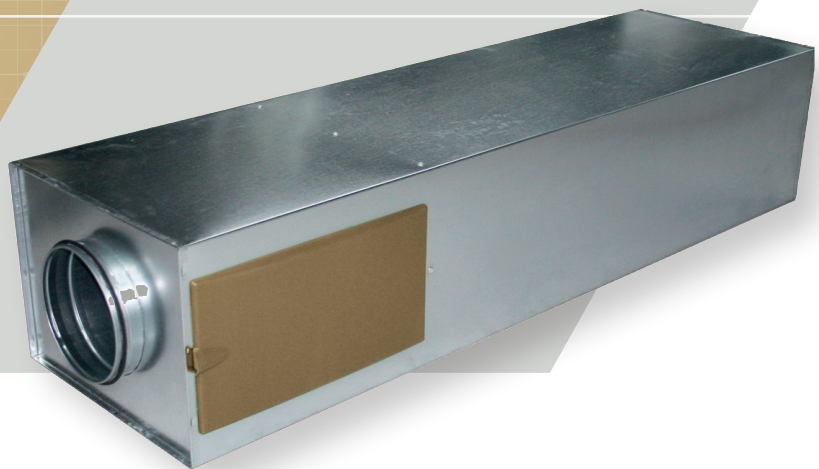
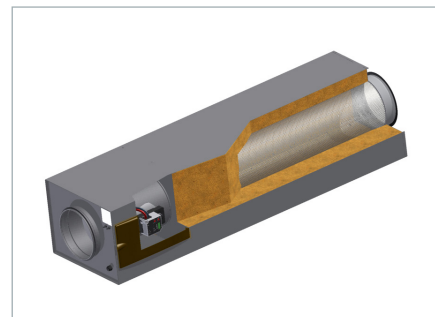
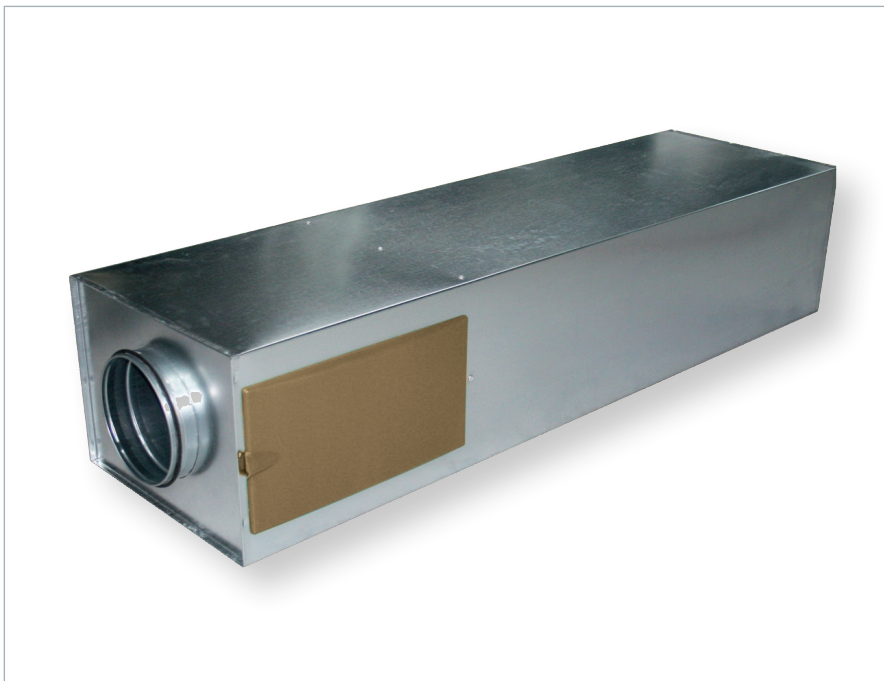


FLOW VARIATOR EMAS, EMAE

TECHNICAL CATALOGUE





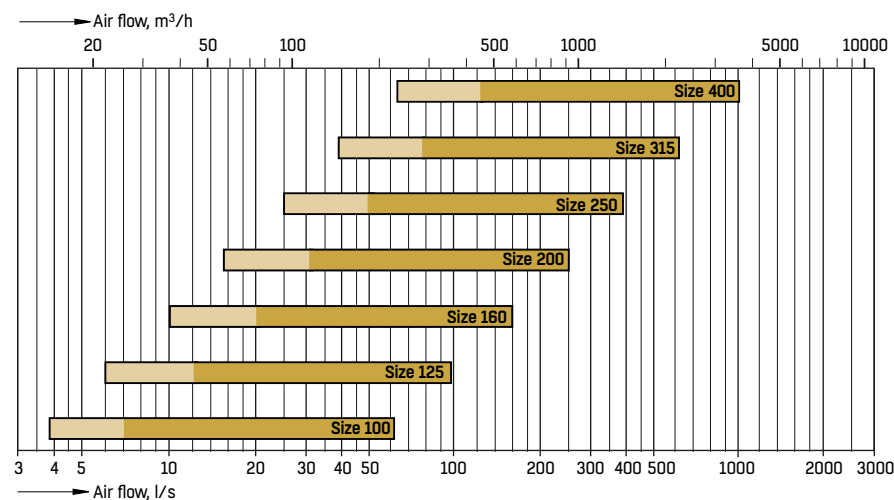
KEY FEATURES

- Sound attenuator as standard
- FG compact controller as standard
- Setting up values without external equipment
- Real time air flow display
- Operating range 0.5 - 8 m/s

FLOW VARIATOR EMAS, EMAE

EMAS and EMAE are flow variators for the OPTIVENT system. They are used to control the supply air flow (EMAS) and the exhaust air flow (EMAE). They can be used for many different purposes, for example for controlling the temperature and the air quality in the room.

QUICK SELECTION



The air flow limits with compact controller 227VM correspond to air velocity 0.5-8 m/s.
When air velocity is below 1 m/s $\pm 10\%$ measuring accuracy cannot be guaranteed (light brown above).

SPECIFICATIONS

- EMAS for supply air
- EMAE for exhaust air
- Insulated casing
- Available in seven sizes for duct diameters between 100 - 400 mm

