NOVOVENT

WINDER

Impellers with higher efficiency
and less sound level

ErP 2015 ACCORDING

MNS

SNC

Winder Solutions

The last new generation impeller

With the **Serrated Novovent Concept** (S.N.C.), NOVOVENT, S.A. has developed a new blades' generation. The S.N.C. is the result of three different research lines. Firstly, we get higher performance due to the sickle blades, secondly, due to the winglet applied at the end of the blade we debug turbulences and thirdly, in order to reduce the sound level we designed a serrated profile at the rear of the blades.

The S.N.C. blade compared with the traditional ones gets better performance in airflow and pressure; decreasing the power needs and sound levels about 15%.

The new impeller will be applied to all our axial product range. Applied with the Multiflow Novovent System (M.N.S.) gives to NOVOVENT an exclusive range of products and the possibility to offer unique solutions.

R+D+I

Our technical department is using for the designs and advanced applications the Computational Fluid Dynamic (CFD) and Finite Element Analysis (FEA).

Those systems get us pre-designed units, like Winder ones, to delimitate the first steps to check mechanical resistance avoiding possible mechanical failures and to pre-define fluid dynamics performance.

These first data are exported to our laboratory to test, check and validate the final design.

Acoustic

Novovent is equipped with the latest technologies for measuring noise under the norm AMCA 300 (BS848 part 2).

Laboratory

It is a long process where our R&D department develops new prototypes, tests them in our own laboratory so that we can finally offer them in our catalogue once we are sure that they guarantee the level of quality that our costumers and the market are expecting.

Our Laboratory tests all acoustic, electrical and fluid dynamics performance of all fans within two cameras and nozzle entrance test for fans up to 1.600 mm in diameter, 150.000 m3/h and 3.000 pa of static pressure following the international standards, ISO 5801:1997, BS 848-1:1980 and ANSI / AMCA 210-85:1985.

AXIAL WINDER

- Polypropylene frame reinforced with fiber glass for diameters 560 and 630. For bigger diameters, the mounting plate is made of galvanized metal sheet, integrated bell mouth.
- High efficiency impellers made of aluminum cast according to SERRATED NOVOVENT CONCEPT and MULTIFLOW NOVOVENT SYSTEM, as a high efficiency option, dynamically balanced and closed hub.
- All the models include epoxy painted grill.
- Motors class F, protection IP 65 up to 750W, others IP 55.
- Working temperature: -30°C to 70°C.
- Airflow: motor - impeller.

AXITUB WINDER and AXITUB PIROS WINDER

- Hot dip galvanized tubular long cased. Including inspection door for models with motor bigger than 7.5kW
- High efficiency impellers made of aluminum cast according to SERRATED NOVOVENT CONCEPT and MULTIFLOW NOVOVENT SYSTEM, as a high efficiency option, dynamically balanced and closed hub.
- Airflow: motor - impeller.
- Axitub Winder: Motors class F, protection IP 65 up to 750W, others IP 55. Working temperature: -30°C to 70°C.
- Axitub Piros Winder: Motors class H, protection IP 55. Fan certified according to EN 1201-3 (F400, F300, F200). Working temperature: S1: -30°C to 70°C, S2: -30°C to 400°C-2hs / to 300°C-2hs / to 200°C-2hs

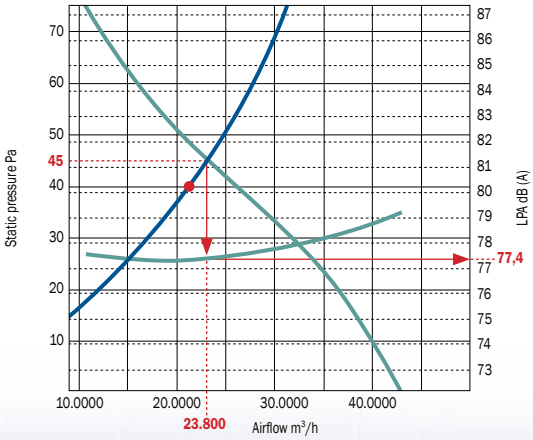
AXI BOX WINDER y PIROS BOX WINDER

- Galvanized metal sheet cabinet with 50 mm rock wool class M0.
- High efficiency impellers made of aluminum cast according to SERRATED NOVOVENT CONCEPT and MULTIFLOW NOVOVENT SYSTEM, as a high efficiency option, dynamically balanced and closed hub.
- Airflow: motor - impeller
- Axi Box Winder: Motors class F, protection IP 65 up to 750W, others IP 55. Working temperature: -30°C to 70°C.
- Piros Box Winder: Motors class H, protection IP 55. Fan certified according to EN 1201-3 (F400, F300, F200). Working temperature: S1: -30°C to 70°C, S2: -30°C to 400°C-2hs / to 300°C-2hs / to 200°C-2hs

