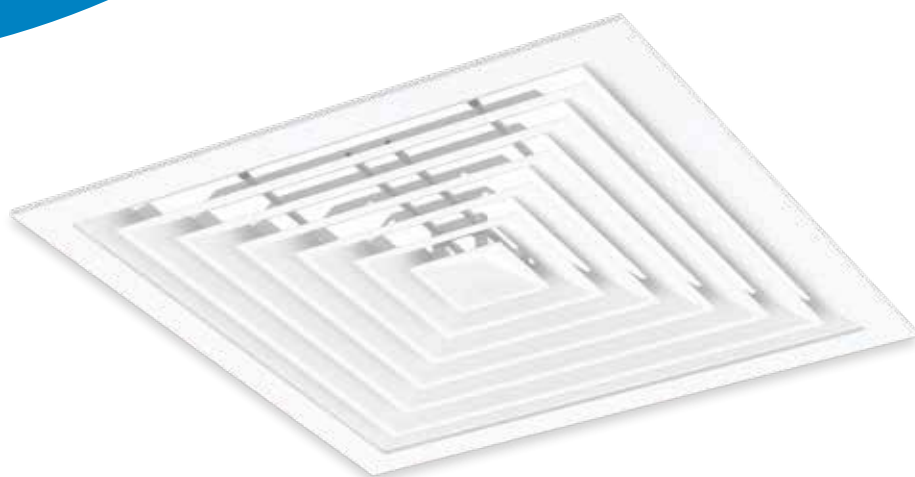




OAK
Square Ceiling Diffuser

- ☞ 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

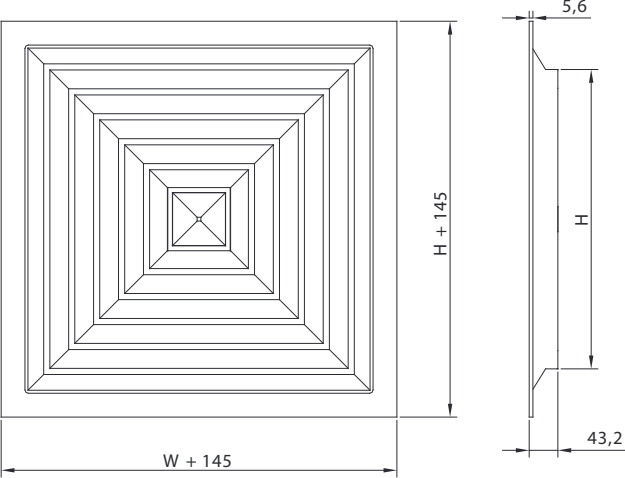
- ☞ Screwed
- ☞ Tile
- ☞ Clip-in
- ☞ Latched
- ☞ Corner Mounted
- ☞ Without Installation Holes

ACCESSORIES

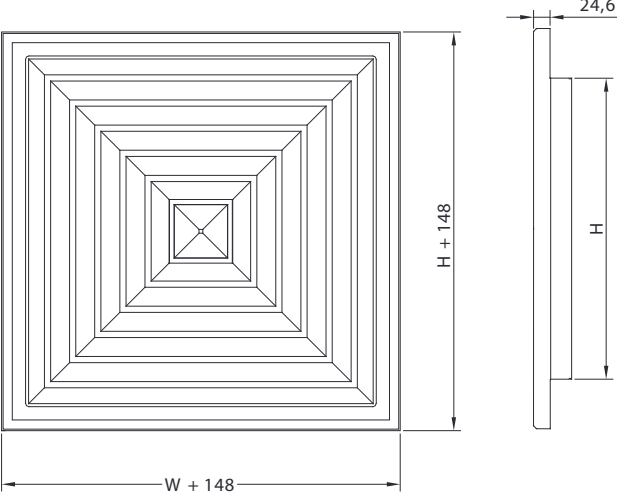
- ☞ Optional
 - ZKD - Opposite Blade Air Adjustment Damper
 - Fiber Filter
 - Reduction

STANDARD SIZES

OAK, OAG, OAB, OAL [STANDARD FRAME]



OAK [CLIP-IN PROFILE FRAME]



OAP [PROFILE FRAME]