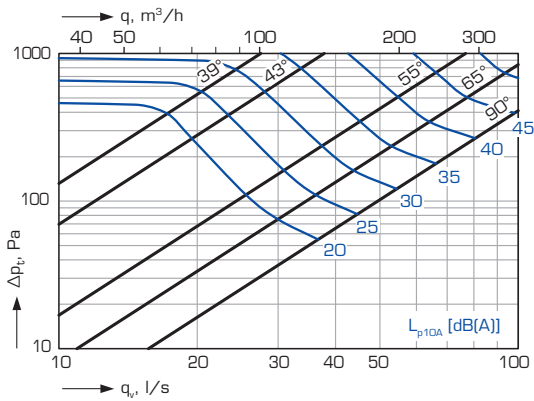
PRODUCT CODE EXAMPLE

Flow variator for supply air with standard sound attenuator EMAS-1-160-1-2

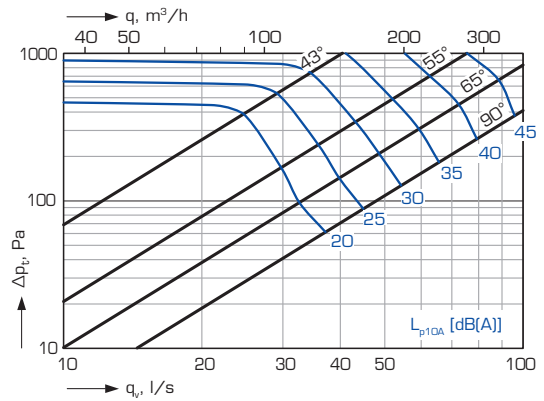
Water reheater, mounted EMAZ-2-160-2-1

SOUND PRESSURE LEVELS IN ROOM

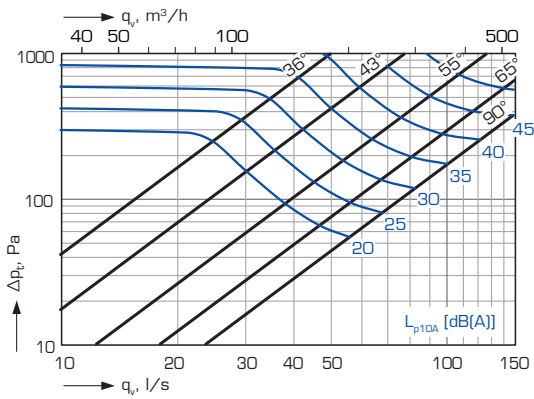
EMAS/EMAE-100



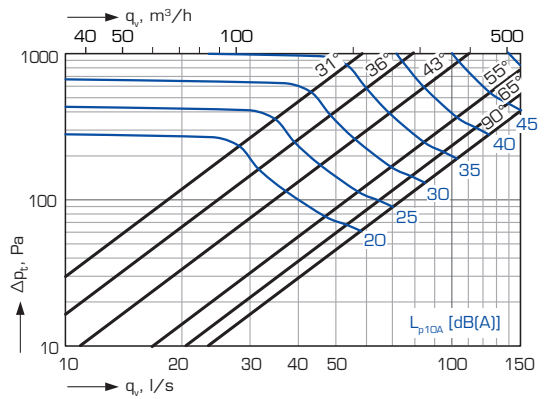
EMAS/EMAE-100 + EMAZ-1



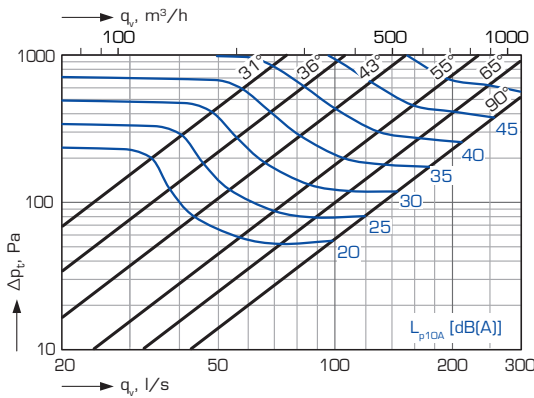
EMAS/EMAE-125



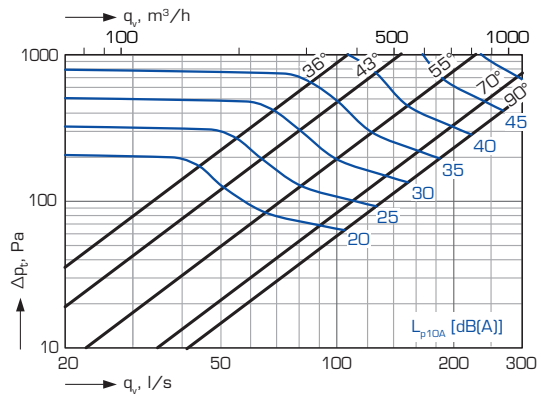
EMAS/EMAE-125 + EMAZ-1



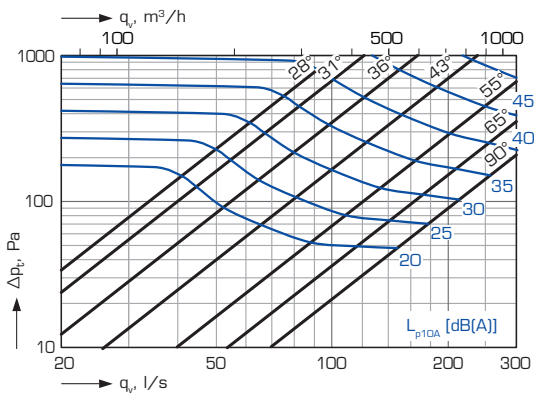
EMAS/EMAE-160



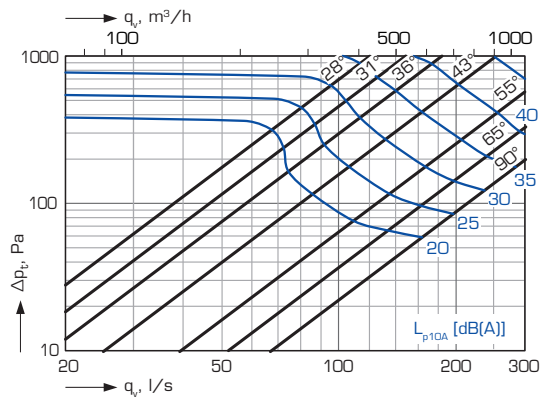
EMAS/EMAE-160 + EMAZ-1



EMAS/EMAE-200

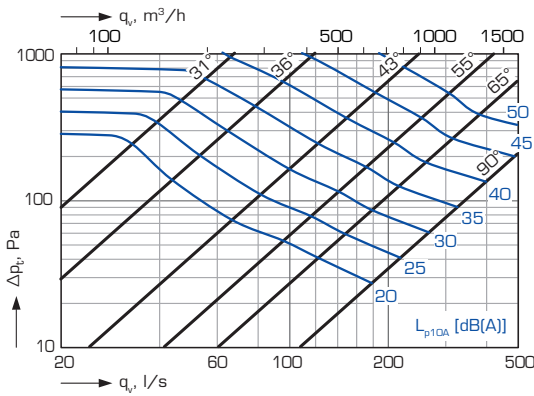


EMAS/EMAE-200 + EMAZ-1

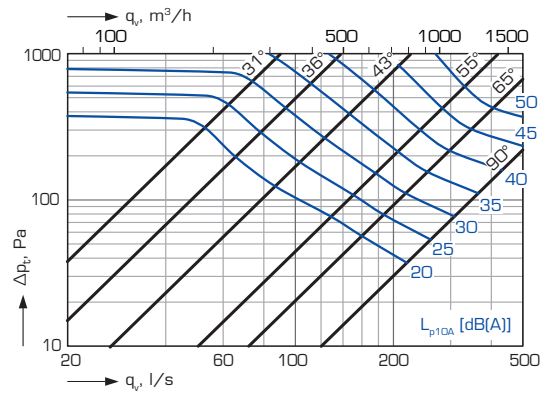


SOUND PRESSURE LEVELS IN ROOM

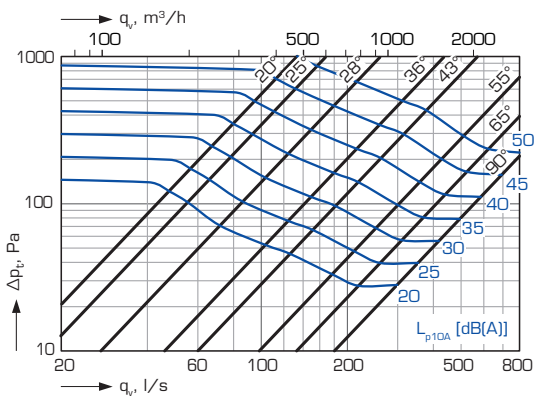
EMAS/EMAE-250



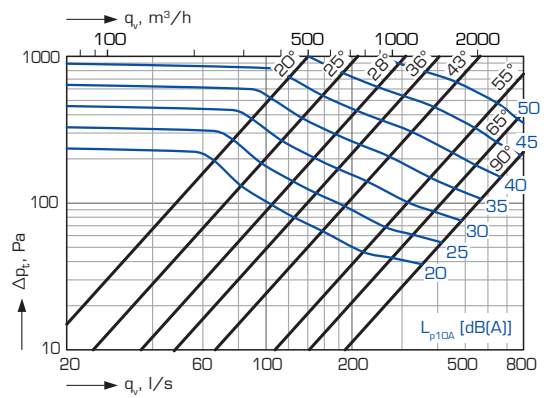
EMAS/EMAE-250 + EMAZ-1



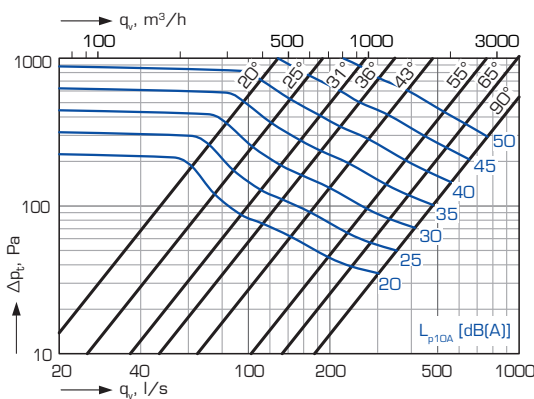
EMAS/EMAE-315



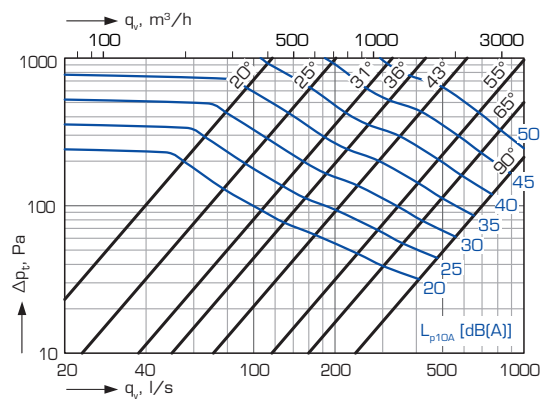
EMAS/EMAE-315 + EMAZ-1



EMAS/EMAE-400



EMAS/EMAE-400 + EMAZ-1



SOUND CHARACTERISTICS, NOMINAL AIR FLOW, SAFETY DISTANCES AND MEASURING ACCURACY

DUCT SOUND

EMA(S,E)	Correction of sound level K (dB)							
	63	125	250	500	1000	2000	4000	8000
100	42	30	23	7	-4	-11	-11	-12
125	35	30	20	6	-6	-10	-12	-15
160	35	30	16	4	-5	-9	-8	-12
200	32	27	14	2	-5	-8	-5	-11
250	28	24	10	0	-6	-4	-3	-12
315	27	22	7	-1	-3	-2	-4	-13
400	27	22	5	-5	-9	-3	-2	-10
Tolerance ±	6	3	2	2	2	2	2	3

EMA(S,E) +EMAZ-1	Correction of sound level K (dB)							
	63	125	250	500	1000	2000	4000	8000
100	43	31	21	8	-1	-9	-12	-12
125	39	31	20	4	-6	-12	-11	-12
160	35	31	15	3	-5	-10	-8	-11
200	32	29	13	2	-6	-10	-5	-8
250	31	26	9	-3	-11	-6	-2	-9
315	30	24	7	-4	-8	-3	-2	-9
400	27	17	3	-6	-6	-1	-3	-12
Tolerance ±	6	3	2	2	2	2	2	3

The sound power levels of the duct for every octave band are obtained by adding to the total sound pressure level L_{A10} , dB(A), the correction K_{oct} presented in the table according to the following formula:

$$L_{Woct} = L_{A10} + K_{oct}$$

Correction K_{oct} is average value in range of use of the flow variator.