Options

AXIAL WINDER	AXITUB WINDER	AXITUB PIROS WINDER	PIROS BOX WINDER	AXI BOX	
•	•	•	•	•	Different tensions, speed and frequencies, 2 speed motors.
•	•	•	•	•	Another configuration with different performance.
•	•	•	•	•	Airflow: impeller - motor.
	•			•	Made in stainless steel.
	•	•			Short cased.
		•	•		For max. temperature of 200°C 2h, 300°C 2h.

How to get the octave bands from the graphic?



For instance, we would like to calculate the octave bands for a fan working at 20.500 m³/h at 450 Pa.
Firstly, we need to get the working point (Q = 23.800 m³/h at 450 Pa).
Secondly, from the working point, vertically, we look for the intersection in the acoustic curve.
Thirdly, we obtain the value of the sound pressure from the data in the right side of the graph.
Once we have the sound pressure (77,4), we subtract the correction factor from the data table.

	Airflow m³/h	Static pressure mmcda	Octaves	LpA 63	LpA 125	LpA 250	LpA 500	LpA 1000	LpA 2000	LpA 4000	LpA 8000
WINDER 4-900T-6 5,5 kW (50 Hz)	23.800	45	Value curve				77,4				
			Correction factor	24,3	12,5	10,0	12,0	15,9	22,6	24,8	33,1
			Total	53,1	64,9	67,4	65,4	61,5	54,8	52,6	44,3

Values at 3 m radiated

400V 50Hz (III~) 1500 r.p.m. Ø 560 - 1.250 mm

				ERP							CORRECTION FACTOR (Hz)							
	Ø [mm]	Q_{max} [m³/h]	P [kW]	q [m³/s]	pf [Pa]	Pe [W]	rpm	ηe [%]	N'	LpA [dB(A)]	63	125	250	500	1000	2000	4000	8000
WINDER 4-560T-4 0,55kW	560	10.087	0,55	1,98	182	521	1.420	69,2	77,3	65	14,8	15,9	12,1	10,1	15,2	24,0	28,7	36,9
WINDER 4-560T-4 0,75kW	560	12.300	0,75	2,49	221	808	1.420	68,1	75,0	65	12,7	14,3	12,3	12,3	16,4	23,8	28,1	35,4
WINDER 4-560T-4 1,1kW	560	13.985	1,10	2,69	257	983	1.455	70,1	76,5	66	14,1	15,3	13,0	13,6	17,6	24,8	28,8	35,5
WINDER 4-630T-4 0,75kW	630	14.054	0,75	2,75	222	874	1.420	69,8	76,5	68	14,8	15,9	12,1	10,1	15,2	24,0	28,7	36,9
WINDER 4-630T-4 1,1kW	630	17.559	1,10	3,75	239	1.217	1.455	73,6	79,3	70	12,7	14,3	12,3	12,3	16,4	23,8	28,1	35,4
WINDER 4-630T-4 1,5kW	630	18.763	1,50	4,70	233	1.400	1.440	78,1	83,1	69	14,1	15,3	13,0	13,6	17,6	24,8	28,8	35,5
WINDER 4-710T-6 1,1kW	710	15.648	1,10	3,44	219	1.166	1.455	64,6	70,4	70	21,7	16,5	10,3	11,0	14,6	21,9	28,0	36,5
WINDER 4-710T-6 1,5kW	710	19.547	1,50	3,56	269	1.435	1.440	66,7	72,0	70	19,7	15,9	10,9	10,5	14,6	21,5	27,1	35,0
WINDER 4-710T-6 2,2kW	710	23.715	2,20	5,30	280	2.181	1.435	68,2	72,3	71	17,4	15,3	11,0	10,7	14,5	21,3	26,9	34,3
WINDER 4-800T-6 3kW	800	29.718	3,00	6,58	292	2.798	1.440	68,7	72,0	73	24,3	12,5	10,0	12,0	15,9	22,6	24,8	33,1
WINDER 4-800T-6 4kW	800	35.695	4,00	7,90	397	4.314	1.450	72,8	75,1	75	17,4	15,3	11,0	10,7	14,5	21,3	26,9	34,3
WINDER 4-800T-6 5,5kW	800	41.350	5,50	9,80	439	5.557	1.465	77,4	78,9	73	16,7	13,3	10,2	11,5	16,8	24,8	29,0	35,6
WINDER 4-900T-6 4kW	900	35.650	4,00	7,30	347	3.695	1.450	68,6	71,2	75	28,3	11,4	10,6	12,8	17,9	25,0	26,9	35,4
WINDER 4-900T-6 5,5kW	900	42.209	5,50	9,25	371	4.728	1.465	72,7	74,6	77	24,3	12,5	10,0	12,0	15,9	22,6	24,8	33,1
WINDER 4-900T-6 7,5kW	900	49.189	7,50	10,81	474	6.902	1.465	74,2	75,2	80	22,3	12,4	9,9	11,6	15,6	22,4	24,9	32,8
WINDER 4-1000T-6 7,5kW	1.000	50.200	7,50	9,86	471	6.412	1.465	72,4	73,6	78	17,4	11,2	10,3	13,1	18,1	25,0	27,8	35,5
WINDER 4-1000T-6 11kW	1.000	62.602	11,00	13,58	552	9.511	1.470	78,8	78,8	79	28,3	11,4	10,6	12,8	17,9	25,0	26,9	35,4
WINDER 4-1000T-6 15kW	1.000	75.500	15,00	16,99	698	14.934	1.470	79,4	79,1	79	21,0	11,4	10,2	12,8	18,2	25,3	27,7	35,8
WINDER 4-1250T-6 18.5kW	1.250	92.600	18,50	17,42	699	15.473	1.470	78,8	78,5	85	28,3	11,4	10,6	12,8	17,9	25,0	26,9	35,4
WINDER 4-1250T-6 22kW	1.250	110.928	22,00	24,32	701	20.513	1.470	83,2	82,6	77	26,6	13,7	10,4	11,5	15,5	22,8	24,4	33,9
WINDER 4-1250T-6 30kW	1.250	129.273	30,00	28,40	894	30.386	1.480	83,6	82,8	80	22,3	12,4	9,9	11,6	15,6	22,4	24,9	32,8

