [m ³ / h]		Effective Velocity [m / s]							
		0,5	1,0	1,5	2,0	2,5	3,0	3,5	4,0
50	Effective Area [m ²]	0,0278	0,0139	0,009	0,007	0,006	0,005	0,004	0,004
	Pressure Drop [Pa]	6	18	33	51	71	94	119	145
	Throw Distance [m]	1	2	2	3	3	3	4	4
	Sound Pressure Level [dB(A)]	<15	<15	18	24	29	32	36	38
100	Effective Area [m ²]	0,0556	0,0278	0,019	0,014	0,011	0,009	0,008	0,007
	Pressure Drop [Pa]	6	18	33	51	71	94	119	145
	Throw Distance [m]	1	2	2	3	3	4	4	4
	Sound Pressure Level [dB(A)]	<15	<15	21	27	32	35	39	41
200	Effective Area [m ²]	0,111	0,056	0,037	0,028	0,022	0,019	0,016	0,014
	Pressure Drop [Pa]	6	18	33	51	71	94	119	145
	Throw Distance [m]	1	2	2	3	3	4	4	4
	Sound Pressure Level [dB(A)]	<15	16	24	30	35	38	42	44
300	Effective Area [m ²]		0,083	0,056	0,042	0,033	0,028	0,024	0,021
	Pressure Drop [Pa]		18	33	51	71	94	119	145
	Throw Distance [m]		2	3	3	3	4	4	4
	Sound Pressure Level [dB(A)]		17	26	32	36	40	43	46
400	Effective Area [m ²]		0,111	0,074	0,056	0,044	0,037	0,032	0,028
	Pressure Drop [Pa]		18	33	51	71	94	119	145
	Throw Distance [m]		2	3	3	3	4	4	4
	Sound Pressure Level [dB(A)]		19	27	33	38	41	45	47
500	Effective Area [m ²]			0,093	0,069	0,056	0,046	0,040	0,035
	Pressure Drop [Pa]			33	51	71	94	119	145
	Throw Distance [m]			3	3	3	4	4	4
	Sound Pressure Level [dB(A)]			28	34	39	42	46	48
600	Effective Area [m ²]			0,111	0,083	0,067	0,056	0,048	0,042
	Pressure Drop [Pa]			33	51	71	94	119	145
	Throw Distance [m]			3	3	3	4	4	4
	Sound Pressure Level [dB(A)]			29	35	39	43	46	49
700	Effective Area [m ²]				0,097	0,078	0,065	0,056	0,049
	Pressure Drop [Pa]				51	71	94	119	145
	Throw Distance [m]				3	3	4	4	4
	Sound Pressure Level [dB(A)]				35	40	44	47	50
800	Effective Area [m ²]				0,111	0,089	0,074	0,064	0,056
	Pressure Drop [Pa]				51	71	94	119	145
	Throw Distance [m]				3	3	4	4	4
	Sound Pressure Level [dB(A)]				36	41	44	48	50
900	Effective Area [m ²]					0,100	0,083	0,071	0,063
	Pressure Drop [Pa]					71	94	119	145
	Throw Distance [m]					3	4	4	5
	Sound Pressure Level [dB(A)]					41	45	48	51
1000	Effective Area [m ²]					0,111	0,093	0,079	0,069
	Pressure Drop [Pa]					71	94	119	145
	Throw Distance [m]					3	4	4	5
	Sound Pressure Level [dB(A)]					42	45	49	51
1250	Effective Area [m ²]						0,116	0,099	0,087
	Pressure Drop [Pa]						94	119	145
	Throw Distance [m]						4	4	5
	Sound Pressure Level [dB(A)]						46	50	52
1500	Effective Area [m ²]							0,119	0,104
	Pressure Drop [Pa]							119	145
	Throw Distance [m]							4	5
	Sound Pressure Level [dB(A)]							50	53
1750	Effective Area [m ²]								0,122
	Pressure Drop [Pa]								145
	Throw Distance [m]								5
	Sound Pressure Level [dB(A)]								54

Table 3. Supply Data Table

Flow Rate [m ³ / h]		Effective Velocity [m / s]							
		0,5	1,0	1,5	2,0	2,5	3,0	3,5	4,0
50	Effective Area [m ²]	0,0278	0,0139	0,009	0,007	0,006	0,005	0,004	0,004
	Pressure Drop [Pa]	6	18	33	51	71	94	119	145
	Throw Distance [m]	1	2	2	3	3	3	4	4
	Sound Pressure Level [dB(A)]	<15	<15	18	24	29	32	36	38
100	Effective Area [m ²]	0,0556	0,0278	0,019	0,014	0,011	0,009	0,008	0,007
	Pressure Drop [Pa]	6	18	33	51	71	94	119	145
	Throw Distance [m]	1	2	2	3	3	4	4	4
	Sound Pressure Level [dB(A)]	<15	<15	21	27	32	35	39	41
200	Effective Area [m ²]	0,111	0,056	0,037	0,028	0,022	0,019	0,016	0,014
	Pressure Drop [Pa]	6	18	33	51	71	94	119	145
	Throw Distance [m]	1	2	2	3	3	4	4	4
	Sound Pressure Level [dB(A)]	<15	16	24	30	35	38	42	44
300	Effective Area [m ²]		0,083	0,056	0,042	0,033	0,028	0,024	0,021
	Pressure Drop [Pa]		18	33	51	71	94	119	145
	Throw Distance [m]		2	3	3	3	4	4	4
	Sound Pressure Level [dB(A)]		17	26	32	36	40	43	46
400	Effective Area [m ²]		0,111	0,074	0,056	0,044	0,037	0,032	0,028
	Pressure Drop [Pa]		18	33	51	71	94	119	145
	Throw Distance [m]		2	3	3	3	4	4	4
	Sound Pressure Level [dB(A)]		19	27	33	38	41	45	47
500	Effective Area [m ²]			0,093	0,069	0,056	0,046	0,040	0,035
	Pressure Drop [Pa]			33	51	71	94	119	145
	Throw Distance [m]			3	3	3	4	4	4
	Sound Pressure Level [dB(A)]			28	34	39	42	46	48
600	Effective Area [m ²]			0,111	0,083	0,067	0,056	0,048	0,042
	Pressure Drop [Pa]			33	51	71	94	119	145
	Throw Distance [m]			3	3	3	4	4	4
	Sound Pressure Level [dB(A)]			29	35	39	43	46	49
700	Effective Area [m ²]				0,097	0,078	0,065	0,056	0,049
	Pressure Drop [Pa]				51	71	94	119	145
	Throw Distance [m]				3	3	4	4	4
	Sound Pressure Level [dB(A)]				35	40	44	47	50
800	Effective Area [m ²]				0,111	0,089	0,074	0,064	0,056
	Pressure Drop [Pa]				51	71	94	119	145
	Throw Distance [m]				3	3	4	4	4
	Sound Pressure Level [dB(A)]				36	41	44	48	50
900	Effective Area [m ²]					0,100	0,083	0,071	0,063
	Pressure Drop [Pa]					71	94	119	145
	Throw Distance [m]					3	4	4	5
	Sound Pressure Level [dB(A)]					41	45	48	51
1000	Effective Area [m ²]					0,111	0,093	0,079	0,069
	Pressure Drop [Pa]					71	94	119	145
	Throw Distance [m]					3	4	4	5
	Sound Pressure Level [dB(A)]					42	45	49	51
1250	Effective Area [m ²]						0,116	0,099	0,087
	Pressure Drop [Pa]						94	119	145
	Throw Distance [m]						4	4	5
	Sound Pressure Level [dB(A)]						46	50	52
1500	Effective Area [m ²]							0,119	0,104
	Pressure Drop [Pa]							119	145
	Throw Distance [m]							4	5
	Sound Pressure Level [dB(A)]							50	53
1750	Effective Area [m ²]								0,122
	Pressure Drop [Pa]								145
	Throw Distance [m]								5
	Sound Pressure Level [dB(A)]								54

Table 4. Exhaust Data Table

		Effective Velocity (m/s)								
Flow Rate (m ³ /h)		0,5	1,0	1,5	2,0	2,5	3,0	3,5	4,0	4,5
50	Effective Area [m ²]	0,0278	0,0139	0,0093	0,0069	0,006	0,005	0,004	0,003	
	Pressure Drop [Pa]	<1	2	5	12	24	42	67	100	
	Sound Pressure Level [dB(A)]	<15	<15	<15	<15	17	24	29	34	
100	Effective Area [m ²]	0,0556	0,0278	0,019	0,014	0,011	0,009	0,008	0,007	0,006
	Pressure Drop [Pa]	<1	2	5	12	24	42	67	100	143
	Sound Pressure Level [dB(A)]	<15	<15	<15	<15	20	27	32	37	42
200	Effective Area [m ²]	0,111	0,056	0,037	0,028	0,022	0,019	0,016	0,014	0,012
	Pressure Drop [Pa]	<1	2	5	12	24	42	67	100	143
	Sound Pressure Level [dB(A)]	<15	<15	<15	<15	23	30	35	40	45
300	Effective Area [m ²]		0,083	0,056	0,042	0,033	0,028	0,024	0,021	0,019
	Pressure Drop [Pa]		2	5	12	24	42	67	100	143
	Sound Pressure Level [dB(A)]		<15	<15	16	25	31	37	42	47
400	Effective Area [m ²]		0,111	0,074	0,056	0,044	0,037	0,032	0,028	0,025
	Pressure Drop [Pa]		2	5	12	24	42	67	100	143
	Sound Pressure Level [dB(A)]		<15	<15	18	26	33	38	43	48
500	Effective Area [m ²]			0,093	0,069	0,056	0,046	0,040	0,035	0,031
	Pressure Drop [Pa]			5	12	24	42	67	100	143
	Sound Pressure Level [dB(A)]			<15	19	27	34	39	44	49
600	Effective Area [m ²]			0,111	0,083	0,067	0,056	0,048	0,042	0,037
	Pressure Drop [Pa]			5	12	24	42	67	100	143
	Sound Pressure Level [dB(A)]			<15	19	28	34	40	45	50
700	Effective Area [m ²]			0,130	0,097	0,078	0,065	0,056	0,049	0,043
	Pressure Drop [Pa]			5	12	24	42	67	100	143
	Sound Pressure Level [dB(A)]			<15	20	28	35	41	46	50
800	Effective Area [m ²]				0,111	0,089	0,074	0,063	0,056	0,049
	Pressure Drop [Pa]				12	24	42	67	100	143
	Sound Pressure Level [dB(A)]				21	29	36	41	46	51
900	Effective Area [m ²]					0,100	0,083	0,071	0,063	0,056
	Pressure Drop [Pa]					24	42	67	100	143
	Sound Pressure Level [dB(A)]					29	36	42	47	51
1000	Effective Area [m ²]					0,111	0,093	0,079	0,069	0,062
	Pressure Drop [Pa]					24	42	67	100	143
	Sound Pressure Level [dB(A)]					30	37	42	47	52
1250	Effective Area [m ²]						0,116	0,099	0,087	0,077
	Pressure Drop [Pa]						42	67	100	143
	Sound Pressure Level [dB(A)]						38	43	48	53
1500	Effective Area [m ²]							0,119	0,104	0,0926
	Pressure Drop [Pa]							67	100	143
	Sound Pressure Level [dB(A)]							44	49	54
1750	Effective Area [m ²]								0,122	0,1080
	Pressure Drop [Pa]								100	143
	Sound Pressure Level [dB(A)]								50	54
2000	Effective Area [m ²]									0,1235
	Pressure Drop [Pa]									143
	Sound Pressure Level [dB(A)]									55