NOMINAL AIR FLOW AND K-FACTORS

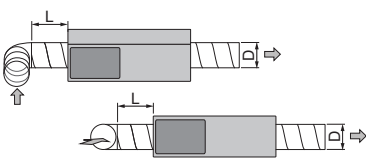
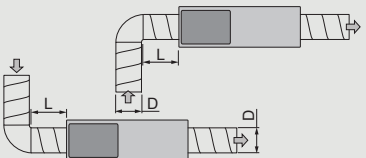
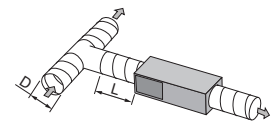

Size	EMA(S,E)-1/-5 q_{nom} (l/s) ¹⁾	EMA(S,E)-2 q_{nom} (l/s) ²⁾	k average ³⁾
100	62	62	4.2
125	92	98	6.0
160	145	160	10
200	246	251	16
250	380	392	25
315	636	623	40
400	998	1005	64

¹⁾ EMA(S,E)-1 since 05.2014 and EMA(S,E)-5 since 08.2014

²⁾ EMA(S,E)-1 before 05.2014 and EMA(S,E)-5 before 08.2014

³⁾ k-value is an average over the entire operating range (blade opening 30- 100 %)

SAFETY DISTANCES

Type of flow disturbance	Measuring accuracy	
	±12%	±15%
Bend (FG recommendation) 	≥ 2D	≥ OD
Bend (other ways) 	≥ 4D	≥ OD
T-piece 	≥ 2D	≥ OD
Reducer (1:3) 	≥ 1D	≥ OD

With other installations and when air velocity is below 1 m/s measuring accuracies in the above table cannot be guaranteed.

MEASURING ACCURACY

With EMA(S,E)-1/5 the measuring accuracy is ±10% or ±3 l/s of display.

When air velocity is below 1 m/s ±10% measuring accuracy cannot be guaranteed.

SOUND TRANSMITTED THROUGH CASING

$\Delta p_s = 50 \text{ Pa}$

Nom. size (mm)	Air flow (l/s)	Middle frequency (Hz)							
		63	125	250	500	1K	2K	4K	8K
100	8	24,1	22,4	16,3	11,2	7,8	8,1	10,9	15,6
	15	4,1	30,2	21,9	18,7	7,8	8,1	10,9	15,6
	30	4,1	27,4	18,6	12,4	7,8	8,1	10,9	15,6
125	12	33,2	30,2	26,1	17,9	11,7	11,8	16,1	21,2
	25	36,1	34,5	27,6	18,4	12,3	11,7	16,1	21,2
	50	33,4	31,1	25,8	16,1	12,5	11,8	16,1	21,2
160	20	14,4	29,0	27,2	22,4	13,1	8,1	10,9	15,6
	40	33,5	35,4	32,9	24,8	13,4	8,1	10,9	15,6
	80	35,1	34,0	30,3	21,2	12,6	8,1	10,9	15,6
200	30	24,2	29,0	31,5	24,1	12,1	8,1	10,9	15,6
	60	31,5	34,2	34,8	26,2	14,6	8,1	10,9	15,6
	120	32,2	32,2	29,8	21,6	13,5	8,1	10,9	15,6
250	50	34,8	33,6	36,7	25,9	14,1	11,9	16,1	21,2
	100	38,0	35,0	35,8	25,3	14,9	12,1	16,2	21,3
	200	36,0	33,0	32,5	24,0	15,1	12,5	16,2	21,3
315	80	35,0	34,9	35,1	24,1	13,5	11,9	16,2	21,2
	150	38,3	34,6	34,7	24,6	14,8	12,0	16,2	21,3
	300	39,4	34,9	35,0	24,5	16,5	12,9	16,3	21,3
400	125	34,7	30,4	26,2	16,9	12,6	13,2	16,8	21,5
	250	37,1	31,0	26,5	18,0	11,9	11,8	16,2	21,3
	500	36,7	29,9	31,3	23,5	14,9	12,5	16,2	21,3

$\Delta p_s = 100 \text{ Pa}$

Nom. size (mm)	Air flow (l/s)	Middle frequency (Hz)							
		63	125	250	500	1K	2K	4K	8K
100	8	4,1	28,4	21,3	15,9	7,8	8,1	10,9	15,6
	15	25,5	33,2	26,1	22,0	12,2	8,1	10,9	15,6
	30	35,6	41,6	34,0	29,8	16,1	8,1	10,9	15,6
	45	24,4	36,0	28,1	24,4	12,5	9,4	10,9	15,6
125	12	32,8	31,7	30,5	23,1	14,6	12,0	16,1	21,2
	25	38,0	40,4	36,0	26,0	15,8	12,5	16,2	21,2
	50	44,0	44,8	37,9	27,5	17,6	13,1	16,2	21,2
	75	36,6	39,1	35,7	24,8	18,2	13,9	16,3	21,2
160	20	21,2	31,9	28,3	24,5	18,8	9,9	10,9	15,6
	40	38,2	40,0	37,9	31,8	22,6	11,3	10,9	15,6
	80	44,6	46,2	41,7	31,6	21,3	12,1	10,9	15,6
	120	36,8	41,6	35,1	27,1	19,6	10,9	10,9	15,6
200	30	29,2	30,5	31,0	26,5	17,0	8,1	10,9	15,6
	60	37,7	39,2	41,0	33,1	22,6	9,6	10,9	15,6
	120	44,7	43,3	41,5	31,0	22,2	12,6	10,9	15,6
	180	39,3	40,7	38,7	30,8	23,9	13,7	10,9	15,6
250	50	43,5	37,9	41,5	33,7	20,6	13,5	16,3	21,2
	100	42,5	43,0	44,6	35,4	22,1	14,2	16,3	21,3
	200	46,6	44,5	43,1	33,4	22,6	15,7	16,6	21,3
	300	42,7	42,1	39,9	31,5	24,0	17,4	17,1	21,3
315	80	38,4	41,4	42,4	33,1	19,9	13,2	16,4	21,2
	150	44,1	42,8	42,8	32,9	21,3	14,2	16,4	21,3
	300	49,1	44,2	43,8	34,3	24,5	16,8	16,9	21,3
	450	47,5	44,2	44,8	33,9	26,4	20,5	18,4	21,3
400	125	39,2	38,2	35,2	24,1	17,0	13,9	16,4	21,5
	250	41,5	39,8	34,7	23,6	16,7	15,1	16,4	21,3
	500	45,9	41,3	37,4	28,7	20,1	16,1	16,5	21,3
	750	45,0	40,1	41,1	36,5	26,4	20,7	17,6	21,3

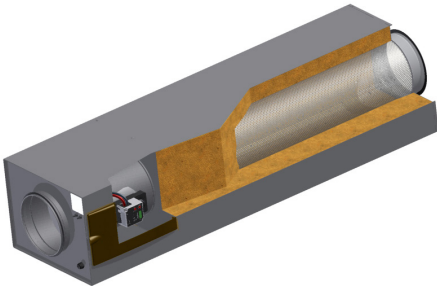
$\Delta p_s = 200 \text{ Pa}$

Nom. size (mm)	Air flow (l/s)	Middle frequency (Hz)							
		63	125	250	500	1K	2K	4K	8K
100	8	18,3	34,3	27,4	22,4	10,5	8,1	10,9	15,6
	15	31,9	39,9	31,4	27,0	17,5	8,4	10,9	15,6
	30	43,9	46,8	40,9	36,5	24,7	16,8	12,2	15,6
	45	43,1	48,9	42,6	39,2	25,3	16,8	10,9	15,6
125	12	33,0	31,4	34,1	29,1	20,4	14,2	16,3	21,2
	25	37,1	40,7	41,6	34,0	22,0	15,4	16,9	21,3
	50	48,8	51,4	47,1	37,1	24,1	18,1	17,9	21,3
	75	51,3	54,1	48,4	38,3	26,5	19,4	18,1	21,3
160	20	26,6	34,5	30,4	26,1	20,4	14,9	10,9	15,6
	40	41,8	43,0	40,1	36,2	27,7	20,2	11,5	15,6
	80	48,4	52,5	49,4	41,7	30,3	21,0	13,6	15,6
	120	51,7	53,5	50,2	40,1	29,5	21,4	14,4	15,6
200	30	30,6	33,6	34,0	29,1	22,1	13,6	10,9	15,6
	60	42,5	42,1	44,9	39,0	29,3	18,2	11,7	15,6
	120	50,1	49,8	51,8	41,5	30,6	19,8	13,2	15,6
	180	53,3	52,3	51,2	40,3	31,0	21,4	14,4	15,6
250	50	37,1	38,5	43,0	37,0	26,2	18,6	17,1	21,3
	100	44,8	47,1	51,7	44,2	31,0	20,8	18,2	21,4
	200	54,1	53,9	54,1	43,7	31,2	22,6	18,9	21,5
	300	54,9	54,2	52,8	42,5	31,7	24,1	20,1	21,7
315	80	37,8	45,7	47,6	40,3	27,7	18,8	17,9	21,3
	150	47,6	49,6	50,7	41,5	29,6	22,0	20,7	21,4
	300	55,2	51,8	51,5	42,1	31,3	23,4	20,5	21,4
	450	56,7	52,9	52,4	42,8	33,1	25,8	22,3	21,5
400	125	40,0	45,7	45,6	37,2	28,3	26,4	24,7	25,8
	250	48,2	48,9	45,8	32,0	23,9	23,2	21,4	23,9
	500	53,8	50,5	46,7	34,9	26,4	24,1	21,5	23,7
	750	55,4	50,8	47,2	37,7	29,1	25,0	21,3	23,2