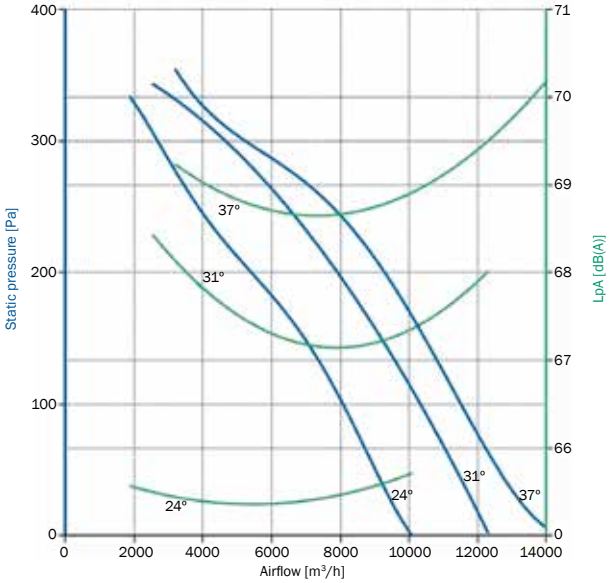
400V 50Hz (III~) 1000 r.p.m. Ø 560 - 1.250 mm

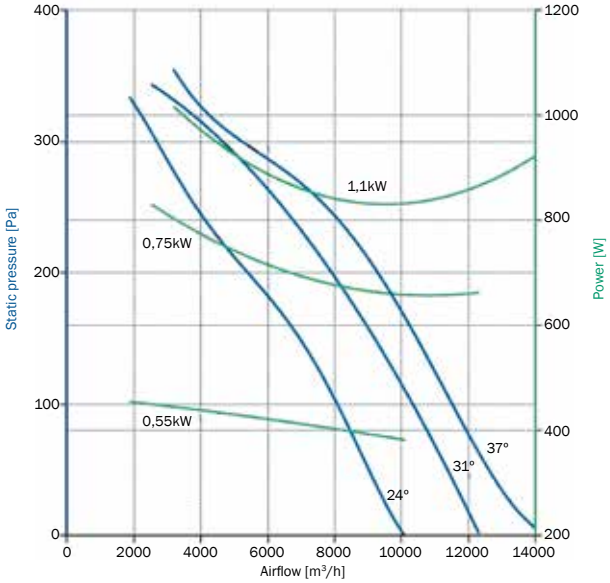
				ERP							CORRECTION FACTOR (Hz)							
	Ø [mm]	Q_{max} [m³/h]	P [kW]	q [m³/h]	pf [Pa]	Pe [W]	rpm	ηe [%]	N'	LpA [dB(A)]	63	125	250	500	1000	2000	4000	8000
WINDER 6-560T-4 0,18kW	560	6.657	0,18	1,29	82	200	900	52,7	63,3	65	14,1	15,3	13,0	13,6	17,6	24,8	28,8	35,5
WINDER 6-560T-4 0,25kW	560	8.118	0,25	1,65	97	308	880	52,1	61,6	65	14,1	15,3	13,0	13,6	17,6	24,8	28,8	35,5
WINDER 6-560T-4 0,37kW	560	9.230	0,37	1,75	115	358	925	56,1	65,2	66	14,1	15,3	13,0	13,6	17,6	24,8	28,8	35,5
WINDER 6-630T-4 0,25kW	630	9.276	0,25	1,81	98	333	880	53,5	62,8	68	14,1	15,3	13,0	13,6	17,6	24,8	28,8	35,5
WINDER 6-630T-4 0,37kW	630	11.589	0,37	2,45	106	439	925	59,3	67,8	70	14,1	15,3	13,0	13,6	17,6	24,8	28,8	35,5
WINDER 6-630T-4 0,55kW	630	12.384	0,55	3,06	104	508	925	62,7	70,5	69	14,1	15,3	13,0	13,6	17,6	24,8	28,8	35,5
WINDER 6-710T-6 0,37kW	710	10.328	0,37	2,24	98	422	925	52,2	60,8	70	17,4	15,3	11,0	10,7	14,5	21,3	26,9	34,3
WINDER 6-710T-6 0,75kW	710	15.652	0,75	3,50	124	700	945	61,8	69,0	71	19,7	15,9	10,9	10,5	14,6	21,5	27,1	35,0
WINDER 6-710T-6 1,5kW	710	12.901	1,50	2,32	121	483	950	57,8	66,1	70	15,9	15,3	12,0	11,4	15,4	21,6	26,8	33,4