DUCT FLOW AND DAMPER CORRECTION TABLE

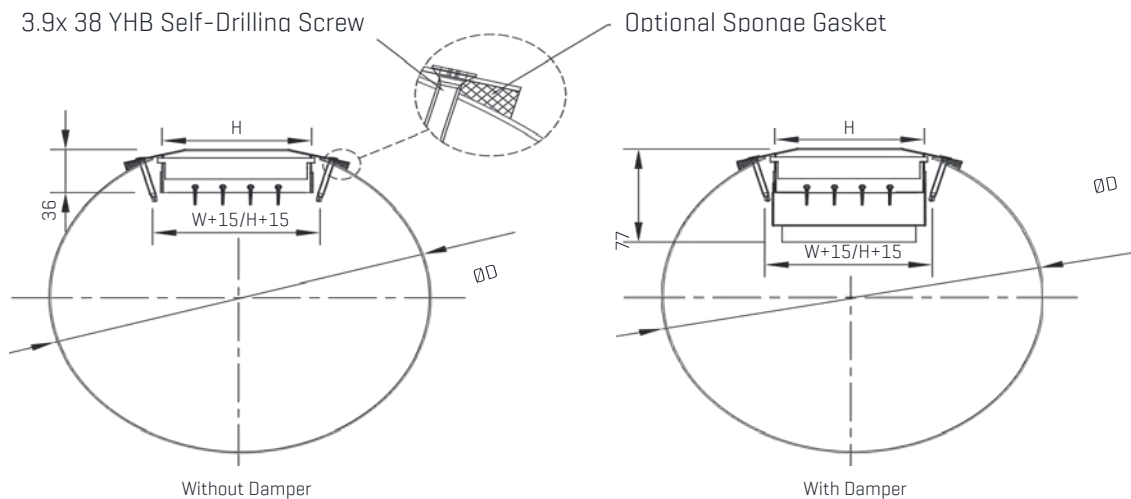
Table 5. Duct Flow and Damper Correction Table

		Multiplier According to Damper Position								
		Full Open		25% Closed		50% Closed		75% Closed		
Duct Velocity [m/s]	Amount to Add	Pressure Multiplier	Sound Multiplier	Pressure Multiplier	Sound Multiplier	Pressure Multiplier	Sound Multiplier	Pressure Multiplier	Sound Multiplier	
0,5	Pressure Drop [Pa]	1,2	1,1	2,0	1,3	2,9	1,5	3,9	1,8	
	Sound Generation [dB(A)]									-6
1	Pressure Drop [Pa]									-5
	Sound Generation [dB(A)]									-5
2	Pressure Drop [Pa]									-3
	Sound Generation [dB(A)]									-2
3	Pressure Drop [Pa]									0
	Sound Generation [dB(A)]									0
4	Pressure Drop [Pa]									4
	Sound Generation [dB(A)]									2
5	Pressure Drop [Pa]									10
	Sound Generation [dB(A)]									4
6	Pressure Drop [Pa]	17								
	Sound Generation [dB(A)]	6								
7	Pressure Drop [Pa]	25								
	Sound Generation [dB(A)]	9								
8	Pressure Drop [Pa]	35								
	Sound Generation [dB(A)]	11								
9	Pressure Drop [Pa]	46								
	Sound Generation [dB(A)]	13								
10	Pressure Drop [Pa]	60								
	Sound Generation [dB(A)]	15								
11	Pressure Drop [Pa]	75								
	Sound Generation [dB(A)]	18								
12	Pressure Drop [Pa]	92								
	Sound Generation [dB(A)]	20								

Note: As the air velocity in the duct increases and the damper position changes, the pressure loss and sound pressure level created by the grill increase. Accordingly, the blowing or suction data in the selected grille must first be multiplied by the damper coefficient if there is a damper. Then the correct result is achieved by adding sound production and pressure loss values according to the channel speed.

MOUNTING TYPES

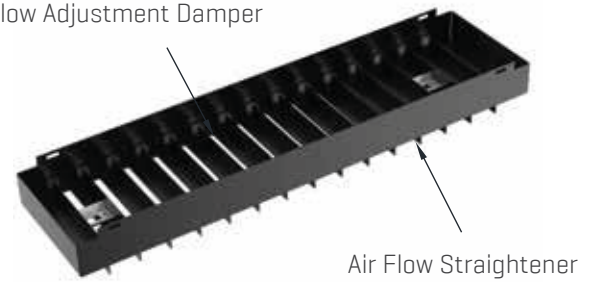
1. SCREWED SYSTEM



OPTIONAL SLIDE DAMPER

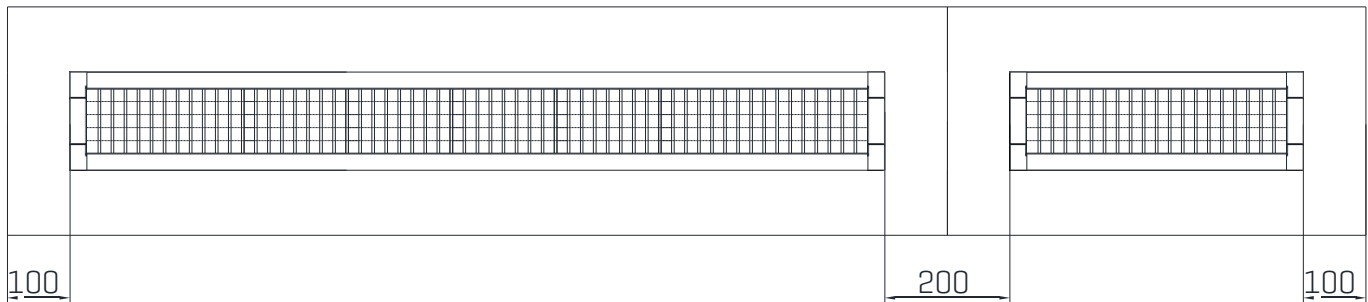
It is suitable to use for blowing and suction.
 With the air flow straightener, homogeneous air distribution is provided in circular duct grilles.

Slide Flow Adjustment Damper



SIZE PARAMETERS

Recommended mounting method in case more than one circular duct grille is positioned side by side.



PRODUCT SELECTION

Example: 200 m³ / h blowing is expected from a circular duct vent connected to a circular duct with an air velocity of 6 m / s. A slide damper will be used. The diameter of the duct which the grille is connected will be 250 mm. The maximum pressure loss should be 100 Pa. Make the selection.

Solution: The necessary correction coefficients for 6 m / s duct air velocity are obtained from the Duct Flow and Damper Correction Table [Table 5].

With the damper in the 25% closed position:

Pressure factor 2

Sound multiplier 1.3

Values to be added for 6 m / s duct air velocity, Pressure drop +17 Pa

Sound generation is +6 dB [A].

From the exhaust data table [Table 3] the required values for a 200 m³ / h exhaust flow rate and the corresponding effective area are obtained. For 0.037 m² effective area, 33 Pa pressure loss, 2 m firing distance and 24 dB [A] sound pressure level and 1.5 m / s effective velocity values are obtained.

Corrected pressure drop and sound pressure level are calculated.

Pressure Drop = $33 \times 2 + 17 = 83$ Pa

Sound Pressure Level = $24 \times 1.3 + 6 = 37.2$ dB [A]

The selected dimension must meet the $H \leq R$ constraint, since the duct radius [R] = 100 mm.

After confirming the conformity of the obtained values, the grille size corresponding to 0.037 m² effective area is selected as W [Width] 525 mm x H [Height] 100 mm on the Effective Area Table [Table 2].

PRODUCT ORDER CODES

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

DZM.<A>..<C>.<D>.<E>.<F>.<G>

A	Raw Material Type	
	GAL	Galvanized
B	Damper	
	OD	Slide Damper
	DZ	Without Damper
C	Mounting Type	
	VD	Screwed System
	MD	Without Mounting Hole
D	Accessories	
	CO	Sponge Gasket
	OO	Without Accessories
E	Width (W) (mm)	
	0000	You can view it from Standard Sizes.
F	Height (H) (mm)	
	0000	You can view it from Standard Sizes.
G	Paint	
	00	Unpainted
	S1	Standard Paint - RAL 9010
	S2	Standard Paint - RAL 9016
	XX	Special Paint

Sample Coding: DZM.GAL.DZ.OO.0600.0150.S1

NOTES



NOTES





We make the difference with
180 different types of products.



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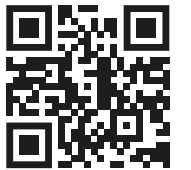
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ACB
Variable Air Volume Device

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 4 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 standards. 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 2 factories, in total area of 45.000 sqm in which 25.000 sqm indoor space that enables DOGU HVAC manufactures 180 various type of products. Additionally, DOGU HVAC has a powerful sales network with 4 sales offices located in İstanbul, Ankara, Antalya and Adana 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 55 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 standards], 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 TSEK, CE and GOST-R quality certifications.



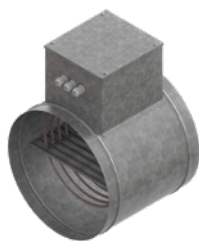
- ☞ ACB Variable Air Volume Control Device, contains an averaging airflow measurement probe, airflow controller and actuator. Airflow is controlled based on actual flow measurement by changing the damper blade position.
- ☞ It is used in circular ducts to control air flow in projects with special requirements such as comfort and hygiene. With variable air flow VAV systems, it provides energy savings of up to 50% in the energy consumed by the fan motor.
- ☞ The airflow set point can be modified between minimum and maximum settings by, e.g., a room controller with an analogue signal [0...10 or 2...10 VDC].
- ☞ All VAV devices produced are calibrated in the VAV laboratory according to the flow rates specified in the order and their leakage is tested according to DIN EN 1751. In this laboratory, calibration is completed by testing one-to-one field conditions with 7 measuring stations, each with different diameter and nominal flow.
- ☞ The tightness of the control damper in closed position conformed to standard EN1751 class 3 and casing tightness to EN 1751 Class B.
- ☞ Duct connection includes airtight rubber gaskets.
- ☞ ACB complies with EN 1946/4 and VDI 6022 hygiene standards.
- ☞ For supply and exhaust installations
- ☞ Maximum differential pressure over the damper of 1000 Pa
- ☞ Operating range: ambient temperature of 0 to 50 °C
- ☞ Ambient relative humidity < 95%, non-condensing
- ☞ Operates at flow rates between 28 m³/h and 5372 m³/h
- ☞ ACB has a compact structure. It works efficiently with low pressure loss thanks to aerodynamic blade design.

MATERIAL

- ☞ Galvanized steel casing and damper blade
- ☞ Zinc coated steel shaft
- ☞ Plastic bearings
- ☞ Neoprene blade gaskets
- ☞ EPDM rubber duct gaskets
- ☞ Aluminium measurement probe

ACCESSORY

- ☞ **Acoustic Insulation:** In order to fulfill the acoustic comfort conditions in the selected product, it is insulated with an optional 19 mm thick foamed rubber. Rubber insulation is covered with galvanized sheet.
- ☞ **ACQ - Electrical Heater:** When an additional heater power is needed for the supply air, an Electric Heater can be added to the output of the ACB.
- ☞ **GSS_K - Circular Silencer:** Duct type silencer option is available to meet comfort conditions.