$\Delta p_s = 300 \text{ Pa}$

Nom. size (mm)	Air flow (l/s)	Middle frequency (Hz)							
		63	125	250	500	1K	2K	4K	8K
100	8	16,8	36,2	30,4	26,0	16,0	14,1	10,9	15,6
	15	33,9	42,8	34,9	30,2	20,7	15,5	10,9	15,6
	30	45,5	51,4	43,5	38,7	28,0	21,4	18,3	15,6
	45	48,6	53,4	47,7	43,2	30,7	23,0	17,7	15,6
125	12	33,0	32,1	35,6	32,0	23,9	18,0	16,9	21,3
	25	36,8	40,8	43,4	38,7	27,0	18,7	17,9	21,4
	50	49,1	53,7	50,9	43,3	28,6	21,9	20,9	21,7
	75	54,0	57,7	53,2	44,0	30,6	23,7	21,4	21,6
160	20	29,2	35,1	31,7	27,2	21,3	19,6	10,9	15,6
	40	42,5	44,8	42,0	39,1	31,3	24,3	16,5	15,6
	80	50,7	55,0	51,2	46,2	36,1	25,7	18,6	15,6
	120	54,7	58,1	54,6	47,0	35,7	26,6	19,3	15,6
200	30	32,8	35,2	36,3	30,9	24,8	19,1	12,5	15,6
	60	44,9	42,4	43,9	39,7	31,8	22,5	15,0	15,6
	120	52,9	52,2	55,3	46,9	36,4	25,0	18,7	15,6
	180	57,5	56,4	57,7	46,8	36,7	26,0	19,6	15,6
250	50	38,6	40,0	45,2	40,3	30,3	23,4	19,5	21,5
	100	47,3	47,8	54,4	48,3	36,4	25,8	21,4	21,9
	200	56,0	56,5	58,9	49,5	37,1	27,8	22,7	22,2
	300	58,5	59,5	59,6	49,0	37,2	28,6	23,5	22,6
315	80	38,0	45,4	50,3	44,0	33,0	24,3	21,2	21,6
	150	48,2	50,4	54,7	46,3	35,1	26,8	25,8	22,2
	300	58,2	55,2	56,3	46,7	36,5	28,6	26,0	22,2
	450	59,7	57,5	57,4	47,6	38,2	30,1	26,8	22,4
400	125	40,4	43,2	42,1	32,0	24,3	24,6	23,0	23,7
	250	49,8	51,8	51,4	38,6	28,6	25,9	23,2	28,5
	500	57,5	55,2	52,5	39,8	30,9	27,8	24,1	28,4
	750	58,7	55,6	52,5	41,9	32,6	28,5	24,1	27,9

EMA(S,E) FLOW VARIATOR



The variator can be used for both variable and constant flow and, if appropriate, forced shut-off for both the supply and exhaust air. The variator consists of a flow regulator chamber and sound attenuator. Regulator chamber consists of flow damper with control equipment, integrated flow measurement device and separate measurement nipples for manual measurement.

The inner surface of sound attenuators is covered with fabric woven from staple fibres and perforated sheet steel, which prevent fibre transference and allows cleaning.

The damper has stable bearings made of nylon and its shaft is mounted in maintenance free nylon headings. Damper equipped with a EPDM rubber blade seal conforms to air tightness class 3 in accordance with EN 1751:1998.

The casing around flow regulator has insulation with a thickness of 30 mm and gives low acoustic radiation.

The control equipment is protected in the casing and is accessible via a simple opening inspection hatch.

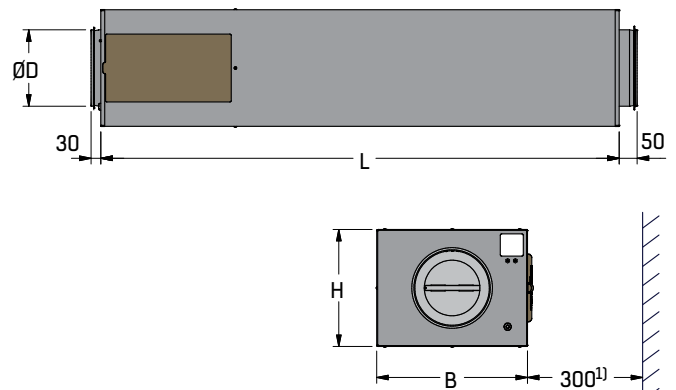
The circular spigot has a sealing ring made of rubber.

Connections dimensions 100 – 400 mm.

Any components in contact with the ventilation air conform to corrosivity classes C3 or C4 in accordance with EN-ISO 12944-2.

Air tightness class B in accordance with EN1751:1998.

DIMENSIONS AND WEIGHTS



¹⁾ = Free space for inspection and maintenance

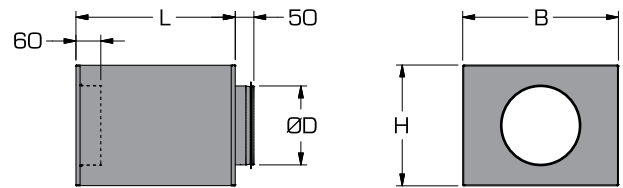
Size	ØD (mm)	B (mm)	H (mm)	L (mm)	Weight (kg)
100	99	285	215	1050	8
125	124	285	215	1150	9
160	159	345	255	1200	12
200	199	395	305	1350	16
250	249	460	370	1450	24
315	314	525	460	1450	29
400	399	665	565	1450	40

EMAZ-1 EXTRA SOUND ATTENUATOR



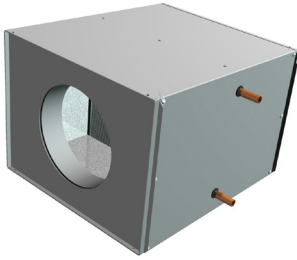
The sound attenuator has the same profile as the variator. The casing is made of galvanized sheet steel. The inner surface is covered with fabric woven from staple fibres and perforated sheet steel, which prevents fibre transference and allows cleaning. Any components in contact with the ventilation air conform to corrosivity classes C3 or C4 in accordance with EN-ISO 12944-2. The circular spigot has a sealing ring made of rubber. Air tightness class B in accordance with EN1751:1998.

DIMENSIONS AND WEIGHTS



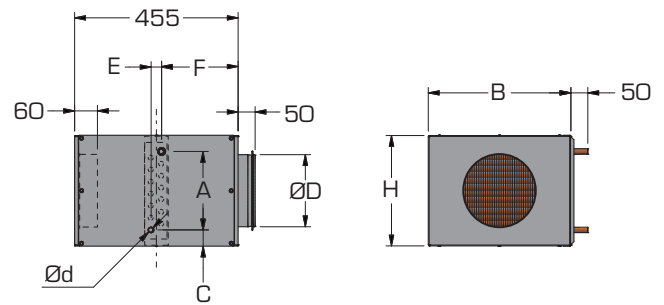
Size	ØD (mm)	B (mm)	H (mm)	L (mm)	Weight (kg)
100	99	285	215	300	3
125	124	285	215	300	3
160	159	345	255	300	3.5
200	199	395	305	400	5.5
250	249	460	370	400	8
315	314	525	460	500	11
400	399	665	565	600	18

EMAZ-2 WATER REHEATER



The water reheater has the same shape as the variator. If extra sound attenuation is needed, EMAZ-1 silencer can be connected right after the water reheater. The reheater body consists of single, two or three row coil copper tubes and aluminium fins. A sheet steel cover protects the ends of the copper tubes. The casing is made of galvanized sheet steel. The circular spigot sleeve has a sealing ring made of rubber. The maximum working pressure is 1.0 MPa, and the maximum water temperature is 100 °C. The battery is pressure tested at 2.1 MPa. Air tightness class B in accordance with EN1751:1998.

DIMENSIONS AND WEIGHTS



SINGLE ROW COILS EMAZ-2-aaa-1-c

Size	ØD (mm)	B (mm)	H (mm)	C (mm)	A (mm)	E (mm)	F (mm)	Ød (mm)	Weight (kg)
100	99	285	215	33	133	0	230	15	5.0
125	124	285	215	33	133	0	230	15	5.0
160	159	345	255	37	167	0	230	15	6.0
200	199	395	305	45	200	0	230	15	8.0
250	249	460	370	44	267	0	230	15	10.5
315	314	525	460	38	367	0	230	15	13.5
400	399	665	565	40	467	0	230	15	18.5

TWO ROW COILS EMAZ-2-aaa-2-c

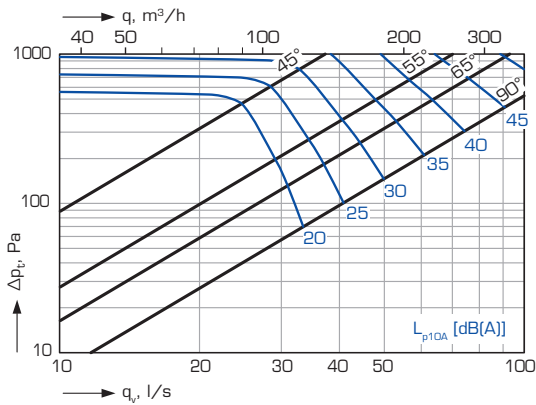
Size	ØD (mm)	B (mm)	H (mm)	C (mm)	A (mm)	E (mm)	F (mm)	Ød (mm)	Weight (kg)
100	99	285	215	33	150	29	202	15	5.0
125	124	285	215	33	150	29	202	15	5.0
160	159	345	255	37	183	29	202	15	6.0
200	199	395	305	45	217	29	202	15	8.0
250	249	460	370	44	283	29	202	15	10.5
315	314	525	460	38	381	29	202	22	13.5
400	399	665	565	40	481	29	202	22	18.5