WINDER 6-800T-6 1,1kW	800	19.614	1,10	4,31	130	906	945	61,8	68,3	73	28,3	11,4	10,6	12,8	17,9	25,0	26,9	35,4
WINDER 6-800T-6 1,5kW	800	23.559	1,50	5,17	177	1.384	950	66,1	71,5	75	24,3	12,5	10,0	12,0	15,9	22,6	24,8	33,1
WINDER 6-800T-6 2,2kW	800	27.291	2,20	6,43	194	1.776	950	70,3	75,0	73	22,3	12,4	9,9	11,6	15,6	22,4	24,9	32,8
WINDER 6-900T-6 1,1kW	900	23.529	1,10	4,77	155	1.210	945	61,2	66,9	75	28,3	11,4	10,6	12,8	17,9	25,0	26,9	35,4
WINDER 6-900T-6 1,5kW	900	27.858	1,50	6,11	164	1.542	950	64,9	69,9	77	26,6	13,7	10,4	11,5	15,5	22,8	24,4	33,9
WINDER 6-900T-6 2,2kW	900	32.465	2,20	7,13	209	2.216	950	67,2	71,3	80	22,3	12,4	9,9	11,6	15,6	22,4	24,9	32,8
WINDER 6-1000T-6 2,2kW	1.000	33.132	2,20	6,51	209	2.059	950	65,9	70,2	78	21,3	11,5	11,0	13,7	19,0	26,0	28,6	36,5
WINDER 6-1000T-6 3kW	1.000	41.318	3,00	8,96	243	2.943	970	74,0	77,3	79	19,0	11,0	10,6	13,4	18,4	25,3	28,0	36,3
WINDER 6-1000T-6 5,5kW	1.000	49.830	5,50	11,11	310	4.679	965	73,7	75,7	79	17,4	11,2	10,3	13,1	18,1	25,0	27,8	35,5
WINDER 6-1250T-6 5,5kW	1.250	61.116	5,50	11,50	309	4.848	965	73,4	75,4	85	26,6	13,7	10,4	11,5	15,5	22,8	24,4	33,9
WINDER 6-1250T-6 7,5kW	1.250	73.213	7,50	15,90	313	6.302	975	79,0	80,1	77	22,3	12,4	9,9	11,6	15,6	22,4	24,9	32,8
WINDER 6-1250T-6 11kW	1.250	85.320	11,00	18,57	398	9.350	975	79,1	79,2	80	28,3	11,4	10,6	12,8	17,9	25,0	26,9	35,4