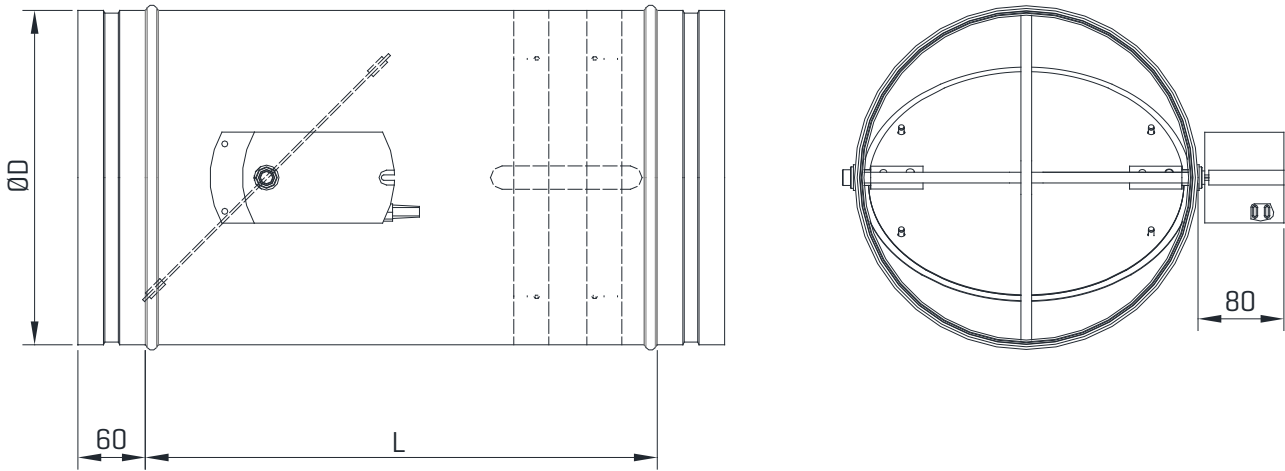
ACQ - Electric Heater



GSS_K - Circular Silencer

STANDARD DIMENSIONS

ACB WITHOUT INSULATION



ACB WITH INSULATION

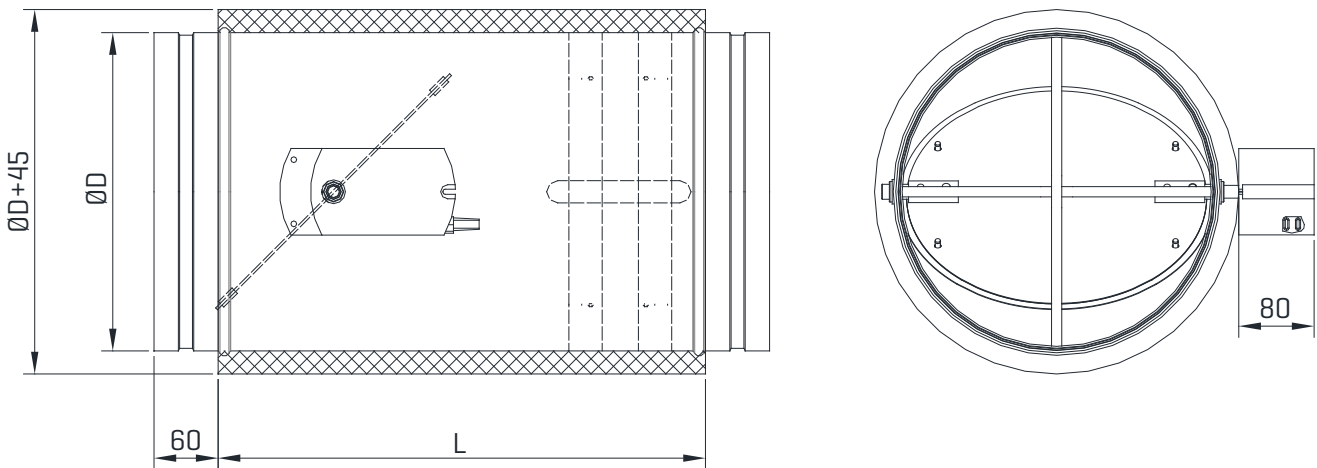


Table 1. Quick Selection

TYPE [By Diameter [mm]]	V _{min}	V _{max}	L
	[m ³ /h]	[m ³ /h]	mm
ACB-100	28	266	345
ACB-125	44	428	325
ACB-160	72	705	330
ACB-200	113	1108	370
ACB-250	177	2086	420
ACB-315	281	3322	485
ACB-355	356	4226	525
ACB-400	452	5372	570

Note:

V_{min} air speed of 1 m/s, V_{nom} values of air velocity 10 m/s refers to the nominal flow is to pass through a duct according to product size.

V_{max} and V_{min} values should be determined in the flow rate selection. The V_{min} value can be selected between 0% and 100% of the V_{nom} value. The V_{max} value can be chosen between 40% and 80% of the V_{nom} value. When V_{min} and V_{max} values are selected the same, the product will operate in constant flow [CAV] mode.

PERFORMANCE DATA

Table 2. Performance Data

ACB - [W/O Insulation]				Air Regenerated Noise				Case Radiated Noise							
ACB - [Insulated]				L _{pA} [dB(A)]				L _{pR} [dB(A)]							
Nominal	Velocity	Flow Rate	Pressure Drop	ACB - [W/O Insulation] ACB - [Insulated]				ACB - [W/O Insulation]				ACB - [Insulated]			
ØD	[m/s]	[m ³ /h]	[Pa]	100	200	400	800	100	200	400	800	100	200	400	800
				[Pa]	[Pa]	[Pa]	[Pa]	[Pa]	[Pa]	[Pa]	[Pa]	[Pa]	[Pa]	[Pa]	[Pa]
100	2	53	2	30	38	45	50	<15	20	28	32	<15	<15	<15	18
	4	106	10	34	40	47	52	<15	22	29	34	<15	<15	<15	21
	6	160	23	36	43	49	54	19	24	31	35	<15	<15	19	23
	8	213	41	39	45	51	57	21	27	33	38	<15	<15	22	27
	10	266	65	42	47	54	59	25	29	36	41	<15	18	24	30
125	2	86	2	30	38	45	50	<15	20	28	33	<15	<15	<15	20
	4	172	10	35	41	48	53	<15	23	31	36	<15	<15	18	23
	6	258	22	38	43	51	56	20	25	33	38	<15	<15	21	26
	8	344	39	41	46	53	58	24	28	35	41	<15	<15	24	29
	10	428	61	44	49	55	60	26	31	37	43	<15	19	26	31
160	2	141	2	28	40	46	52	<15	24	30	36	<15	<15	<15	20
	4	282	10	33	43	48	55	<15	26	32	38	<15	<15	17	23
	6	423	22	37	47	51	57	20	31	34	41	<15	21	22	28
	8	564	39	40	49	53	60	23	33	36	44	<15	18	24	31
	10	705	61	44	51	55	62	27	35	38	46	<15	20	26	33
200	2	222	2	29	38	44	54	<15	22	29	39	<15	<15	<15	26
	4	444	9	34	42	49	56	17	27	33	41	<15	<15	21	28
	6	666	19	38	45	51	58	22	30	36	43	<15	18	24	31
	8	888	35	41	48	54	61	25	33	38	45	<15	21	26	33
	10	1108	54	45	51	56	63	29	35	40	48	<15	23	29	35
250	2	348	2	28	37	46	52	<15	21	30	39	<15	<15	<15	26
	4	696	9	35	42	49	57	17	27	33	41	<15	<15	21	28
	6	1044	18	38	46	52	59	22	30	36	43	<15	18	24	31
	8	1392	33	41	49	54	61	25	33	38	45	<15	21	26	33
	10	1740	51	45	51	56	63	29	35	40	48	<15	23	29	35
	12	2086	53	48	53	58	64	32	36	42	48	22	28	33	39
315	2	554	2	29	37	46	52	<15	21	31	37	<15	<15	20	27
	4	1108	9	36	44	50	56	19	27	34	40	<15	19	25	31
	6	1662	17	40	47	54	59	24	31	37	43	<15	22	29	34
	8	2216	29	44	50	56	62	28	33	40	45	19	25	31	37
	10	2770	46	48	53	58	64	32	36	42	48	22	28	33	39
	12	3322	54	52	57	59	66	34	39	45	50	24	30	36	43
355	2	704	3	28	37	44	53	<15	23	31	40	<15	<15	20	29
	4	1408	14	36	45	49	56	21	30	35	43	<15	20	24	32
	6	2112	15	39	47	53	60	24	33	39	46	15	22	29	35
	8	2816	26	43	50	56	63	28	36	42	49	18	26	31	38
	10	3520	41	46	53	59	66	32	39	44	52	22	29	34	41
	12	4226	54	52	56	60	68	34	41	45	54	24	30	36	43
400	2	895	2	29	36	46	55	<15	22	34	41	<15	<15	22	31
	4	1790	10	37	44	50	57	22	30	36	43	<15	21	26	34
	6	2685	14	40	47	54	60	26	33	39	46	17	23	30	37
	8	3580	25	45	50	56	63	30	36	41	49	21	27	32	39
	10	4475	38	48	54	59	67	33	39	45	53	24	30	36	43
	12	5372	54	52	56	60	68	34	41	45	54	24	30	36	43

FLOW AREA

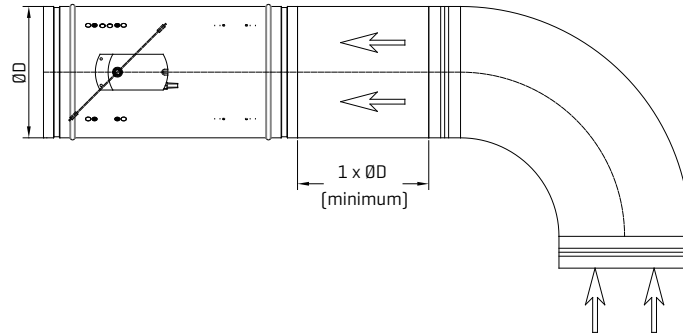
Table 3. Flow Area By Dimensions

Flow Area Table	TYPE [By Diameter [mm]]							
	ACB- 100	ACB- 125	ACB- 160	ACB- 200	ACB- 250	ACB- 315	ACB- 355	ACB- 400
Flow Area [m ²]	0,008	0,012	0,020	0,031	0,049	0,078	0,099	0,126

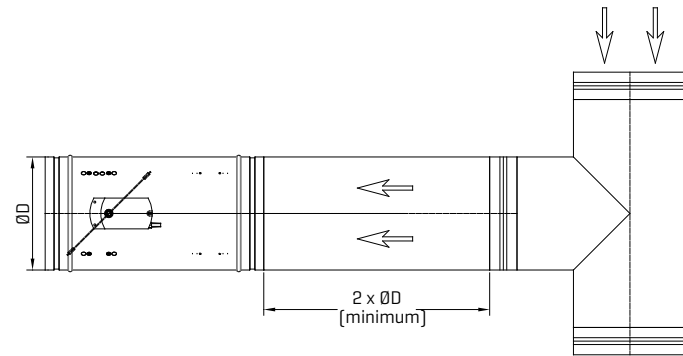
INSTALLATION

It is installed by considering the air flow direction arrow on the ACB. For the differential pressure sensors to function correctly, the following distance rules must be observed. For duct connections such as elbows, branches, tee connections and reductions must conform to EN 13180 design.

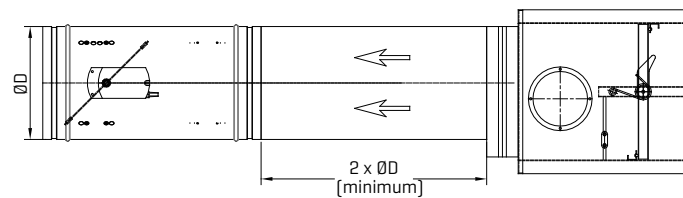
A. AFTER BENDS



B. AFTER BRANCHES



C. AFTER FIRE DAMPERS



D. AFTER SILENCERS

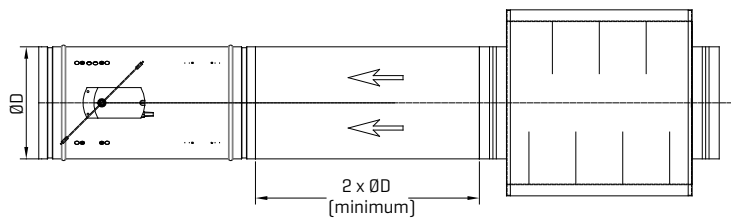


Table 4. Minimum Duct Length Table

Connection	Minimum Duct Length
Elbow	1xØD
Other duct equipment (T connection, reduction etc. duct equipment)	2xØD
Fire Damper	2xØD
Silencer	2xØD

VAV COMPACT CONTROLLERS

VAV controllers are equipped as standard with actuators with analog setpoint and feedback signals in DC 2 V... 10 V or DC 0 V... 10 V mode.

MP-BUS, MODBUS and BACnet communication options are available in the control devices.

Control devices are calibrated and adjusted at the factory to the desired flow rate and Vmin Vmax value with ZTH-EU and Belimo PC Tool.