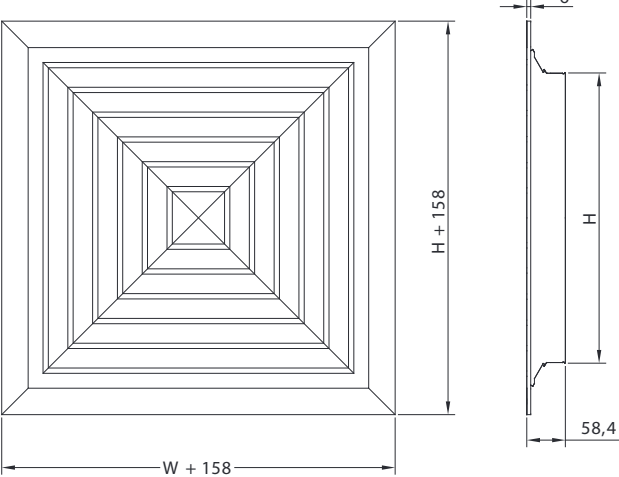


Table 1. Standard Sizes

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		
	450 x 450		Screwed, Latched, Tile
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

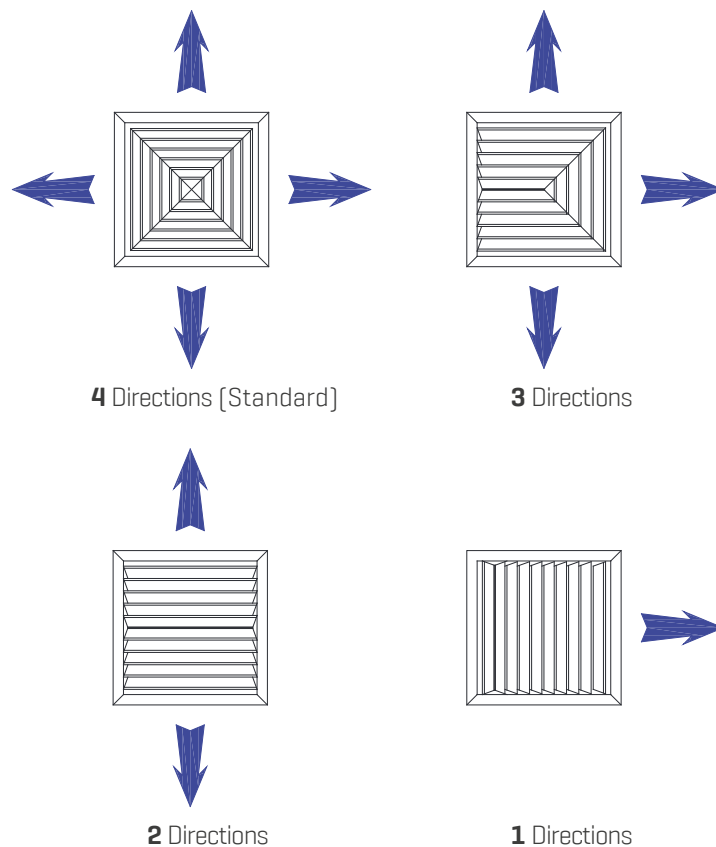


Table 2. Material Options

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 $\Delta T = 8 \text{ K}$.
- ☞ 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	0.002	0.001
	Pressure Drop [Pa]	<1	<1	1	2	3	4	5	7	8	10	14	18	23	29	35
	Throw Distance [m]	0	0	1	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	27
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	0.003
	Pressure Drop [Pa]	<1	<1	1	2	3	5	6	8	9	11	16	21	27	33	40
	Throw Distance [m]	0	1	1	1	1	1	1	1	1	1	1	1	1	2	2
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	19	23	26	29	32
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]	<1	<1	1	2	4	5	7	9	11	13	18	24	31	38	46
	Throw Distance [m]	1	1	1	1	1	1	2	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	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	0.009	0.008
	Pressure Drop [Pa]	<1	<1	2	3	4	6	7	9	12	14	20	26	33	41	50
	Throw Distance [m]	1	1	1	2	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	39
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]	<1	<1	2	3	4	6	8	10	12	15	21	28	35	44	53
	Throw Distance [m]	1	1	2	2	2	2	2	2	3	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	40
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]	<1	<1	2	3	4	6	8	10	13	16	22	29	37	46	55
	Throw Distance [m]	1	2	2	2	2	2	3	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	42
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]	<1	<1	2	3	5	6	8	11	13	16	22	30	38	47	57
	Throw Distance [m]	1	2	2	2	3	3	3	3	3	3	4	4	4	4	5
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	18	21	24	26	31	34	38	41	43
700	Effective Area [m²]	0.389	0.194	0.130	0.097	0.078	0.065	0.056	0.049	0.043	0.038	0.032	0.028	0.024	0.022	0.019
	Pressure Drop [Pa]	<1	<1	2	3	5	7	9	11	14	17	23	31	39	49	59
	Throw Distance [m]	1	2	2	2	3	3	3	3	4	4	4	5	5	5	5
	Sound Power Level [dB(A)]	<15	<15	<15	<15	<15	<15	19	22	25	27	32	35	39	42	44
800	Effective Area [m²]		0.222	0.148	0.111	0.089	0.074	0.064	0.056	0.049	0.044	0.037	0.032	0.028	0.025	0.022
	Pressure Drop [Pa]		<1	2	3	5	7	9	11	14	17	24	32	40	50	61
	Throw Distance [m]		2	2	3	3	3	3	4	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	45
900	Effective Area [m²]		0.250	0.167	0.125	0.100	0.083	0.071	0.063	0.056	0.050	0.042	0.036	0.031	0.028	0.025