CM = Measurement category: D
CE = Efficiency category: Total
SR = Specific ratio: 1
VSD = Variable speed drive: NO

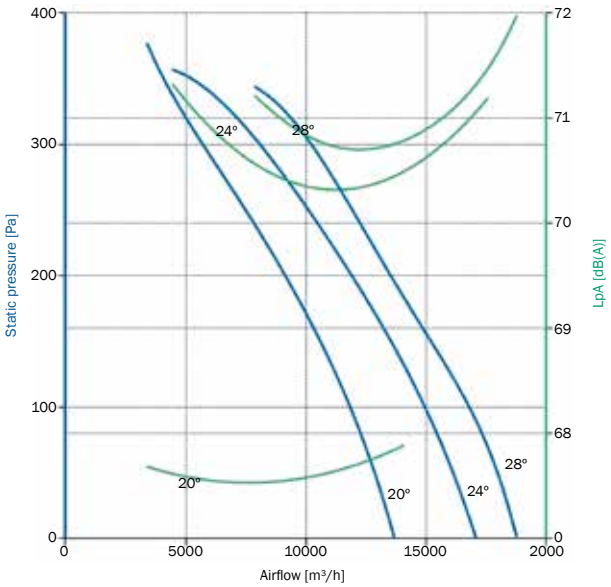
pf = Fan total pressure
psf = Fan static pressure
pe = Power measured at the main input terminals to the motor
ηe [%] = Overall efficiency
N' = Efficiency grade