Table 5. VAV Controller Information Table

Order Code	Belimo Motor Code	Flow Volume Adjustment Analog input	Flow Volume Adjustment via BUS Com.	Controller Parameters Setup ⁽³⁾	Hard Wired Override	Feedback Signal Type	Feedback Values ⁽²⁾	BUS Communicated Variables	Power Supply	Operating Temperature [°C]
S71 S70	LMV-D3-MP [5 Nm] NMV-D3-MP [10 Nm]	DC 0...10 V, DC 2...10 V	MP-BUS	ZTH-EU, PC TOOL, NFC [Android], MP-BUS	Open ⁽¹⁾ Close Vmin, Vmax	DC 0...10 V, DC 2...10 V, MP-BUS	Actual Volume, Damper Angle, Actual Pressure	Read/Write: Setpoint, Vmin, Vmax, Open, Close Read: Actual Volume, Damper Angle, Actual Pressure, Serial Number, Fault, Alarm Messages	AC 24 V, DC 24 V	0...+50 °C
S72	LMV-D3-MF [5 Nm]		—	ZTH-EU, PC TOOL		DC 0...10 V, DC 2...10 V		—		
S71 S86	LMV-D3-MOD [5 Nm] NMV-D3-MOD [10 Nm]		MODBUS, BACnet, MP-BUS	ZTH-EU, PC TOOL, MODBUS, MP-BUS		DC 0...10 V, DC 2...10 V, MODBUS, MP-BUS		Read/Write: Setpoint, Vmin, Vmax, Open, Close Read: Actual Volume, Damper Angle, Actual Pressure, Serial Number, Fault, Alarm Messages		

Note:

- 1) Available on AC 24 supply only.
- 2) Output is analog. Therefore, only one feedback value can be selected.
- 3) Control units are not provided as accessories.

VAV COMPACT CONTROL DEVICE ELECTRIC CONNECTION

S72: LMV-D3-MF [STANDARD PRODUCTION]



No.	Designation	Wire Colour	Function
1	$\perp-$	Black	AC/DC 24 V Supply
2	$\sim+$	Red	
3	$\blacktriangleleft Y$	White	Reference Signal VAV / CAV
5	$\blacktriangleright U$	Orange	-Actual Value Signal -Tool Communication

S71: LMV-D3-MP & S70: NMV-D3-MP



No.	Designation	Wire Colour	Function
1	$\perp-$	Black	AC/DC 24 V Supply
2	$\sim+$	Red	
3	$\blacktriangleleft Y$	White	Reference Signal VAV / CAV
5	$\blacktriangleright U$	Orange	-Actual Value Signal -MP-Bus Connection

S73: LMV-D3-MOD & S86: NMV-D3-MOD

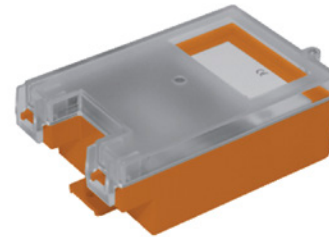
No.	Designation	Wire Colour	Function
1	$\perp-$	Black	AC/DC 24 V Supply
2	$\sim+$	Red	
3			
5	$\blacktriangleright MFT$	Orange	MP Connection
6	D-	Pink	BACnet / Modbus [RS485]
7	D+	Gray	

OPTIONAL ADAPTIVE VAV CONTROL SYSTEM

If desired, a product option is available with a fast response VAV servomotor, static pressure sensor and control platform. It provides the adaptive control of the ambient air flow by providing an on-off speed control independent of the duct pressure in 2.5 seconds.

Table 6. VRP-M Regulator Information Table

VRP-M Controller	
Nominal Voltage	24 V AC, 50/60 Hz 24 V DC
Power Supply	1,1 W (Without Servomotor, with VFP 300)
Reference Signal w [terminal 3] Range: Vmin...Vmax	Input Impedance > 200 kΩ - DC 0...10 / 2...10 V or - 0...20 / 4...20 mA (with 500 Ω resistance)
Actual Value	0...10 / 2...10 DC, maximum 5 mA
Degree of Protection	IP 42
Operating Temperature	0...+50°C
EMC	CE 2004/108/EC
Ambient Humidity	5...95% r.h



VRP-M

Table 7. VFP-300 Static Differential Pressure Transducer Information Table

VFP-300 Static Differential Pressure Sensor	
Supply Connection	15 V DC (Suitable with VRP-M)
Measuring Ranges	0...300 Pa
Output Signal	0...10 V DC
Connection for Pressure Losses	Internal Diameter Ø4...6 mm
Protection Class	III Safety Extra-Low Voltage
Degree of Protection	IP42
Operating Temperature	0...+50°C
EMC	CE 2004/108/EC



VRP-300

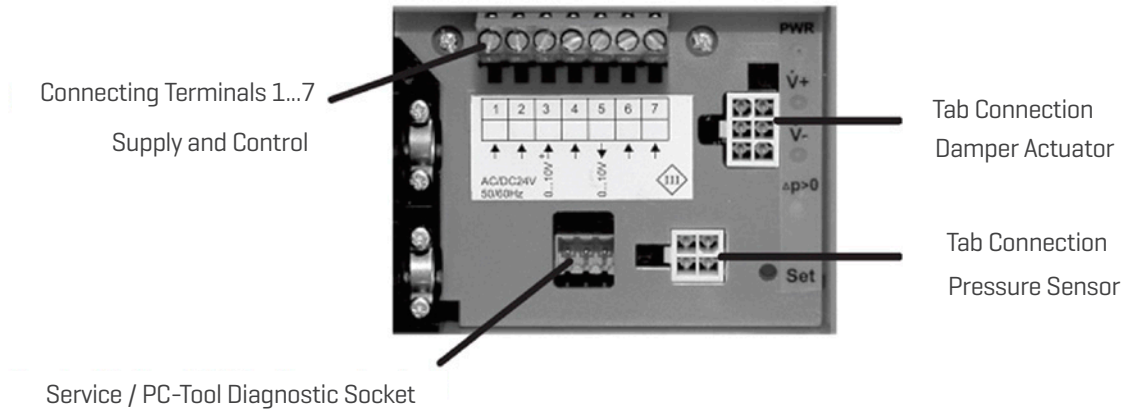
Table 8. LMQ24A-SRV-ST & LMQ24A-SRV-ST Servomotor Information Table

LMQ24A-SRV-ST Servomotor	
Supply with VRP-M	24 V AC, 50/60 Hz 24 V DC
Power Operating Consumption	13 W
Protection Class	III [Safety Extra-Low Voltage]
Torque	4 Nm
Speed	2,5 s / 90°
Degree of Protection	IP54
Operating Temperature	0...+50°C
EMC	CE 89/336/EEC
Ambient Humidity	5...95% r.h.
Maintenance	Maintenance Free

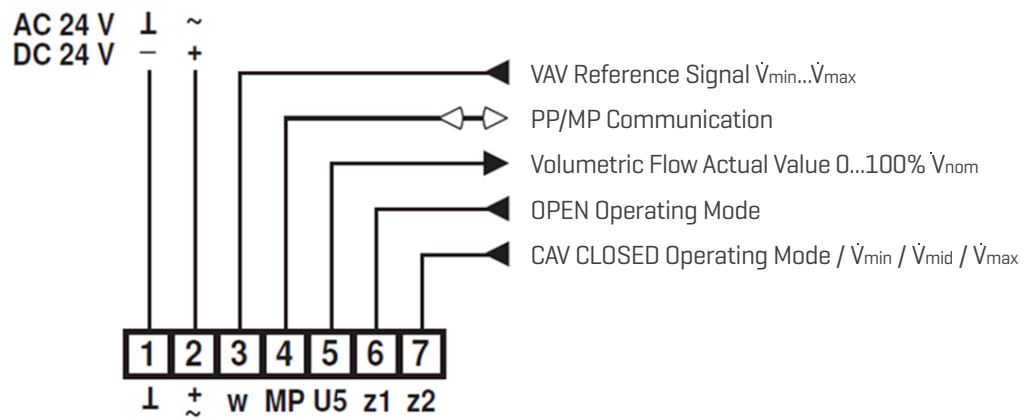
LMQ24A-SRV-ST
NMQ24A-SRV-ST

ADAPTIVE VAV CONTROL SYSTEM ELECTRIC CONNECTION

FRONT PANEL



FRONT PANEL CONNECTION TERMINALS FUNCTIONS



PRODUCT SELECTION

The maximum air flow rate of the space is known as V_{max} . V_{max} volume flow rate can be selected between maximum 80% and 40% of the nominal volume flow rate of the damper. V_{min} flow rate can be selected as 30% of the nominal air flow rate of the damper. In 2-10V controller selection, the damper operates at a flow rate of V_{min} at 2V and below. Between 0-10V, the damper has the feature of completely closing. If V_{max} and V_{min} are selected at the same value, the damper will operate in CAV [constant flow rate setting] mode.

Example: The total air flow of a zone is determined as $15000 \text{ m}^3 / \text{h}$. 5 VAV devices for the room will be installed in the supply duct. Select your product.

The maximum supply flow rate for each VAV to be used is calculated as $15000/5 = 3000 \text{ m}^3 / \text{h}$. Since $V_{max} = 80\% V_{nom}$ and $V_{max} = 3000 \text{ m}^3 / \text{h}$, it is calculated as $V_{nom} = 3750 \text{ m}^3/\text{h}$ from the formula. V_{min} can be 30% of the V_{nom} value and can be selected $V_{min} = 1125 \text{ m}^3/\text{h}$. According to the values of V_{min} and V_{max} , the appropriate size is selected from the Table 2. Quick Selection table as $V_{nom} = 4226 \text{ m}^3/\text{h}$ and duct dimension is $\varnothing 355 \text{ mm}$.

For maximum calibrated flowrate of VAV is $3000 \text{ m}^3/\text{h}$ and diameter $\varnothing 355 \text{ mm}$, the performance data can be obtained from Table 2. Performance Data. According to the table, values can be interpolated. Example results shown below.

Pressure drop = 30 Pa

Air Regenerated Noise: 44 dB[A] [100 Pa], 64 dB[A] [800 Pa]

Case Radiated Noise Without Insulation: 29 dB[A] [100 Pa], 50 dB[A] [800 Pa]

Case Radiated Noise With Insulation: 19 dB[A] [100 Pa], 39 dB[A] [800 Pa]

Actuator Selection

According to the building automation system, the desired motor is selected from Table 5. VAV Controller Information Table. If the system is desired to be fast reacting under special conditions, adaptive vav control system is preferred. For electric connection information, see the section "Adaptive Vav Control System Electric Connection".

ORDER CODE

ACB.<A>..<C>.<D>.<E>.<F>.<G>

A	Material Type	
	GAL	Galvanized
	PAS	Stainless Steel
B	Flow Type	
	E	Exhaust
	U	Supply
C	Mechanism	
	S70	NMV-D3-MP
	S71	LMV-D3-MP
	S72	LMV-D3-MF
	S73	LMV-D3-MOD
	S74	LMV-D3-LON
	S86	NMV-D3-MOD
	S97	Adaptive VAV Control System
D	Installation	
	KG	Duct Type
E	Insulation	
	00	Without Insulation
	04	With Insulation
G	Dimension [ØD]	
125 mm - 160 mm - 200 mm - 250 mm - 315 mm - 355 mm - 400 mm		

Example; ACB.GAL.E.S72.KG.00.0200



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UDS
Circular Displacement Flow Unit

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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 6 major groups as Air Handling Units, Rooftop Units, Heat/Energy Recovery Units, Air Purifiers, Air Distribution & Management Products and Kitchen Ventilation Equipments 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 2 factories, in total area of 32.000 sqm in which 17.500 sqm indoor space that enables DOGU HVAC manufactures 180 various type of products. Additionally, DOGU HVAC has a powerful sales network with 4 sales offices located in İstanbul, Ankara, Antalya and Adana 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 55 countries.