THREE ROW COILS EMAZ-2-aaa-3-c

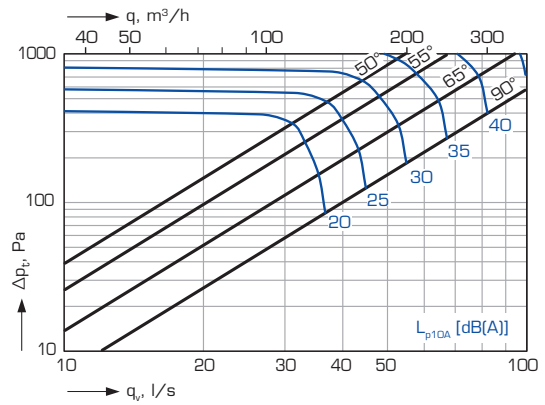
Size	ØD (mm)	B (mm)	H (mm)	C (mm)	A (mm)	E (mm)	F (mm)	Ød (mm)	Weight (kg)
100	99	285	215	33	133	58	185	15	6.0
125	124	285	215	33	133	58	185	15	6.0
160	159	345	255	37	167	58	185	15	7.0
200	199	395	305	45	200	58	185	15	9.0
250	249	460	370	44	284	58	185	22	12.5
315	314	525	460	38	384	58	185	22	16.0
400	399	665	565	40	484	58	185	22	22.5