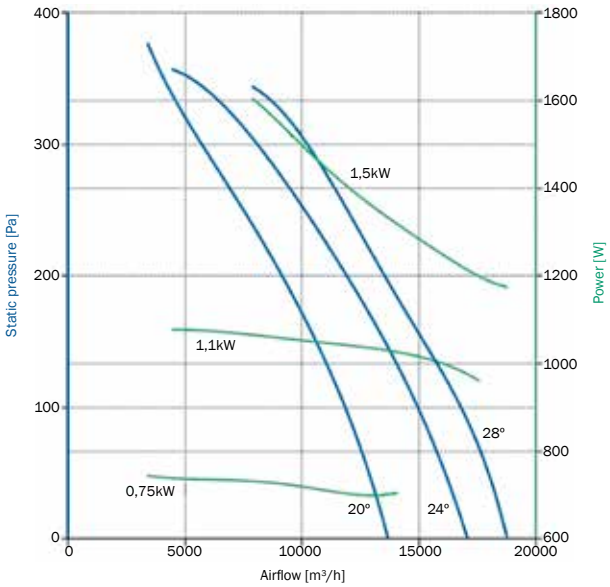
4 Poles - Ø 560



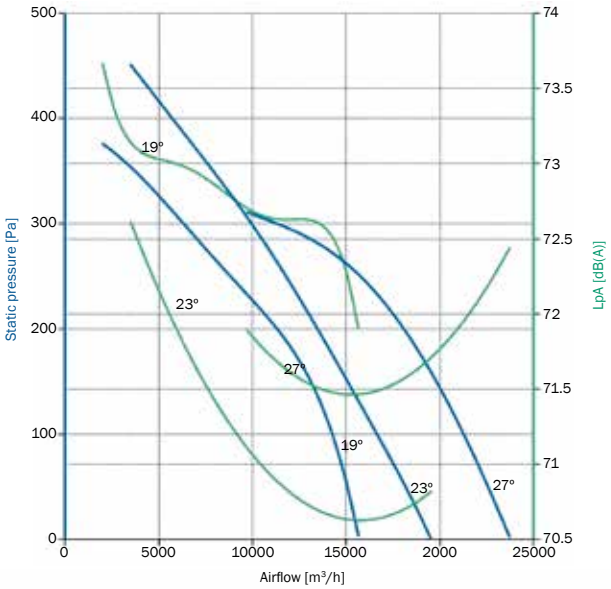


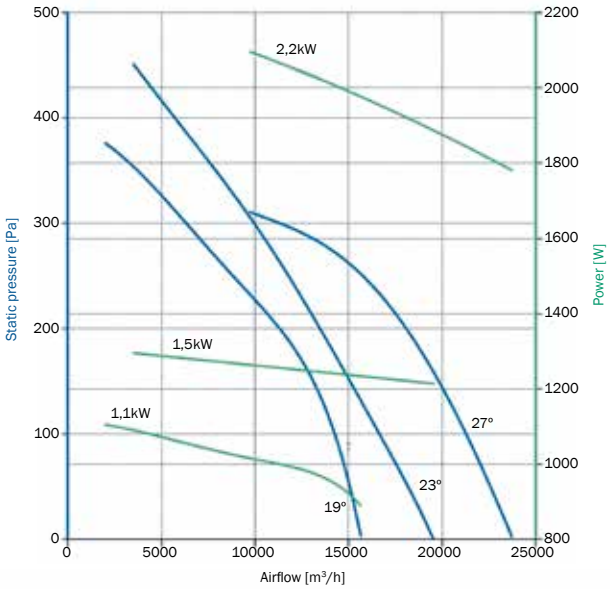
4 Poles - Ø 630



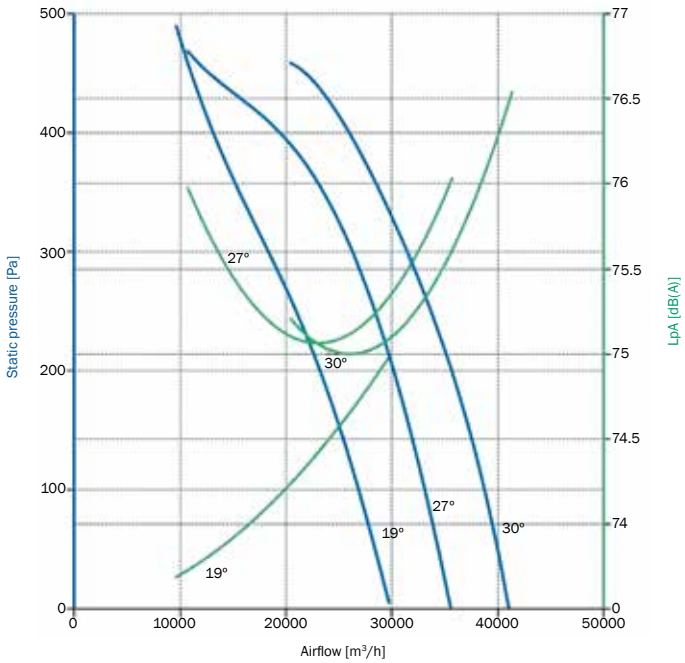