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GENERAL FEATURES

- ☞ UDS - Circular Displacement Flow Unit provides maximum comfort for residents with low flow rates in large spaces such as hotel lobbies, factory areas, atriums and airports.
- ☞ It is recommended to use low speed units in cooling applications between -1°C and -6°C .
- ☞ Provides 360° air supply in the area where it is positioned, thanks to its circular feeding option.
- ☞ The velocity of the air leaving the unit is low. Thus, the fresh air cools the environment without disturbing the residents.
- ☞ Effectively removes the particles released by various pollutants from the space together with the heated air.
- ☞ TSE ISO EN 14644, DIN 1946/4, DIN 24194 and DIN 25414 hygiene quality standards.



MATERIAL

UDS - Circular Displacement Flow Unit is shaped from galvanized sheet metal. It is coated with electrostatic powder paint with high corrosion resistance. It can also be produced as stainless in line with customer preferences. There is a rubber gasket on the throat of the UDS that prevents air leakage.

DIMENSIONS

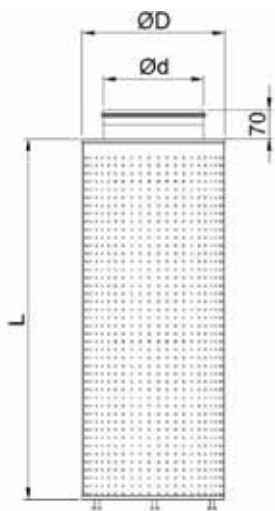


Table 1. Dimensions

UDS	Ød [mm]	ØD [mm]	L [mm]
200	199	286	Between 200 mm and 1200 mm
250	249	336	
315	314	406	
400	399	506	
500	499	636	
630	629	808	

PERFORMANCE DATA

Table 2. Performance

Flow rate [m³/h]	L = 1000mm	Ød [mm]					
		200	250	315	400	500	630
100	Velocity [m/s]	0.04	0.04	0.03	0.02	0.02	0.01
	Pressure Drop [Pa]	0.2	0.1	<0.1	<0.1	<0.1	<0.1
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15
	Throw Distance [m]	0.4	0.3	0.3	0.3	0.2	0.2
150	Hz [m/s]	0.07	0.05	0.04	0.03	0.03	0.02
	Pressure Drop [Pa]	0.4	0.3	0.2	0.1	<0.1	<0.1
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15
	Throw Distance [m]	0.5	0.5	0.4	0.4	0.3	0.3
200	Velocity [m/s]	0.09	0.07	0.06	0.04	0.04	0.03
	Pressure Drop [Pa]	1	1	0.3	0.2	0.1	<0.1
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15
	Throw Distance [m]	0.6	0.6	0.5	0.4	0.4	0.4
250	Velocity [m/s]	0.11	0.09	0.07	0.06	0.04	0.04
	Pressure Drop [Pa]	1	1	1	0.3	0.2	0.1
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15
	Throw Distance [m]	0.8	0.7	0.6	0.5	0.5	0.4
300	Velocity [m/s]	0.13	0.11	0.08	0.07	0.05	0.04
	Pressure Drop [Pa]	2	1	1	0.5	0.3	0.2
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15
	Throw Distance [m]	0.9	0.8	0.7	0.6	0.6	0.5
400	Velocity [m/s]	0.18	0.14	0.11	0.09	0.07	0.06
	Pressure Drop [Pa]	3	2	1	1	1	0
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15
	Throw Distance [m]	1.1	1.0	0.9	0.8	0.7	0.6
500	Velocity [m/s]	0.22	0.18	0.14	0.11	0.09	0.07
	Pressure Drop [Pa]	5	3	2	1	1	1
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15
	Throw Distance [m]	1.4	1.2	1.1	1.0	0.8	0.8
600	Velocity [m/s]	0.27	0.21	0.17	0.13	0.11	0.08
	Pressure Drop [Pa]	7	5	3	2	1	1
	Sound Power Level [dB(A)]	18	<15	<15	<15	<15	<15
	Throw Distance [m]	1.6	1.4	1.3	1.1	1.0	0.9
800	Velocity [m/s]	0.35	0.28	0.22	0.18	0.14	0.11
	Pressure Drop [Pa]	13	8	5	3	2	1
	Sound Power Level [dB(A)]	27	20	<15	<15	<15	<15
	Throw Distance [m]	2.0	1.8	1.6	1.4	1.2	1.1
1000	Velocity [m/s]	0.44	0.35	0.28	0.22	0.18	0.14
	Pressure Drop [Pa]	20	13	8	5	3	2
	Sound Power Level [dB(A)]	34	27	20	<15	<15	<15
	Throw Distance [m]	2.4	2.1	1.9	1.7	1.5	1.3
1200	Velocity [m/s]	0.53	0.42	0.34	0.27	0.21	0.17
	Pressure Drop [Pa]	28	18	12	7	5	3
	Sound Power Level [dB(A)]	39	33	26	18	<15	<15
	Throw Distance [m]	2.8	2.5	2.2	2.0	1.7	1.5
1400	Velocity [m/s]	0.62	0.50	0.39	0.31	0.25	0.20
	Pressure Drop [Pa]	38	25	16	10	6	4
	Sound Power Level [dB(A)]	44	37	30	23	16	<15
	Throw Distance [m]	3.2	2.8	2.5	2.2	2.0	1.8
1600	Velocity [m/s]	0.71	0.57	0.45	0.35	0.28	0.22
	Pressure Drop [Pa]	50	33	21	13	8	5
	Sound Power Level [dB(A)]	48	41	34	27	20	<15
	Throw Distance [m]	3.5	3.1	2.8	2.5	2.2	2.0
1800	Velocity [m/s]	0.80	0.64	0.51	0.40	0.32	0.25
	Pressure Drop [Pa]	64	41	26	17	11	7
	Sound Power Level [dB(A)]	52	45	38	31	24	17
	Throw Distance [m]	3.9	3.5	3.1	2.7	2.4	2.2
2000	Velocity [m/s]	0.88	0.71	0.56	0.44	0.35	0.28
	Pressure Drop [Pa]	79	51	33	20	13	8
	Sound Power Level [dB(A)]	55	48	41	34	27	20
	Throw Distance [m]	4.2	3.8	3.4	3.0	2.6	2.4
2500	Velocity [m/s]	1.11	0.88	0.70	0.55	0.44	0.35
	Pressure Drop [Pa]	123	80	51	32	21	13
	Sound Power Level [dB(A)]	62	55	48	41	34	27
	Throw Distance [m]	5.1	4.5	4.0	3.6	3.2	2.8
3000	Velocity [m/s]	1.33	1.06	0.84	0.66	0.53	0.42
	Pressure Drop [Pa]	177	115	73	46	30	19
	Sound Power Level [dB(A)]	67	60	53	46	39	32
	Throw Distance [m]	5.9	5.3	4.7	4.1	3.7	3.3

Table 3. Correction Factors

L [mm]	Correction Factor			
	Velocity	Pressure	Sound	Throw
100	10	100	4	3.3
200	5	25	3.1	2.3
400	2.5	6.3	2.2	1.6
500	2.0	4	1.8	1.4
750	1.3	1.8	1.3	1.2
1000	1.0	1	1	1
1200	0.8	0.7	0.7	0.9

ORDER CODE

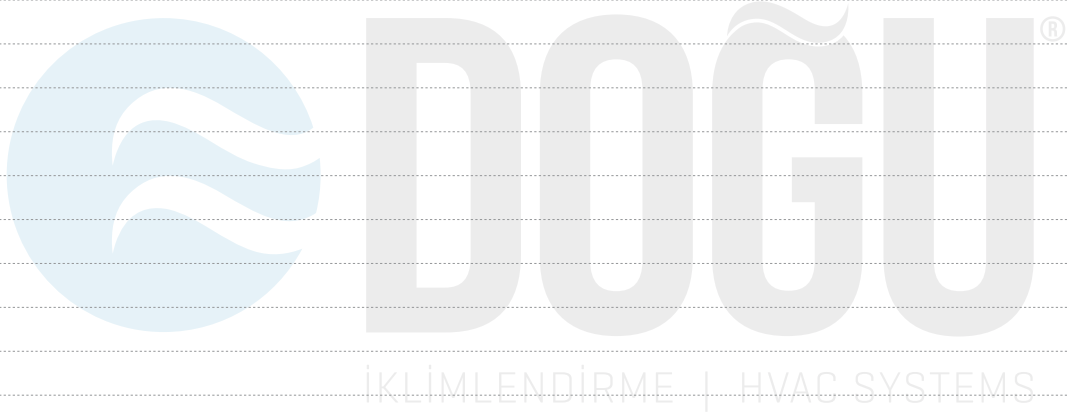
You can place your orders according to the following coding format.

UDS. <A> . . <C> . <D>

A	Material	
	GAL	Galvanized
	PAS	Stainless Steel
B	Dimension (Ød) [mm]	
	Ø200 - Ø250 - Ø315 - Ø400 - Ø500 - Ø630	
C	Length (L) [mm]	
	0000	Standard Dimensions
D	Coating	
	00	Without Color
	S1	Standard Color - RAL 9010
	S2	Standard Color - RAL 9016
	XX	Special Color

Example: UDS.GAL.0500.1200.S1

NOTLAR





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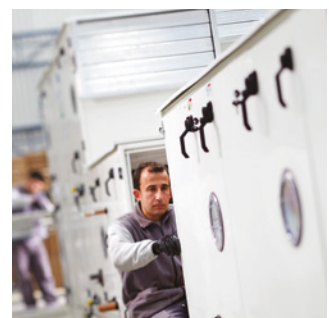


VKG
RECTANGULAR BACKDRAFT DAMPER

Venues Breathe with DOGU HVAC Systems!

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- ☞ VKG - Rectangular Backdraft Damper opens with the air flow and pressure created by the operation of the fan motor in ventilation systems. It turns off when the fan motor stops.
- ☞ In the system, it prevents air flow in the opposite direction of the air flow direction to which the damper is applied.
- ☞ When the fan motor is off, it prevents rain, dust or small creatures such as insects and birds from entering the system.
- ☞ In parallel working fan systems (multiple fan system), it prevents the air from leaving the non-operating fan group.
- ☞ In case of positive pressure in pressurized ventilation systems, it opens its wings and reduces the internal pressure. In this way, it can respond quickly to pressure differences caused by suddenly closing dampers such as fire dampers and sealed dampers.

PRODUCT TYPE AND MATERIAL

- ☞ The case is produced from aluminum as standard, optionally from galvanized sheet.
- ☞ The blades are made of aluminum. There is a silicone gasket resistant to 80C temperature on the blades.

SURFACE COATING

- ☞ Unpainted as standard.
- ☞ Optional [VKG.ALM]
 - Electrostatic powder paint in RAL color codes

INSTALLATION OPTIONS

- ☞ Duct Installation
- ☞ Supply Air Side
- ☞ Return Air Side
- ☞ Air Transfer

STANDARD SIZES

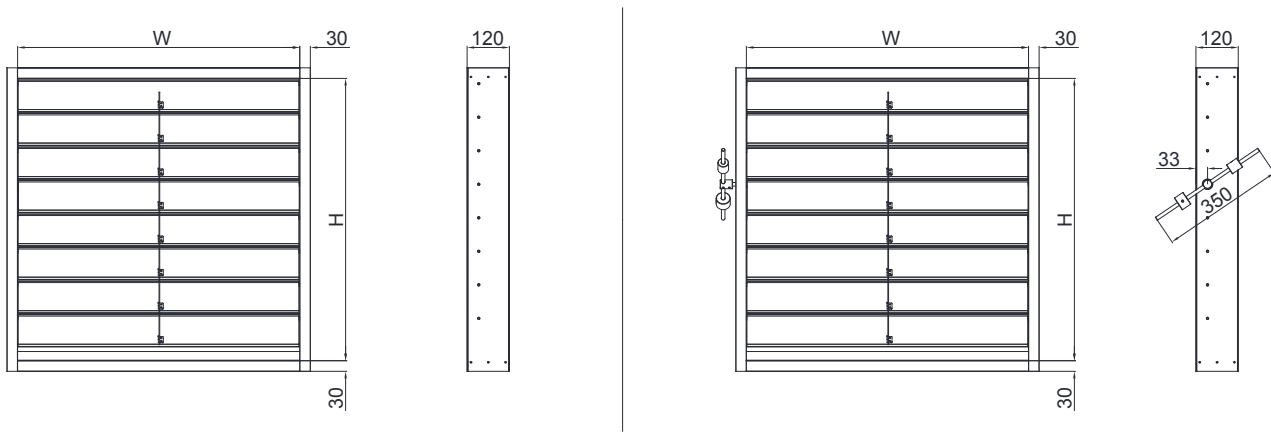


Table 1. Standard Sizes

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

QUICK SELECTION

In the quick selection table below, air flow and throat measurements are given when the air velocity is 1.5m/s.