SOUND PRESSURE LEVELS IN ROOM WITH EMAZ-2

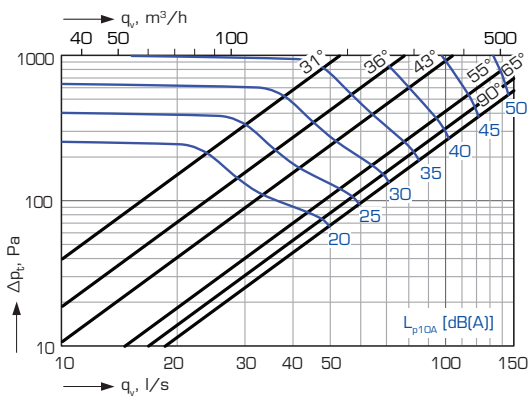
EMAS/EMAE-100 + EMAZ-2



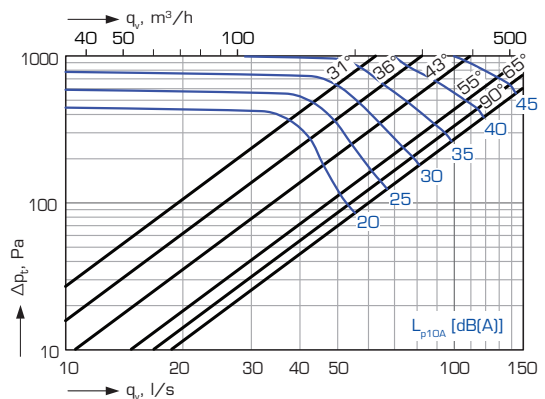
EMAS/EMAE-100 + EMAZ-2 + EMAZ-1



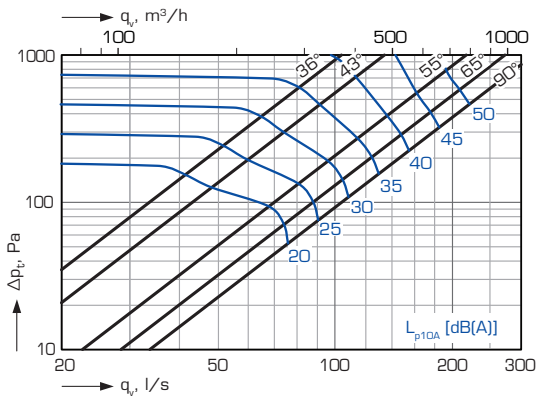
EMAS/EMAE-125 + EMAZ-2



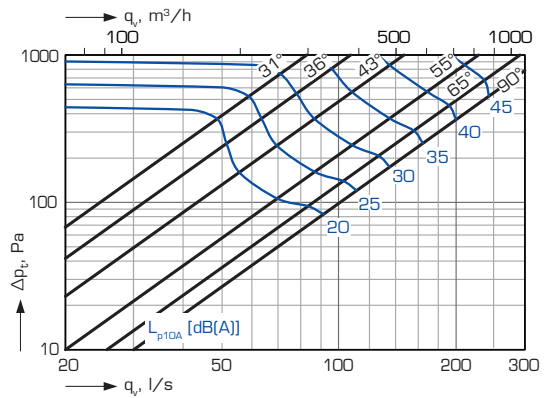
EMAS/EMAE-125 + EMAZ-2 + EMAZ-1



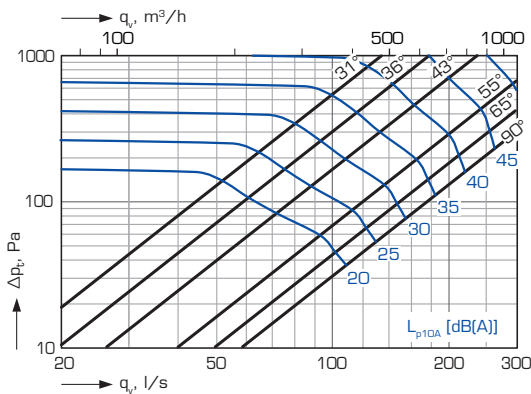
EMAS/EMAE-160 + EMAZ-2



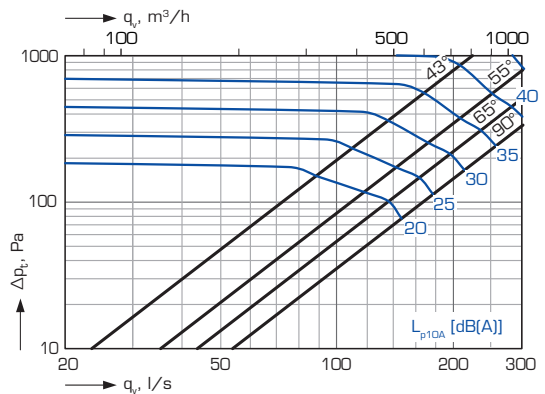
EMAS/EMAE-160 + EMAZ-2 + EMAZ-1



EMAS/EMAE-200 + EMAZ-2

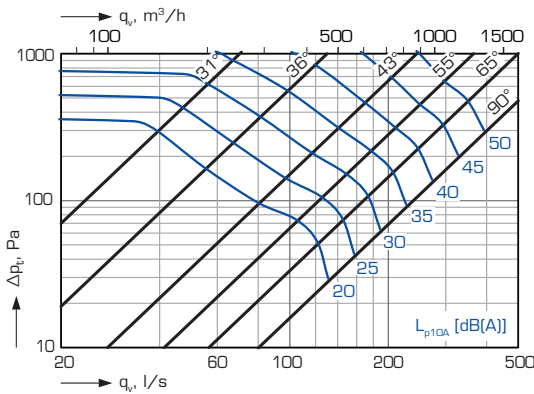


EMAS/EMAE-200 + EMAZ-2 + EMAZ-1

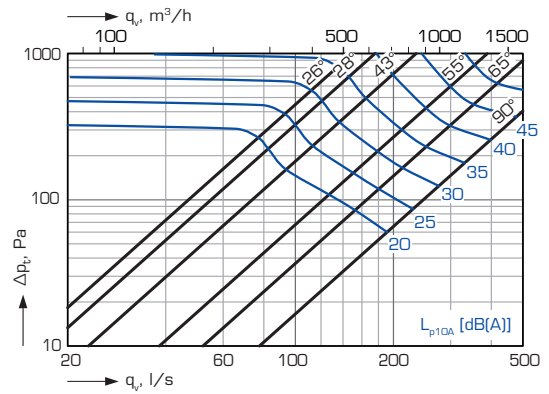


SOUND PRESSURE LEVELS IN ROOM WITH EMAZ-2

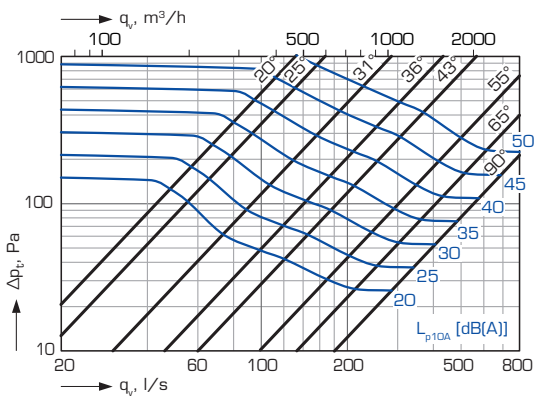
EMAS/EMAE-250 + EMAZ-2



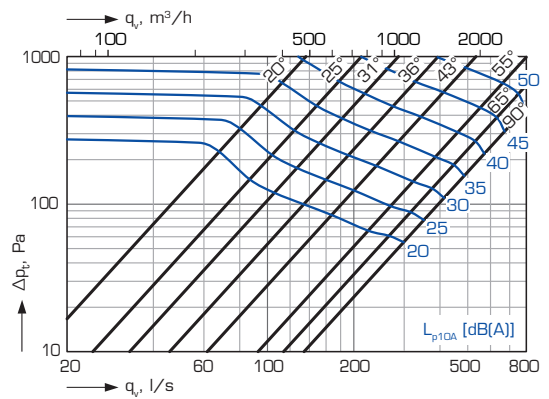
EMAS/EMAE-250 + EMAZ-2 + EMAZ-1



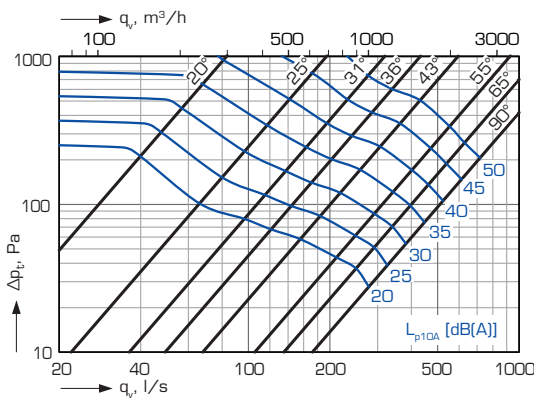
EMAS/EMAE-315 + EMAZ-2



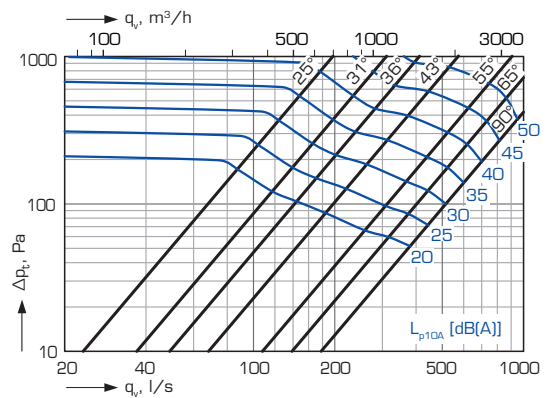
EMAS/EMAE-315 + EMAZ-2 + EMAZ-1



EMAS/EMAE-400 + EMAZ-2



EMAS/EMAE-400 + EMAZ-2 + EMAZ-1



SOUND CHARACTERISTICS WITH EMAZ-2, DIMENSIONING EMAZ-2

DUCT SOUND

EMA(S,E) +EMAZ-2	Correction of sound level K (dB)							
	63	125	250	500	1000	2000	4000	8000
100	43	30	22	8	-3	-9	-12	-13
125	37	29	19	8	-4	-9	-12	-13
160	33	28	15	6	-3	-7	-11	-14
200	31	26	14	4	-3	-7	-9	-13
250	31	24	11	3	-6	-5	-6	-13
315	27	22	7	-1	-4	-2	-5	-14
400	24	15	5	0	-3	-1	-6	-15
Tolerance ±	6	3	2	2	2	2	2	3

EMA(S,E) +EMAZ-2 +EMAZ-1	Correction of sound level K (dB)							
	63	125	250	500	1000	2000	4000	8000
100	46	30	20	8	0	-9	-12	-13
125	44	30	19	6	-4	-12	-13	-13
160	39	32	14	3	-6	-11	-10	-10
200	34	28	13	3	-3	-9	-11	-15
250	30	29	9	-3	-12	-7	-5	-11
315	30	24	6	-4	-10	-3	-3	-11
400	27	18	4	-4	-7	-1	-4	-13
Tolerance ±	6	3	2	2	2	2	2	3

The sound power levels of the duct for every octave band are obtained by adding to the total sound pressure level L_{A10} , dB(A), the correction K_{oct} presented in the table according to the following formula:

$$L_{Woct} = L_{A10} + K_{oct}$$

Correction K_{oct} is average value in range of use of the flow variator.

DIMENSIONING EMAZ-2

Examples of capacity for each size are given in charts on next pages. Effect of the batteries is calculated using +15 °C input air temperature.

DEFINITIONS

q_v = air flow, l/s

P = effect, kW

q_r = water flow, l/s

Δp_r = water pressure drop, kPa

t_{ri} = temperature, water in, °C

t_{ru} = temperature, water out, °C

DIMENSIONING EMAZ-2, SINGLE ROW COILS

EMAZ-2-100-1

q_v (l/s)	t_{r_i} / t_{r_u} (°C) 85/60			t_{r_i} / t_{r_u} (°C) 60/40			t_{r_i} / t_{r_u} (°C) 55/45		
	P (kW)	q_r (l/s)	Δp_r (kPa)	P (kW)	q_r (l/s)	Δp_r (kPa)	P (kW)	q_r (l/s)	Δp_r (kPa)
16	0.27	0.01	<0.1	0.15	0.01	<0.1	0.17	0.01	<0.1
28	0.32	0.01	<0.1	0.19	0.01	<0.1	0.21	0.01	<0.1
40	0.35	0.01	<0.1	0.20	0.01	<0.1	0.23	0.01	<0.1
53	0.38	0.01	0.1	0.21	0.01	0.1	0.25	0.01	0.1

EMAZ-2-125-1

q_v (l/s)	t_{r_i} / t_{r_u} (°C) 85/60			t_{r_i} / t_{r_u} (°C) 60/40			t_{r_i} / t_{r_u} (°C) 55/45		
	P (kW)	q_r (l/s)	Δp_r (kPa)	P (kW)	q_r (l/s)	Δp_r (kPa)	P (kW)	q_r (l/s)	Δp_r (kPa)
25	0.31	0.01	<0.1	0.18	0.01	<0.1	0.20	0.01	<0.1
44	0.36	0.01	<0.1	0.20	0.01	<0.1	0.24	0.01	<0.1
64	0.40	0.01	<0.1	0.23	0.01	<0.1	0.27	0.01	<0.1
83	0.43	0.01	0.1	0.24	0.01	0.1	0.29	0.01	0.1

EMAZ-2-160-1

q_v (l/s)	t_{r_i} / t_{r_u} (°C) 85/60			t_{r_i} / t_{r_u} (°C) 60/40			t_{r_i} / t_{r_u} (°C) 55/45		
	P (kW)	q_r (l/s)	Δp_r (kPa)	P (kW)	q_r (l/s)	Δp_r (kPa)	P (kW)	q_r (l/s)	Δp_r (kPa)
40	0.61	0.01	0.1	0.35	0.01	0.1	0.39	0.01	0.1
72	0.73	0.01	0.1	0.41	0.01	0.1	0.48	0.02	0.1
104	0.83	0.02	0.1	0.46	0.01	0.1	0.61	0.02	0.1
136	0.95	0.02	0.1	0.50	0.02	0.1	0.74	0.03	0.2

EMAZ-2-200-1

q_v (l/s)	t_{r_i} / t_{r_u} (°C) 85/60			t_{r_i} / t_{r_u} (°C) 60/40			t_{r_i} / t_{r_u} (°C) 55/45		
	P (kW)	q_r (l/s)	Δp_r (kPa)	P (kW)	q_r (l/s)	Δp_r (kPa)	P (kW)	q_r (l/s)	Δp_r (kPa)
63	0.88	0.01	0.1	0.48	0.01	0.1	0.63	0.01	0.1
113	1.29	0.01	0.1	0.57	0.01	0.1	0.88	0.02	0.2
163	1.59	0.02	0.2	0.64	0.01	0.1	1.08	0.02	0.3
213	1.85	0.02	0.2	0.69	0.02	0.1	1.25	0.03	0.5

EMAZ-2-250-1

q_v (l/s)	t_{r_i} / t_{r_u} (°C) 85/60			t_{r_i} / t_{r_u} (°C) 60/40			t_{r_i} / t_{r_u} (°C) 55/45		
	P (kW)	q_r (l/s)	Δp_r (kPa)	P (kW)	q_r (l/s)	Δp_r (kPa)	P (kW)	q_r (l/s)	Δp_r (kPa)
98	1.82	0.01	0.2	0.8	0.01	0.1	1.2	0.03	0.5
176	2.4	0.02	0.4	1.0	0.01	0.1	1.6	0.04	0.9
255	3.0	0.02	0.5	1.4	0.02	0.2	1.9	0.05	1.3
333	3.4	0.03	0.7	1.63	0.02	0.3	2.2	0.06	1.7

EMAZ-2-315-1

q_v (l/s)	t_{r_i} / t_{r_u} (°C) 85/60			t_{r_i} / t_{r_u} (°C) 60/40			t_{r_i} / t_{r_u} (°C) 55/45		
	P (kW)	q_r (l/s)	Δp_r (kPa)	P (kW)	q_r (l/s)	Δp_r (kPa)	P (kW)	q_r (l/s)	Δp_r (kPa)
56	3.3	0.03	0.9	1.8	0.02	0.5	2.1	0.05	2.2
280	4.5	0.04	1.6	2.4	0.03	0.8	2.8	0.07	3.8
405	5.4	0.05	2.2	2.9	0.03	1.2	3.4	0.08	5.0
530	6.3	0.06	2.9	3.4	0.04	1.6	4.0	0.10	7.0

EMAZ-2-400-1

q_v (l/s)	t_{r_i} / t_{r_u} (°C) 85/60			t_{r_i} / t_{r_u} (°C) 60/40			t_{r_i} / t_{r_u} (°C) 55/45		
	P (kW)	q_r (l/s)	Δp_r (kPa)	P (kW)	q_r (l/s)	Δp_r (kPa)	P (kW)	q_r (l/s)	Δp_r (kPa)
251	5.5	0.05	3.0	3.1	0.04	1.8	3.4	0.08	7.0
452	7.5	0.06	5.0	4.2	0.05	3.0	4.7	0.11	13
653	9.1	0.07	8.0	5.2	0.06	4.3	5.7	0.14	18
854	10.6	0.08	10	6.0	0.07	6.0	6.6	0.16	23