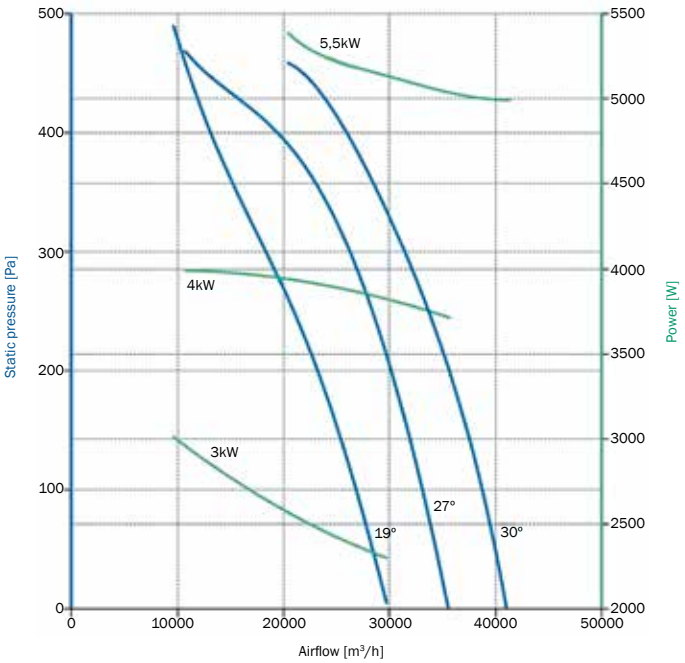
4 Poles - Ø 710



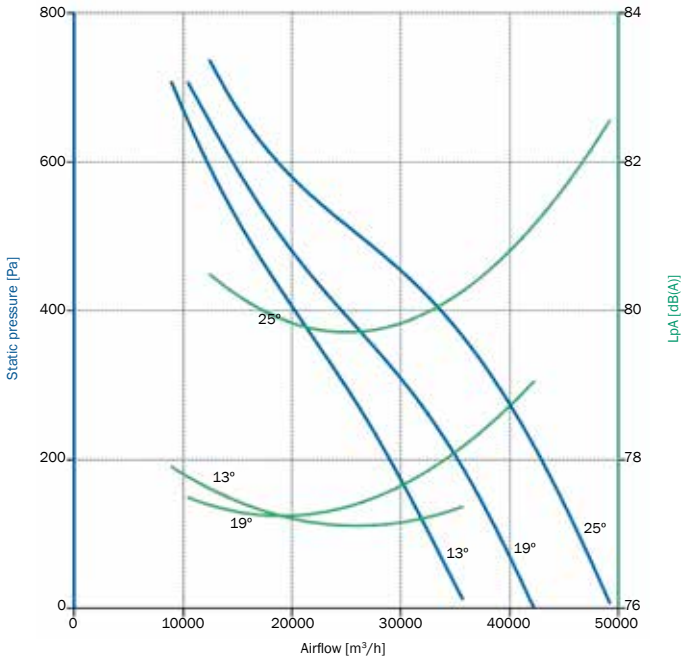


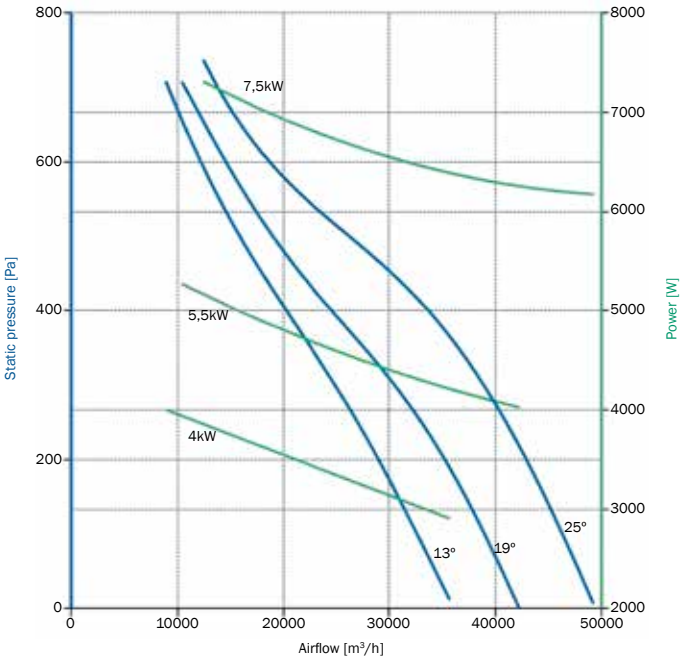
4 Poles - Ø 800