Table 2. Quick Selection

Flow Rate [m³/h]		H (Height) [mm]								
		100	200	300	400	500	700	800	900	1000
W (Width) [mm]	100	54	108	162	216	270	378	432	486	540
	200	108	216	324	432	540	756	864	972	1080
	300	162	324	486	648	810	1134	1296	1458	1620
	400	216	432	648	864	1080	1512	1728	1944	2160
	500	270	540	810	1080	1350	1890	2160	2430	2700
	600	324	648	972	1296	1620	2268	2592	2916	3240
	700	378	756	1134	1512	1890	2646	3024	3402	3780
	800	432	864	1296	1728	2160	3024	3456	3888	4320
	900	486	972	1458	1944	2430	3402	3888	4374	4860
	1000	540	1080	1620	2160	2700	3780	4320	4860	5400
	1100	594	1188	1782	2376	2970	4158	4752	5346	5940
	1200	648	1296	1944	2592	3240	4536	5184	5832	6480
	1300	702	1404	2106	2808	3510	4914	5616	6318	7020
	1400	756	1512	2268	3024	3780	5292	6048	6804	7560
1500	810	1620	2430	3240	4050	5670	6480	7290	8100	

FLOW FIELD

Flow fields used in product selection by using performance data are given in the table below.

Table 3. Flow Field

Flow Field [m²]		H (Height) [mm]													
		100	200	300	400	500	700	800	900	1000	1100	1200	1300	1400	1500
W (Width) [mm]	100	0.01	0.02	0.03	0.04	0.05	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15
	200	0.02	0.04	0.06	0.08	0.10	0.14	0.16	0.18	0.20	0.22	0.24	0.26	0.28	0.30
	300	0.03	0.06	0.09	0.12	0.15	0.21	0.24	0.27	0.30	0.33	0.36	0.39	0.42	0.45
	400	0.04	0.08	0.12	0.16	0.20	0.28	0.32	0.36	0.40	0.44	0.48	0.52	0.56	0.60
	500	0.05	0.10	0.15	0.20	0.25	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75
	600	0.06	0.12	0.18	0.24	0.30	0.42	0.48	0.54	0.60	0.66	0.72	0.78	0.84	0.90
	700	0.07	0.14	0.21	0.28	0.35	0.49	0.56	0.63	0.70	0.77	0.84	0.91	0.98	1.05
	800	0.08	0.16	0.24	0.32	0.40	0.56	0.64	0.72	0.80	0.88	0.96	1.04	1.12	1.20
	900	0.09	0.18	0.27	0.36	0.45	0.63	0.72	0.81	0.90	0.99	1.08	1.17	1.26	1.35
	1000	0.10	0.20	0.30	0.40	0.50	0.70	0.80	0.90	1.00	1.10	1.20	1.30	1.40	1.50

PERFORMANCE DATA

Table 4. Performance Data

Flow Rate [m³/h]		Flow Field [m²]														
		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1	1.1	1.2	1.3	1.4	1.5
500	Air Flow Speed [m/s]	1.4														
	Pressure Drop [Pa]	23														
	Sound Level [dB(A)]	27														
750	Air Flow Speed [m/s]	2.1	1.0													
	Pressure Drop [Pa]	29	20													
	Sound Level [dB(A)]	34	24													
1000	Air Flow Speed [m/s]	2.8	1.4													
	Pressure Drop [Pa]	33	23													
	Sound Level [dB(A)]	39	30													
1250	Air Flow Speed [m/s]	3.5	1.7	1.2												
	Pressure Drop [Pa]	38	26	21												
	Sound Level [dB(A)]	43	34	28												
1500	Air Flow Speed [m/s]	4.2	2.1	1.4	1.0											
	Pressure Drop [Pa]	42	29	23	20											
	Sound Level [dB(A)]	47	37	31	27											
1750	Air Flow Speed [m/s]	4.9	2.4	1.6	1.2											
	Pressure Drop [Pa]	45	31	25	21											
	Sound Level [dB(A)]	50	40	34	30											
2000	Air Flow Speed [m/s]	5.6	2.8	1.9	1.4	1.1										
	Pressure Drop [Pa]	49	33	27	23	20										
	Sound Level [dB(A)]	52	42	37	33	29										
2500	Air Flow Speed [m/s]	6.9	3.5	2.3	1.7	1.4	1.2									
	Pressure Drop [Pa]	55	38	30	26	23	21									
	Sound Level [dB(A)]	56	47	41	37	34	31									
3000	Air Flow Speed [m/s]	8.3	4.2	2.8	2.1	1.7	1.4	1.2	1.0							
	Pressure Drop [Pa]	60	42	33	29	25	23	21	20							
	Sound Level [dB(A)]	60	50	44	40	37	34	32	30							
3500	Air Flow Speed [m/s]	9.7	4.9	3.2	2.4	1.9	1.6	1.4	1.2	1.1						
	Pressure Drop [Pa]	66	45	36	31	28	25	23	21	20						
	Sound Level [dB(A)]	63	53	47	43	40	37	35	33	31						
4000	Air Flow Speed [m/s]	5.6	3.7	2.8	2.2	1.9	1.6	1.4	1.2	1.1	1.0					
	Pressure Drop [Pa]	49	39	33	30	27	25	23	22	20	19					
	Sound Level [dB(A)]	55	49	45	42	40	37	36	34	32	31					
5000	Air Flow Speed [m/s]	6.9	4.6	3.5	2.8	2.3	2.0	1.7	1.5	1.4	1.3	1.2	1.1			
	Pressure Drop [Pa]	55	44	38	33	30	28	26	24	23	22	21	20			
	Sound Level [dB(A)]	59	54	50	46	44	42	40	38	37	35	34	33			
6000	Air Flow Speed [m/s]	8.3	5.6	4.2	3.3	2.8	2.4	2.1	1.9	1.7	1.5	1.4	1.3	1.2	1.1	
	Pressure Drop [Pa]	60	49	42	37	33	31	29	27	25	24	23	22	21	20	
	Sound Level [dB(A)]	63	57	53	50	47	45	43	41	40	39	37	36	35	34	
7000	Air Flow Speed [m/s]	9.7	6.5	4.9	3.9	3.2	2.8	2.4	2.2	1.9	1.8	1.6	1.5	1.4	1.3	
	Pressure Drop [Pa]	66	53	45	40	36	33	31	29	28	26	25	24	23	22	
	Sound Level [dB(A)]	66	60	56	53	50	48	46	44	43	41	40	39	38	37	
8000	Air Flow Speed [m/s]	11.1	7.4	5.6	4.4	3.7	3.2	2.8	2.5	2.2	2.0	1.9	1.7	1.6	1.5	
	Pressure Drop [Pa]	71	57	49	43	39	36	33	31	30	28	27	26	25	24	
	Sound Level [dB(A)]	68	62	58	55	52	50	48	47	45	44	43	42	40	40	
9000	Air Flow Speed [m/s]	8.3	6.3	5.0	4.2	3.6	3.1	2.8	2.5	2.3	2.1	1.9	1.8	1.7		
	Pressure Drop [Pa]	60	52	46	42	38	36	33	32	30	29	27	26	25		
	Sound Level [dB(A)]	64	60	57	55	52	51	49	47	46	45	44	43	42		
10000	Air Flow Speed [m/s]	9.3	6.9	5.6	4.6	4.0	3.5	3.1	2.8	2.5	2.3	2.1	2.0	1.9		
	Pressure Drop [Pa]	64	55	49	44	40	38	35	33	32	30	29	28	27		
	Sound Level [dB(A)]	66	62	59	57	54	53	51	49	48	47	46	45	44		
12500	Air Flow Speed [m/s]	11.6	8.7	6.9	5.8	5.0	4.3	3.9	3.5	3.2	2.9	2.7	2.5	2.3		
	Pressure Drop [Pa]	72	62	55	50	46	42	40	38	36	34	33	31	30		
	Sound Level [dB(A)]	71	66	63	61	59	57	55	53	52	51	50	49	48		
15000	Air Flow Speed [m/s]	10.4	8.3	6.9	6.0	5.2	4.6	4.2	3.8	3.5	3.2	3.0	2.8			
	Pressure Drop [Pa]	68	60	55	50	47	44	42	39	38	36	35	33			
	Sound Level [dB(A)]	70	67	64	62	60	58	57	56	54	53	52	51			
17500	Air Flow Speed [m/s]	9.7	8.1	6.9	6.1	5.4	4.9	4.4	4.1	3.7	3.5	3.2				
	Pressure Drop [Pa]	66	59	55	51	48	45	43	41	39	38	36				
	Sound Level [dB(A)]	70	67	65	63	61	60	58	57	56	55	54				
20000	Air Flow Speed [m/s]	11.1	9.3	7.9	6.9	6.2	5.6	5.1	4.6	4.3	4.0	3.7				
	Pressure Drop [Pa]	71	64	59	55	51	49	46	44	42	40	39				
	Sound Level [dB(A)]	72	69	67	65	64	62	61	60	58	57	56				

PRODUCT SELECTION

Sample Selection 1:

Example: In a system, 2500 m³/h air flow will be exhausted. Pressure loss should be less than 50Pa and sound power level should be less than 40dB. Make the product selection.

Solution: From the performance data table, the performance data is evaluated according to the area at an air flow rate of 2500m³/h. Accordingly, the velocity corresponding to 0.4m² is 1.7m/s, the pressure loss is 26Pa, and the sound power level is 37dB. Flow areas table is used within the dimensions that can be selected in the size of 0.4m². The product is chosen as 800x500mm.

Sample Selection 2:

Example: In a system, an air flow of 2500m³/h will be exhausted. Make the product selection.

Solution: The quick selection table is used to select a standard non-return damper. Accordingly, 900x500, 800x600 or 1200x400 selections can be made from the quick selection table. For the performance data of the 800x600 sized product, the flow area is first found 0.48m² by using the flow areas table. From the performance data table, values between 0.4m² and 0.5m² are interpolated for an air flow rate of 2500m³/h and the result is obtained. Accordingly, the speed is 1.5m/s, the pressure loss is 25Pa, and the sound power level is 36dB[A].

PRODUCT ORDER CODE

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

VKG . < A > . MEK . < B > . < C > . < D > . < E >

A	Material	
	ALM	Aluminum
	GAL	Galvanized
B	Type	
	ST	Without Balance Weight
	01	With Balance Weight
C	Width [W] [mm]	
	0000	Standard Sizes
D	Height [H] [mm]	
	0000	Standard Sizes
E	Paint	
	00	Unpainted
	S1	Standard Painted - RAL 9010
	S2	Standard Painted - RAL 9016
	XX	Special Painted

Sample Coding: VKG.AL.MEK.ST.1000.0800.S1

NOTES



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GFL
Leaf Filter Unit

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 4 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 2 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 3 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.



- ☞ GFL – Leaf Filter Unit is an extract grille designed for sterile environments.
- ☞ It is used to prevent fibers and particles in the exhausted air from entering the ventilation system.