DIMENSIONING EMAZ-2, TWO ROW COILS

EMAZ-2-100-2

q_v (l/s)	t_{r_i} / t_{r_u} (°C) 85/60			t_{r_i} / t_{r_u} (°C) 60/40			t_{r_i} / t_{r_u} (°C) 55/45		
	P (kW)	q_r (l/s)	Δp_r (kPa)	P (kW)	q_r (l/s)	Δp_r (kPa)	P (kW)	q_r (l/s)	Δp_r (kPa)
16	0.94	0.01	0.1	0.53	0.01	0.1	0.59	0.01	0.2
28	1.16	0.01	0.1	0.61	0.01	0.1	0.76	0.01	0.2
40	1.39	0.01	0.1	0.68	0.01	0.1	0.91	0.02	0.3
53	1.71	0.02	0.2	0.76	0.02	0.1	1.11	0.03	0.5

EMAZ-2-125-2

q_v (l/s)	t_{r_i} / t_{r_u} (°C) 85/60			t_{r_i} / t_{r_u} (°C) 60/40			t_{r_i} / t_{r_u} (°C) 55/45		
	P (kW)	q_r (l/s)	Δp_r (kPa)	P (kW)	q_r (l/s)	Δp_r (kPa)	P (kW)	q_r (l/s)	Δp_r (kPa)
25	1.04	0.01	0.1	0.57	0.01	0.1	0.69	0.01	0.2
44	1.50	0.02	0.1	0.70	0.01	0.1	0.98	0.02	0.4
64	1.92	0.02	0.1	0.81	0.01	0.1	1.26	0.03	0.6
83	2.20	0.03	0.3	0.88	0.02	0.1	1.47	0.04	0.8

EMAZ-2-160-2

q_v (l/s)	t_{r_i} / t_{r_u} (°C) 85/60			t_{r_i} / t_{r_u} (°C) 60/40			t_{r_i} / t_{r_u} (°C) 55/45		
	P (kW)	q_r (l/s)	Δp_r (kPa)	P (kW)	q_r (l/s)	Δp_r (kPa)	P (kW)	q_r (l/s)	Δp_r (kPa)
40	1.8	0.02	0.3	0.85	0.01	0.1	1.15	0.03	0.7
72	2.6	0.02	0.5	1.2	0.02	0.2	1.65	0.04	1.3
104	3.4	0.03	0.8	1.6	0.03	0.4	2.15	0.05	2.0
136	3.9	0.04	1.1	1.85	0.03	0.5	2.5	0.06	2.7

EMAZ-2-200-2

q_v (l/s)	t_{r_i} / t_{r_u} (°C) 85/60			t_{r_i} / t_{r_u} (°C) 60/40			t_{r_i} / t_{r_u} (°C) 55/45		
	P (kW)	q_r (l/s)	Δp_r (kPa)	P (kW)	q_r (l/s)	Δp_r (kPa)	P (kW)	q_r (l/s)	Δp_r (kPa)
63	3.1	0.03	0.8	1.5	0.02	0.4	1.8	0.05	1.9
113	4.3	0.04	1.6	2.4	0.02	0.8	2.8	0.07	3.7
163	5.4	0.05	2.3	3.0	0.03	1.2	3.5	0.08	6.0
213	6.4	0.06	3.1	3.5	0.04	1.6	4.0	0.10	7.0

EMAZ-2-250-2

q_v (l/s)	t_{r_i} / t_{r_u} (°C) 85/60			t_{r_i} / t_{r_u} (°C) 60/40			t_{r_i} / t_{r_u} (°C) 55/45		
	P (kW)	q_r (l/s)	Δp_r (kPa)	P (kW)	q_r (l/s)	Δp_r (kPa)	P (kW)	q_r (l/s)	Δp_r (kPa)
98	4.5	0.05	2.5	2.5	0.03	1.4	3.0	0.07	6.0
176	6.5	0.07	4.9	3.5	0.04	2.8	4.0	0.10	12
255	8.5	0.09	7.0	4.5	0.05	4.2	5.5	0.13	17
333	10	0.10	10	5.5	0.07	5.0	6.5	0.16	23

EMAZ-2-315-2

q_v (l/s)	t_{r_i} / t_{r_u} (°C) 85/60			t_{r_i} / t_{r_u} (°C) 60/40			t_{r_i} / t_{r_u} (°C) 55/45		
	P (kW)	q_r (l/s)	Δp_r (kPa)	P (kW)	q_r (l/s)	Δp_r (kPa)	P (kW)	q_r (l/s)	Δp_r (kPa)
156	7.0	0.07	1.1	4.0	0.05	0.6	4.0	0.11	2.5
280	10.5	0.10	2.2	6.0	0.07	1.2	6.5	0.15	5.0
405	13	0.12	3.2	7.0	0.08	1.7	8.0	0.20	8.0
530	15.5	0.15	4.3	8.0	0.10	2.3	9.5	0.24	10

EMAZ-2-400-2

q_v (l/s)	t_{r_i} / t_{r_u} (°C) 85/60			t_{r_i} / t_{r_u} (°C) 60/40			t_{r_i} / t_{r_u} (°C) 55/45		
	P (kW)	q_r (l/s)	Δp_r (kPa)	P (kW)	q_r (l/s)	Δp_r (kPa)	P (kW)	q_r (l/s)	Δp_r (kPa)
251	12.5	0.10	3.8	7.0	0.10	2.2	7.5	0.18	9.0
452	18.5	0.18	8.0	10.5	0.13	4.6	11.5	0.28	18
653	23	0.22	12	13	0.16	7.0	14.5	0.35	27
854	27	0.30	15	15	0.19	9.0	16.5	0.37	30

DIMENSIONING EMAZ-2, THREE ROW COILS

EMAZ-2-100-3

q_v (l/s)	t_{r_i} / t_{r_u} (°C) 85/60			t_{r_i} / t_{r_u} (°C) 60/40			t_{r_i} / t_{r_u} (°C) 55/45		
	P (kW)	q_r (l/s)	Δp_r (kPa)	P (kW)	q_r (l/s)	Δp_r (kPa)	P (kW)	q_r (l/s)	Δp_r (kPa)
16	0.95	0.01	0.1	0.54	0.01	0.1	0.60	0.01	0.2
28	1.31	0.01	0.1	0.69	0.01	0.1	0.83	0.02	0.4
40	1.65	0.02	0.2	0.82	0.01	0.1	1.04	0.02	0.6
53	2.0	0.03	0.3	0.94	0.02	0.1	1.28	0.03	0.8

EMAZ-2-125-3

q_v (l/s)	t_{r_i} / t_{r_u} (°C) 85/60			t_{r_i} / t_{r_u} (°C) 60/40			t_{r_i} / t_{r_u} (°C) 55/45		
	P (kW)	q_r (l/s)	Δp_r (kPa)	P (kW)	q_r (l/s)	Δp_r (kPa)	P (kW)	q_r (l/s)	Δp_r (kPa)
25	1.11	0.01	0.1	0.62	0.01	0.1	0.71	0.02	0.3
44	1.77	0.02	0.2	0.86	0.01	0.1	1.12	0.03	0.6
64	2.30	0.02	0.4	1.05	0.02	0.1	1.47	0.03	1.0
83	2.80	0.03	0.6	1.27	0.02	0.2	1.75	0.04	1.4

EMAZ-2-160-3

q_v (l/s)	t_{r_i} / t_{r_u} (°C) 85/60			t_{r_i} / t_{r_u} (°C) 60/40			t_{r_i} / t_{r_u} (°C) 55/45		
	P (kW)	q_r (l/s)	Δp_r (kPa)	P (kW)	q_r (l/s)	Δp_r (kPa)	P (kW)	q_r (l/s)	Δp_r (kPa)
40	2.2	0.02	0.4	1.2	0.01	0.2	1.35	0.03	1.0
72	3.2	0.03	1.0	1.72	0.02	0.5	2.0	0.04	2.4
104	4.2	0.04	1.6	2.2	0.03	0.9	2.6	0.06	3.7
136	5.0	0.05	2.3	2.7	0.04	1.2	3.1	0.07	5.0

EMAZ-2-200-3

q_v (l/s)	t_{r_i} / t_{r_u} (°C) 85/60			t_{r_i} / t_{r_u} (°C) 60/40			t_{r_i} / t_{r_u} (°C) 55/45		
	P (kW)	q_r (l/s)	Δp_r (kPa)	P (kW)	q_r (l/s)	Δp_r (kPa)	P (kW)	q_r (l/s)	Δp_r (kPa)
63	3.5	0.03	1.2	1.8	0.02	0.7	2.0	0.05	2.7
113	5.0	0.04	2.6	2.8	0.03	1.5	3.1	0.07	6.0
163	6.5	0.06	4.1	3.6	0.04	2.3	4.0	0.09	10
213	7.6	0.07	6.0	4.3	0.05	3.2	4.7	0.11	13

EMAZ-2-250-3

q_v (l/s)	t_{r_i} / t_{r_u} (°C) 85/60			t_{r_i} / t_{r_u} (°C) 60/40			t_{r_i} / t_{r_u} (°C) 55/45		
	P (kW)	q_r (l/s)	Δp_r (kPa)	P (kW)	q_r (l/s)	Δp_r (kPa)	P (kW)	q_r (l/s)	Δp_r (kPa)
98	5.0	0.05	0.5	3.0	0.03	0.3	3.5	0.07	1.1
176	7.5	0.07	1.1	4.0	0.04	0.4	5.0	0.11	2.5
255	9.5	0.09	1.6	5.5	0.06	0.9	6.5	0.14	3.9
333	11.5	0.11	2.2	6.5	0.07	1.2	7.5	0.17	5.0