	Pressure Drop [Pa]		<1	2	3	5	7	9	12	14	17	24	32	41	51	62
	Throw Distance [m]		2	3	3	3	3	4	4	4	4	5	5	5	6	6
	Sound Power Level [dB(A)]		<15	<15	<15	<15	17	20	24	26	29	33	37	40	43	46
1000	Effective Area [m²]		0.278	0.185	0.139	0.111	0.093	0.079	0.069	0.062	0.055	0.046	0.040	0.035	0.031	0.028
	Pressure Drop [Pa]		<1	2	3	5	7	9	12	15	18	25	33	42	52	63
	Throw Distance [m]		2	3	3	3	4	4	4	4	4	5	5	6	6	6
	Sound Power Level [dB(A)]		<15	<15	<15	<15	17	21	24	27	30	34	38	41	44	46
1250	Effective Area [m²]		0.347	0.232	0.174	0.139	0.116	0.099	0.087	0.077	0.069	0.058	0.050	0.043	0.039	0.035
	Pressure Drop [Pa]		<1	2	4	5	7	10	12	15	19	26	34	44	54	66
	Throw Distance [m]		3	3	3	4	4	4	5	5	5	6	6	6	7	7
	Sound Power Level [dB(A)]		<15	<15	<15	<15	19	22	26	28	31	35	39	42	45	48
1500	Effective Area [m²]		0.417	0.278	0.208	0.167	0.139	0.119	0.104	0.092	0.083	0.069	0.060	0.052	0.046	0.042
	Pressure Drop [Pa]		<1	2	4	5	8	10	13	16	19	27	36	45	56	68
	Throw Distance [m]		3	3	4	4	5	5	5	5	5	6	7	7	7	8
	Sound Power Level [dB(A)]		<15	<15	<15	15	20	24	27	30	32	37	40	44	46	49
1750	Effective Area [m²]			0.324	0.243	0.194	0.162	0.139	0.122	0.108	0.097	0.081	0.069	0.061	0.054	0.049
	Pressure Drop [Pa]			2	4	6	8	10	13	16	20	28	37	47	58	70
	Throw Distance [m]			4	4	5	5	5	6	6	6	7	7	8	8	9
	Sound Power Level [dB(A)]			<15	<15	16	21	25	28	31	33	38	41	45	47	50
2000	Effective Area [m²]			0.370	0.278	0.222	0.185	0.159	0.139	0.123	0.111	0.093	0.079	0.069	0.062	0.056
	Pressure Drop [Pa]			2	4	6	8	11	14	17	20	28	38	48	60	72
	Throw Distance [m]			4	5	5	5	6	6	6	7	7	8	8	9	9
	Sound Power Level [dB(A)]			<15	<15	17	22	25	29	32	34	38	42	45	48	51
2500	Effective Area [m²]				0.347	0.278	0.232	0.198	0.174	0.154	0.138	0.116	0.099	0.087	0.077	0.069
	Pressure Drop [Pa]				4	6	8	11	14	18	21	30	39	50	62	76
	Throw Distance [m]				5	6	6	7	7	7	8	8	9	9	10	10
	Sound Power Level [dB(A)]				<15	19	23	27	30	33	36	40	44	47	50	52
3000	Effective Area [m²]				0.417	0.333	0.278	0.238	0.208	0.185	0.166	0.139	0.119	0.104	0.093	0.083
	Pressure Drop [Pa]				4	6	9	12	15	18	22	31	41	52	65	78
	Throw Distance [m]				6	6	7	7	8	8	9	9	10	11	11	12
	Sound Power Level [dB(A)]				<15	20	24	28	31	34	37	41	45	48	51	53
4000	Effective Area [m²]						0.370	0.318	0.278	0.246	0.222	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	0.347	0.308	0.277					
	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 $\Delta T = 8 \text{ K}$.