MATERIAL

- ☞ Made of AISI 304 quality stainless steel
- ☞ Porous chrome mesh filter

SURFACE COATING

- ☞ It is produced from stainless steel as standard.
- ☞ Optional
 - Different RAL color codes

MOUNTING OPTIONS

- ☞ Internally screwed

STANDARD DIMENSIONS

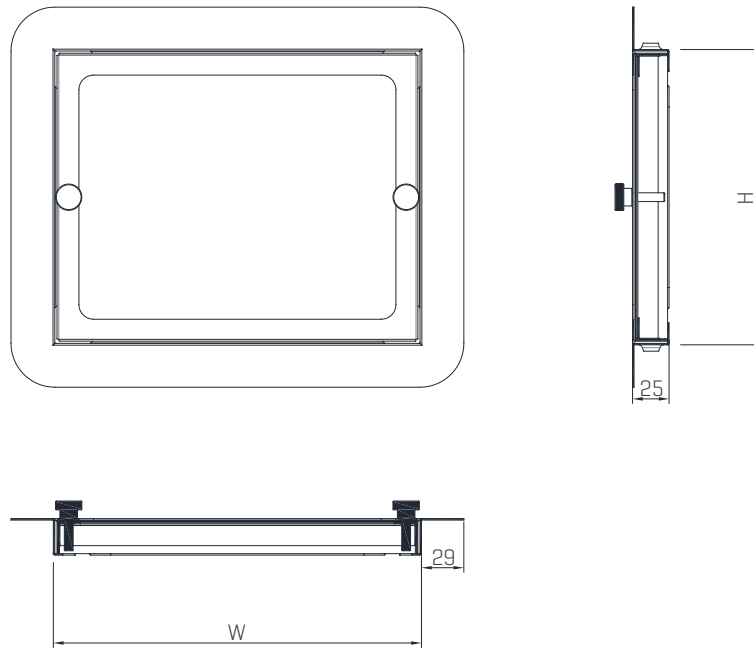


Table 1. Standard Dimensions

W (mm) (Width)	100 - 150 - 200 - 250 - 300 - 350 - 400 - 450 - 500 - 550 - 600 - 650 - 700
H (mm) (Height)	100 - 150 - 200 - 250 - 300 - 350 - 400 - 450 - 500

PERFORMANCE DATA

EFFECTIVE AREA TABLE

Table 2. Effective Area

Effective Area (mm ²)	H (Height) (mm)									
	100	150	200	250	300	350	400	450	500	
W (Width) (mm)	100	0.006	0.010	0.015	0.020	0.025	0.030	0.035	0.039	0.044
	150	0.010	0.018	0.025	0.032	0.039	0.047	0.054	0.061	0.068
	200	0.015	0.025	0.035	0.044	0.054	0.064	0.073	0.083	0.092
	250	0.020	0.032	0.044	0.056	0.068	0.080	0.092	0.105	0.117
	300	0.025	0.039	0.054	0.068	0.083	0.097	0.112	0.126	0.141
	350	0.030	0.047	0.064	0.080	0.097	0.114	0.131	0.148	0.165
	400	0.035	0.054	0.073	0.092	0.112	0.131	0.150	0.170	0.189
	450	0.039	0.061	0.083	0.105	0.126	0.148	0.170	0.192	0.213
	500	0.044	0.068	0.092	0.117	0.141	0.165	0.189	0.213	0.237
	550	0.049	0.076	0.102	0.129	0.155	0.182	0.208	0.235	0.262
	600	0.054	0.083	0.112	0.141	0.170	0.199	0.228	0.257	0.286
	650	0.059	0.090	0.121	0.153	0.184	0.216	0.247	0.279	0.310
	700	0.064	0.097	0.131	0.165	0.199	0.233	0.266	0.300	0.334

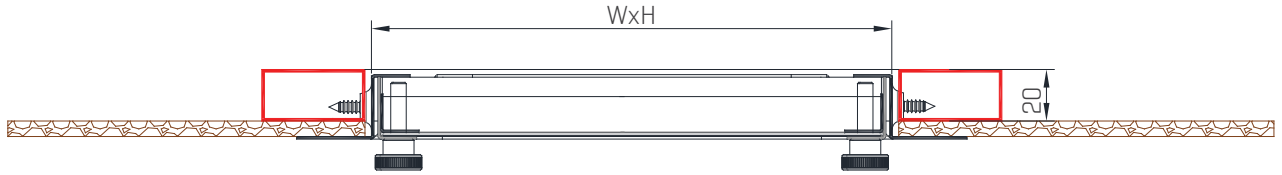
EXTRACT AIR DATA TABLE

Table 3. Extract Air Data

Flow Rate [m ³ / h]		Effective Speed (m/s)					
		0.5	1.0	1.5	2.0	2.5	3.0
50	Effective Area [m ²]	0.028	0.0139	0.0093	0.0069	0.006	
	Pressure Drop [Pa]	18	50	90	136	188	
	Sound Pressure Level [db(A)]	<15	21	29	35	39	
100	Effective Area [m ²]	0.0556	0.0278	0.019	0.014	0.011	
	Pressure Drop [Pa]	17	46	84	127	176	
	Sound Pressure Level [db(A)]	<15	23	31	37	41	
200	Effective Area [m ²]	0.111	0.056	0.037	0.028	0.022	
	Pressure Drop [Pa]	16	43	78	119	164	
	Sound Pressure Level [db(A)]	<15	25	33	39	44	
300	Effective Area [m ²]	0.167	0.083	0.056	0.042	0.033	
	Pressure Drop [Pa]	15	42	75	114	158	
	Sound Pressure Level [db(A)]	<15	27	35	41	45	
400	Effective Area [m ²]	0.222	0.111	0.074	0.056	0.044	0.037
	Pressure Drop [Pa]	15	41	73	111	153	200
	Sound Pressure Level [db(A)]	<15	28	36	42	46	50
500	Effective Area [m ²]	0.278	0.139	0.093	0.069	0.056	0.046
	Pressure Drop [Pa]	15	40	71	108	150	195
	Sound Pressure Level [db(A)]	<15	28	36	42	47	50
600	Effective Area [m ²]	0.333	0.167	0.111	0.083	0.067	0.056
	Pressure Drop [Pa]	14	39	70	107	147	192
	Sound Pressure Level [db(A)]	<15	29	37	43	47	51
700	Effective Area [m ²]		0.194	0.130	0.097	0.078	0.065
	Pressure Drop [Pa]		38	69	105	145	189
	Sound Pressure Level [db(A)]		29	38	43	48	52
800	Effective Area [m ²]		0.222	0.148	0.111	0.089	0.074
	Pressure Drop [Pa]		38	68	104	143	187
	Sound Pressure Level [db(A)]		30	38	44	48	52
900	Effective Area [m ²]		0.250	0.167	0.125	0.100	0.083
	Pressure Drop [Pa]		37	67	102	142	184
	Sound Pressure Level [db(A)]		30	38	44	49	52
1000	Effective Area [m ²]		0.278	0.185	0.139	0.111	0.093
	Pressure Drop [Pa]		37	67	101	140	183
	Sound Pressure Level [db(A)]		31	39	45	49	53
1250	Effective Area [m ²]			0.231	0.174	0.139	0.116
	Pressure Drop [Pa]			65	99	137	179
	Sound Pressure Level [db(A)]			39	45	50	53
1500	Effective Area [m ²]			0.278	0.208	0.167	0.139
	Pressure Drop [Pa]			64	97	135	175
	Sound Pressure Level [db(A)]			40	46	50	54
1750	Effective Area [m ²]			0.324	0.243	0.194	0.162
	Pressure Drop [Pa]			63	96	133	173
	Sound Pressure Level [db(A)]			41	46	51	55
2000	Effective Area [m ²]				0.278	0.222	0.185
	Pressure Drop [Pa]				95	131	171
	Sound Pressure Level [db(A)]				47	51	55
2500	Effective Area [m ²]					0.278	0.231
	Pressure Drop [Pa]					128	167
	Sound Pressure Level [db(A)]					52	56
3000	Effective Area [m ²]					0.333	0.278
	Pressure Drop [Pa]					126	164
	Sound Pressure Level [db(A)]					53	56

INSTALLATION

1. INTERNALLY SCREWED



PRODUCT SELECTION

Example: The total exhaust flow rate in the operating room has been determined as 2000 m³/h. 4 Leaf Filter Unit will be used. Make your product selection.

Solution: There is an air flow of $2000/4=500$ m³/h for one grille.

For 500 m³/h air flow, effective areas corresponding to appropriate pressure loss and flow rate values are selected from the extract air data table.

For example, in an effective area of 0.139 m², the effective speed is 1 m/s, pressure loss is 40 Pa and sound pressure is 28 dB(A). The appropriate grille size is selected from the effective area table [Table 2] as 600 mm x 250 mm corresponding to the value of 0.139 m².

PRODUCT ORDER CODES

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

GFL.< A > . DZ . < B > . < C > . < D > . < E >

A	Raw Material Type	
	PAS	Stainless-Steel
B	Installation Method	
	IC	Internally Screwed
C	Width [W] [mm]	
	0000	You can look at the standard sizes.
D	Height [H] [mm]	
	0000	You can look at the standard sizes.
E	Paint	
	00	Unpainted

Sample Coding: GFL.PAS.DZ.VD.0400.0400.00



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ACD
Circular Constant Air Volume Device [CAV]

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- ☞ ACD – Circular Constant Air Volume Unit is used to control the air flow in projects where comfort and hygiene requirements are high, such as operating theaters, clean rooms, and special processes.
- ☞ The desired air volume can be easily changed on the unit with the help of an allen wrench.
- ☞ It can stabilize the pressure in the air duct between 20 Pa and 1000 Pa.
- ☞ All ACD units produced are calibrated in the HVAC calibration laboratory according to the flow rates specified in the order. In this laboratory, calibration is completed by testing one-to-one field conditions with 7 measuring stations, each of which has different diameters and nominal flow.
- ☞ Since it is a completely mechanical system, it does not require any power input. The stabilization of the air flow is based on meeting the pressure changes in the system. When the air flow decreases depending on the pressure and pressure in the duct, the torque acting on the blade of the ACD decreases and the wing opens. With the opening of the blade, the air flow through the duct increases and returns to the calibration value.
- ☞ Conversely, when the air flow rate increases, the torque acting on the blade increases and the blade closes. With the closing of the blade, the air flow through the duct decreases and returns to the calibration value.
- ☞ The mechanism, which is precisely designed with the calibration spring according to the position of the blade, enables the ACD to work successfully with 10% deviation in the calibrated flow rate.
- ☞ It has a specially designed air viscous piston to keep the blade oscillations at a minimum level due to increased turbulence at high pressures.
- ☞ It complies with DIN EN 1946/4 and VDI 6022 hygiene standards.

MATERIAL

- ☞ The casing is manufactured from galvanized steel sheet as standard. AISI 304 quality stainless case option is available.
- ☞ Blades and air-viscous piston made of aluminium.
- ☞ Plastic tube for airflow calibration.
- ☞ Stainless steel calibration spring.
- ☞ Standard duct sealing.
- ☞ Blade shaft is AISI 304 stainless, shaft bush is PTFE plastic.

ACCESSORIES

- ☞ **Acoustic Insulation:** In order to fulfill the acoustic comfort conditions in the selected product, it is insulated with an optional 19 mm thick foamed rubber. Rubber is surrounded by galvanized sheet metal.
- ☞ **GSS_K – Duct Type Circular Silencer:** Silencer option for the sound level to meet the desired comfort conditions available.