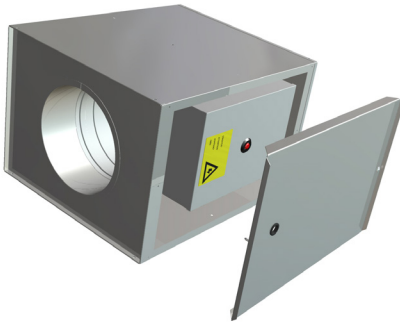
EMAZ-2-315-3

q_v (l/s)	t_{r_i} / t_{r_u} (°C) 85/60			t_{r_i} / t_{r_u} (°C) 60/40			t_{r_i} / t_{r_u} (°C) 55/45		
	P (kW)	q_r (l/s)	Δp_r (kPa)	P (kW)	q_r (l/s)	Δp_r (kPa)	P (kW)	q_r (l/s)	Δp_r (kPa)
156	8.5	0.08	1.8	4.5	0.06	1.1	5.0	0.12	4.2
280	12.5	0.11	4.0	7.5	0.08	2.3	8.0	0.17	9.0
405	16	0.14	6.0	9.0	0.11	3.6	10	0.23	14
530	19.5	0.18	9.0	11	0.13	4.9	12	0.28	20

EMAZ-2-400-3

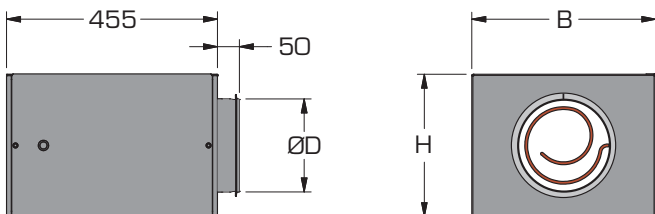
q_v (l/s)	t_{r_i} / t_{r_u} (°C) 85/60			t_{r_i} / t_{r_u} (°C) 60/40			t_{r_i} / t_{r_u} (°C) 55/45		
	P (kW)	q_r (l/s)	Δp_r (kPa)	P (kW)	q_r (l/s)	Δp_r (kPa)	P (kW)	q_r (l/s)	Δp_r (kPa)
251	13.5	0.13	6.0	8.0	0.10	4.0	8.5	0.20	14
452	21	0.20	14	12.5	0.15	9.0	13	0.30	32
653	27	0.26	22	16	0.20	14	16.5	0.37	45
854	33	0.30	30	18.5	0.25	18	19	0.37	45

EMAZ-3 ELECTRIC REHEATER



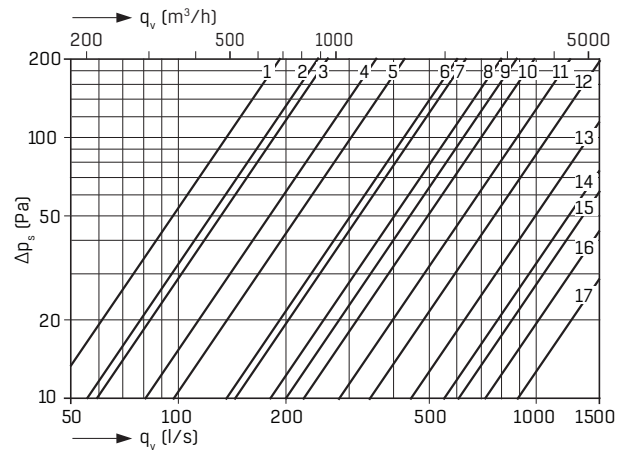
The electric reheater has the same profile as the variator. The standard reheater is inserted in the casing. The junction box is protected inside the casing and is accessible via a simple opening inspection hatch. The reheater is supplied with built-in regulator and electronic flow monitor. The regulator is electronic and controls the output across a triac by means of time proportional control (intermittent ON/OFF control). The flow monitor continually monitors the air flow and shuts down the heater if the air velocity should drop below 1.5 m/s, thus avoiding overheating. When the air velocity again exceeds 1.5 m/s, the heater will automatically be switched on. This means that the CV with built-in flow monitor meets the requirements for interlocking with the fan/air flow and can be installed without any external interlocking. The reheater has an automatically (60 °C) resettable overheating protection and one which is manually (120 °C) resettable. The casing is made of galvanized steel steel, and the heating element of stainless material. The reheater is provided for single-phase, two-phase and three-phase current and in a number of variants. The electric safety of the reheater is tested and approved by SEMKO in accordance with SEMKO 111 FA-1982 and EN 60335-1 and EN-60335-2-30. It is also approved by SEMKO in respect of EMC and conforms to European standards EN-50081-1 and EN-50082-1. The circular spigot has a sealing ring made of rubber. Air tightness class C in accordance with EN1751:1998.

DIMENSIONS AND WEIGHTS



Size	ØD (mm)	B (mm)	H (mm)	Weight (kg)
100	99	285	215	5
125	124	285	215	5
160	159	345	255	6
200	199	395	305	8
250	249	460	370	12
315	314	525	460	15
400	399	665	565	20

PRESSURE DIFFERENCE OVER THE ELECTRIC REHEATER



Type	Voltage	Output (W)	Min air flow (l/s)	Pressure drop curve (in graph)
EMAZ-3-100-1	230V~	400	12	2
EMAZ-3-125-1	230V~	600	20	3
EMAZ-3-125-2	230V~	1200	20	1
EMAZ-3-160-1	230V~	400	31	7
EMAZ-3-160-2	230V~	1200	31	5
EMAZ-3-160-3	230V~	2100	31	4
EMAZ-3-200-1	230V~	1200	48	10
EMAZ-3-200-2	230V~	2100	48	8
EMAZ-3-200-3	230V~	3000	48	6
EMAZ-3-200-4	400V2~	3000	48	6
EMAZ-3-250-1	230V~	2100	75	12
EMAZ-3-250-2	230V~	3000	75	11
EMAZ-3-250-3	400V2~	3000	75	11
EMAZ-3-250-4	400V3~	6000	75	9
EMAZ-3-315-1	230V~	3000	116	14
EMAZ-3-315-2	400V2~	3000	116	14
EMAZ-3-315-3	400V3~	6000	116	13
EMAZ-3-315-4	400V3~	9000	116	12
EMAZ-3-400-1	400V3~	6000	192	17
EMAZ-3-400-2	400V3~	9000	192	16
EMAZ-3-400-3	400V3~	12000	192	15

PRODUCT CODE AND ACCESSORIES

PRODUCT CODE

Flow variator with sound attenuator, supply air
Flow variator with sound attenuator, exhaust air

EMAS-a-bbb-c-d
EMAE-a-bbb-c-d

Actuator (a)

1 = Compact controller 227VM
 2 = Compact controller D3
 5 = Compact controller for Modbus 227VM-MB

Size (bbb)

100, 125, 160, 200, 250, 315, 400

Material (c)

1 = galvanized sheet steel (corrosivity class C3)
 2 = acid-proof steel AISI 316 (corrosivity class C4)
 (applies to parts in contact with the ventilation air)

Sound attenuation material (d)

1 = mineral wool
 2 = polyester fibre

ACCESSORIES

Extra sound attenuator
 Fitted

EMAZ-1-aaa-b-c

Size (aaa)

100, 125, 160, 200, 250, 315, 400

Material (b)

1 = galvanized sheet steel (corrosivity class C3)
 2 = acid-proof steel AISI 316 (corrosivity class C4)
 (applies to parts in contact with the ventilation air)

Sound attenuation material (c)

1 = mineral wool
 2 = polyester fibre

Water reheater

Fitted, only corrosivity class C3

EMAZ-2-aaa-b-c

Size (aaa)

100, 125, 160, 200, 250, 315, 400

Battery depth (b)

1 = 1 pipe row
 2 = 2 pipe rows
 3 = 3 pipe rows

Insulation (c)

1 = uninsulated
 2 = insulated

Electric reheater

Fitted, casing uninsulated only corrosivity class C3

EMAZ-3-aaa-b

Size (aaa)

100, 125, 160, 200, 250, 315, 400

Output/voltage (b)

1 - 4 (see table below)

Size	b =			
	1	2	3	4
100	400 W/230V~	-	-	-
125	600 W/230V~	1200W/230V~	-	-
160	600 W/230V~	1200W/230V~	2100W/230V~	-
200	1200W/230V~	2100W/230V~	3000W/230V~	3000W/400V2~
250	2100W/230V~	3000W/230V~	3000W/400V2~	6000W/400V3~
315	3000W/230V~	3000W/400V2~	6000W/400V3~	9000W/400V3~
400	6000W/400V3~	9000W/400V3~	12000W/400V3~	-

EXCELLENCE IN SOLUTIONS

FläktGroup is the European market leader for smart and energy efficient Indoor Air and Critical Air solutions to support every application area. We offer our customers innovative technologies, high quality and outstanding performance supported by more than a century of accumulated industry experience. The widest product range in the market, and strong market presence in 65 countries worldwide, guarantee that we are always by your side, ready to deliver Excellence in Solutions.

PRODUCT FUNCTIONS BY FLÄKTGROUP

Air Treatment | Air Movement | Air Diffusion | Air Distribution | Air Filtration
Air Management & ATD's | Air Conditioning & Heating | Controls | Service

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