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

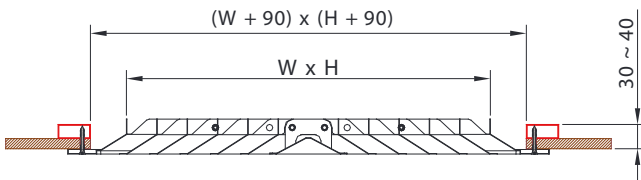
Table 8. Filter Pressure Drop Table

Air Velocity [m/s]															
Pressure Drop [Pa]	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

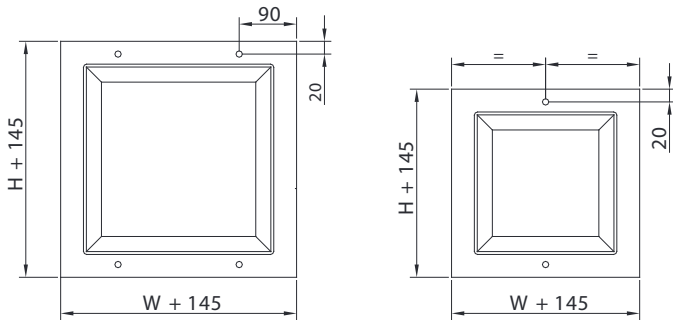
INSTALLATION TABLE

OAK-OAB-OAG-OAL INSTALLATIONS

Screwed



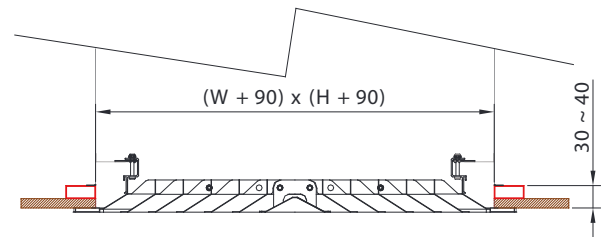
The number of screw holes used is given in the table below.



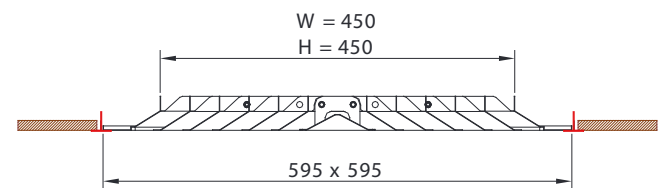
W [Width] [mm]	Number of Top Profile Holes	Number of Bottom Profile Holes
$W < 150$	1	1
$W \geq 150$	2	2