GSS_K – Duct Type Circular Silencer

STANDARD SIZES

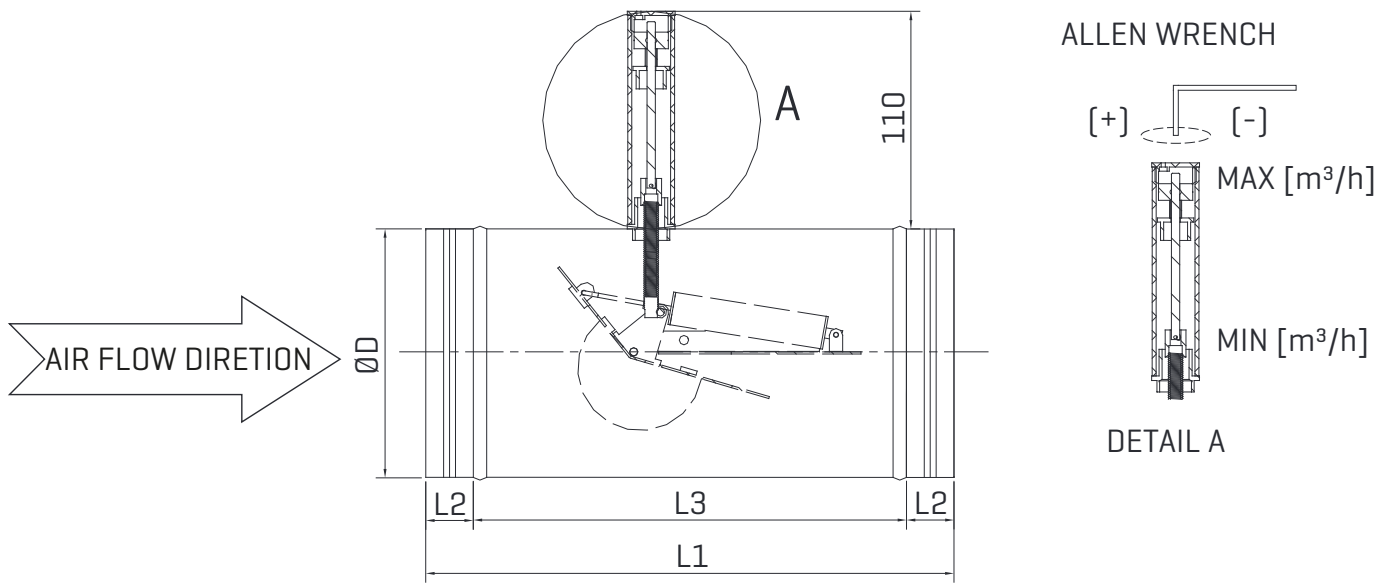


Table 1. Standard Dimensions

Sizes [mm]	ØD [mm]	L1-Total [mm]	L2 [mm]	L3 [mm]	Vmin [m³/h]	Vmax [m³/h]
ACD- 100	98	240	50	140	50	250
ACD- 125	123	240	50	140	80	400
ACD- 150	148	240	50	140	115	575
ACD- 160	158	250	50	150	130	700
ACD- 200	198	280	50	180	200	1000
ACD- 250	248	280	50	180	350	1650
ACD- 300	298	380	50	280	450	2400
ACD- 315	313	380	50	280	540	2700
ACD- 355	353	450	50	350	690	3400
ACD- 400	398	450	50	350	880	4400

Note: When the duct velocity is less than 2m/s, the flow rate adjustment deviation will be ±20%.
Flow adjustment is made from the calibration tube with a 2 mm allen wrench.

PERFORMANCE DATA

VELOCITY & MINIMUM PRESSURE LOSS DATA

Table 3. Velocity & Minimum Static Pressure Loss Data

Air Velocity [m/s]	Pressure Drop [Pa]
2	32
3	40
4	49
5	60
6	73
7	90
8	110
9	135
10	166

FLOW FIELD TABLE

Table 3. Flow Field Table

Sizes	Flow Field [m²]
ACD- 100	0,008
ACD- 125	0,012
ACD- 150	0,018
ACD- 160	0,020
ACD- 200	0,031
ACD- 250	0,049
ACD- 300	0,071
ACD- 315	0,078
ACD- 355	0,099
ACD- 400	0,126

SOUND PRESSURE LEVEL DATA

Table 4. Sound Pressure Level Table

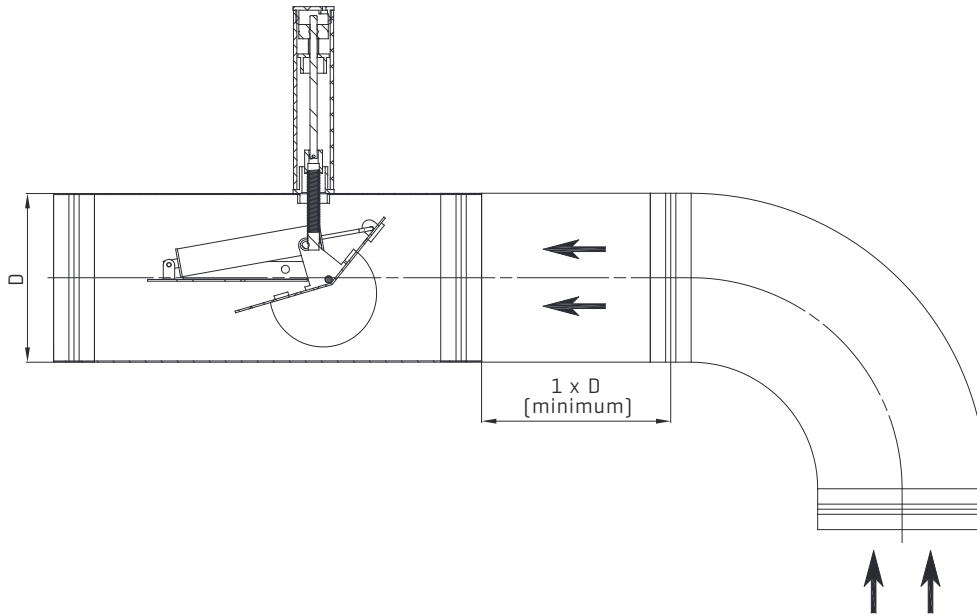
Size [mm]	Air Velocity [m/s]	Flow Rate [m³/h]	Flow Sound Pressure Level [dB(A)]			Sound Pressure Level Emitted from the Case [dB(A)]	
			Differential Pressure Value [Pa]			Un-Insulated	Acoustic Isolated
			100	200	500		
100	2	60	26	33	38	<15	<15
	4	120	33	40	45	23	<15
	6	170	37	44	49	29	18
	8	230	41	48	53	33	22
	10	290	44	51	56	36	25
125	2	90	29	36	41	<15	<15
	4	180	36	43	48	21	<15
	6	270	40	47	52	27	16
	8	360	43	50	55	31	19
	10	450	46	53	58	34	22
150	2	130	33	40	45	27	<15
	4	260	37	44	49	34	23
	6	390	40	47	52	39	28
	8	510	42	49	54	42	32
	10	640	43	50	55	44	35
160	2	150	33	40	45	27	16
	4	290	37	44	49	34	24
	6	440	40	47	52	39	29
	8	580	42	49	54	42	32
	10	730	43	50	55	44	35
200	2	230	34	41	46	26	14
	4	460	38	45	50	34	23
	6	680	40	47	52	39	28
	8	910	42	49	54	42	32
	10	1140	44	51	56	45	35
250	2	360	36	43	48	28	18
	4	710	37	44	49	35	26
	6	1060	38	45	50	40	30
	8	1420	39	46	51	43	33
	10	1770	39	46	51	45	36
300	2	510	33	40	45	28	17
	4	1020	35	42	47	36	25
	6	1530	37	44	49	40	31
	8	2040	38	45	50	44	34
	10	2550	39	46	51	46	37
315	2	570	33	40	45	35	26
	4	1130	35	42	47	43	33
	6	1690	37	44	49	47	37
	8	2250	38	45	50	50	40
	10	2810	39	46	51	52	41.2
355	2	720	26	33	38	42	34
	4	1430	33	40	45	49	40
	6	2140	37	44	49	53	43
	8	2850	41	48	53	56	45
	10	3570	44	51	56	59	47
400	2	910	40	47	52	42	31
	4	1810	42	49	54	49	39
	6	2720	43	50	55	53	43
	8	3620	44	51	56	56	47
	10	4530	44	51	56	59	49

Note: Data were obtained according to the VDI 2081 standard.

INSTALLATION

It is mounted to the duct by considering the air flow direction arrow on the ACD. The ACD product design complies with the EN 13180 standard for duct connections such as elbows, tees and reducers.

Minimum channel length after elbows



Minimum duct length after duct equipment such as Te - Reduction

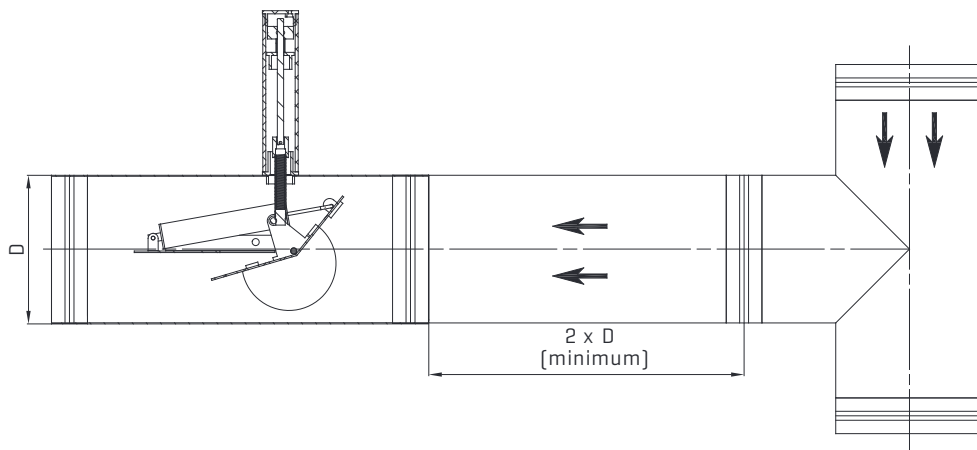


Table 5. Minimum Duct Length Table

Fastener	Minimum Duct Length
Elbow	1 x D
Other duct equipment (Duct equipment such as T-joint, reduction)	2 x D
Fire Damper	2 x D
Silencer	2 x D

Note: It should be taken into account that turbulence will prevent the correct operation of the constant flow rate adjustment mechanism in cases where no additional channels are placed.

PRODUCT SELECTION

Example: The total air flow to be blown into the room is determined as 7500 m³/h. 10 ACD units will be used in the supply line. Make the product selection.

The air flow rate that will pass through the ACD will be $7500/10 = 750\text{m}^3/\text{h}$. ACD sizes to be selected accordingly Table 1. Dimensions between Ø200 and Ø355 can be selected from the Standard Dimensions Table.

From Table 3:

Flow area is 0.031 m² for ACD-200 and 0.099m² for ACD-355.

Velocity and minimum static pressure loss from the selected flow rate according to these areas:

ACD-200: Speed = $750/3600/0.031 = 6.72\text{ m/s}$ Minimum Static Pressure Loss [Table 2] = 82 Pa

ACD-355: Speed = $750/3600/0.099 = 2.1\text{ m/s}$ Minimum Static Pressure Loss [Table 2] = 32 Pa

Table 4. Sound Pressure Level Table is used by interpolation to evaluate sound pressure levels and additional acoustic insulation.

Sound data for values obtained with the selection of ACD – 200 and air velocity of 6.72 m/s:

Flow sound pressure level 41 dB[A][100Pa], 48 dB[A][200Pa], 53 dB[A][500Pa]

Sound pressure level emanating from the case which is non-insulated: 40 dB[A]

Sound pressure level emanating from the case which is acoustically isolated: 29 dB[A]

Sound data for 2.1 m/s air velocity in ACD – 355 selection:

Flow sound pressure level 26 dB[A][100Pa], 33 dB[A][200Pa], 38 dB[A][500Pa]

Sound pressure level emanating from the case without acoustic insulation: 35 dB[A]

Sound pressure level from the acoustically insulated case

PRODUCT ORDER CODE

ACD.< A >.KG.< B >.< C >

A	Raw Material Type	
	GAL	Galvanised
	PAS	Stainless Steel
B	Insulation	
	00	No insulation
	04	Acoustic Insulation
C	Product Size [mm]	
	0100	100 mm
	0125	125 mm
	0150	150 mm
	0160	160 mm
	0200	200 mm
	0250	250 mm
	0300	300 mm
	0315	315 mm
	0355	355 mm
	0400	400 mm

Sample Coding; ACD.GAL.KG.00.0250



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