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

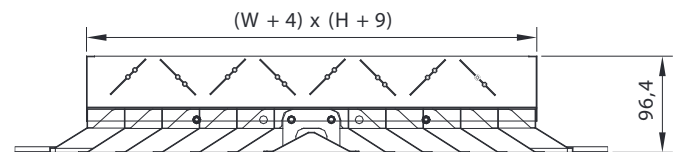
Latched



Tile

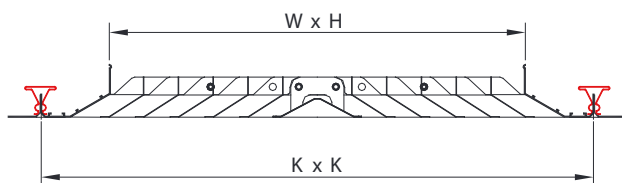


With Damper



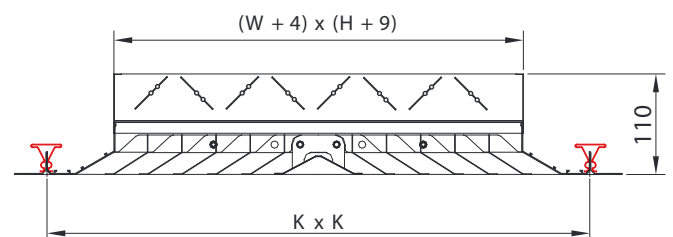
OAK-OAB

Clip-In



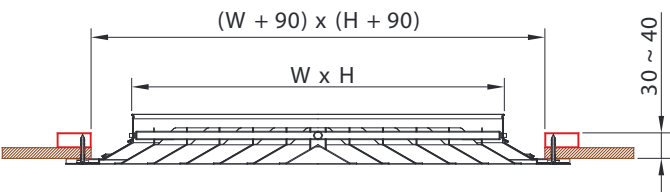
Clip-In Sizes [K x K] [mm]	W[mm]	H[mm]
300 x 300	152	152
600 x 600	452	452

With Damper

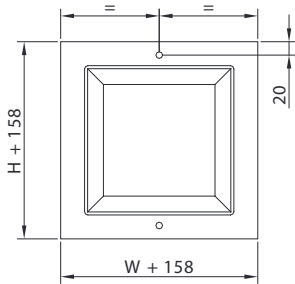
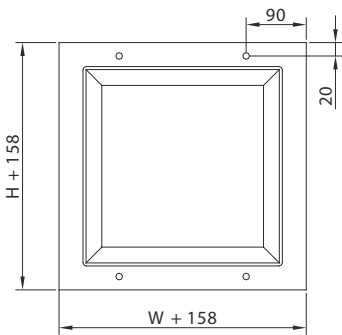


OAP

Screwed



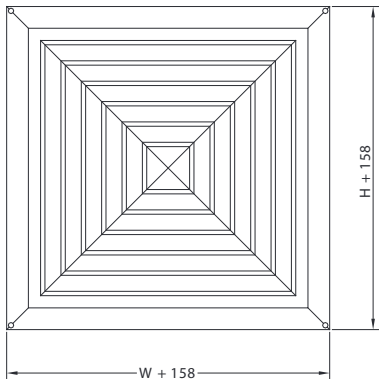
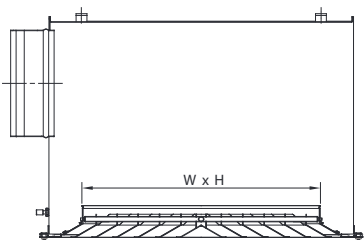
The number of screw holes used is given in the table below.



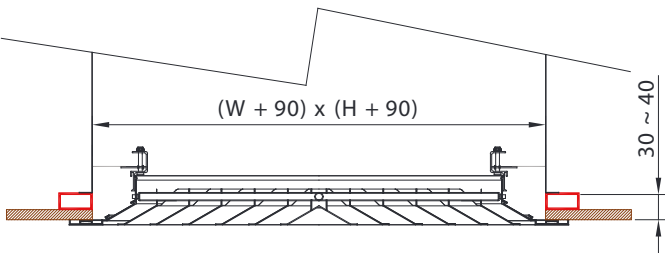
W [Width] [mm]	Number of Top Profile Holes	Number of Bottom Profile Holes
$W < 150$	1	1
$W \geq 150$	2	2

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

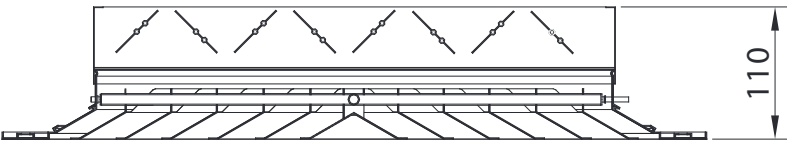
Corner Mounting [with Hepa Filter Box]



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