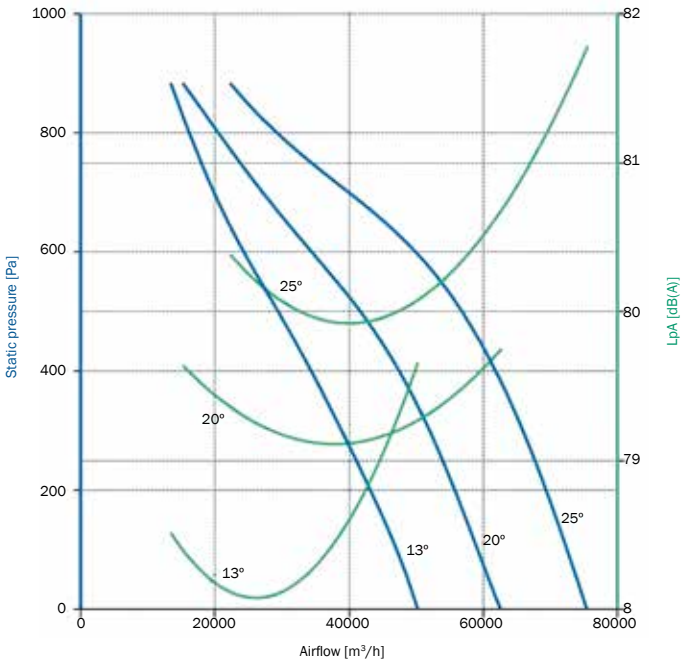


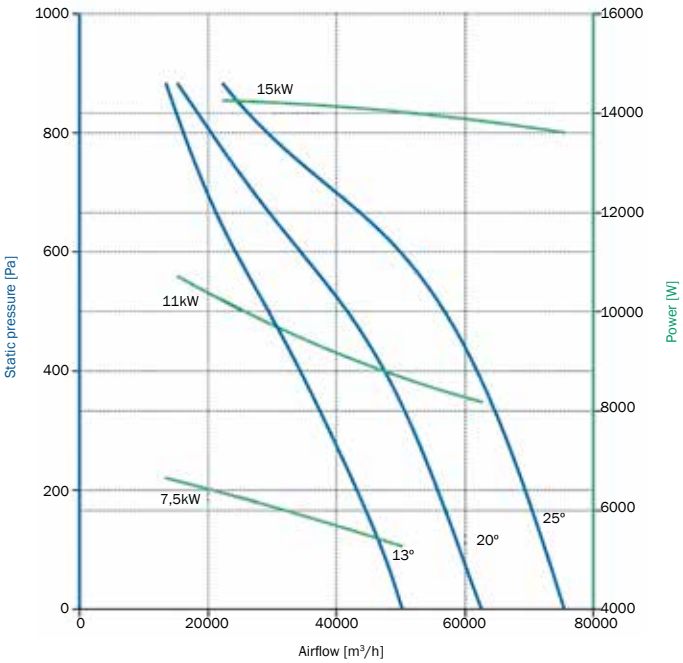
4 Poles - Ø 900



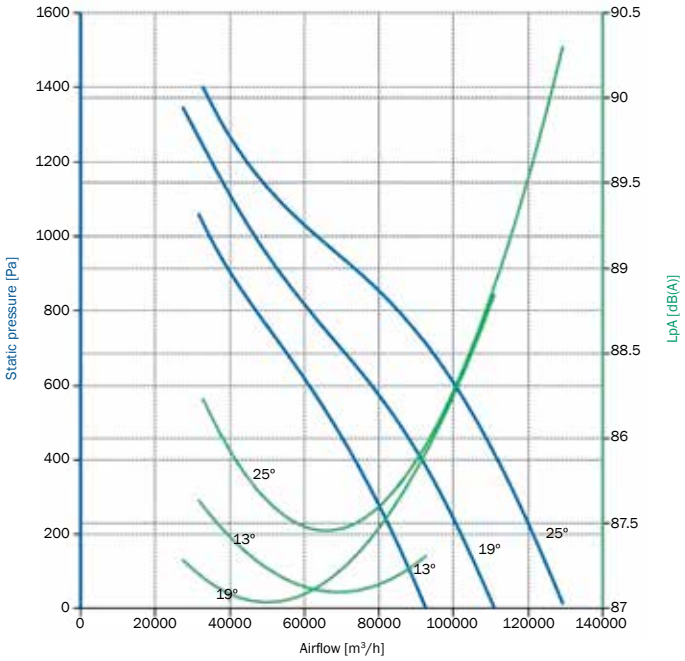


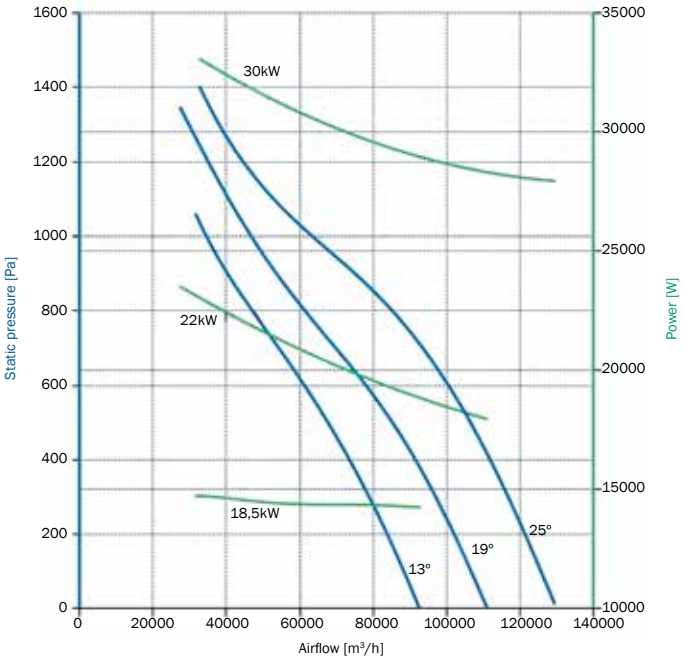
4 Poles - Ø1000



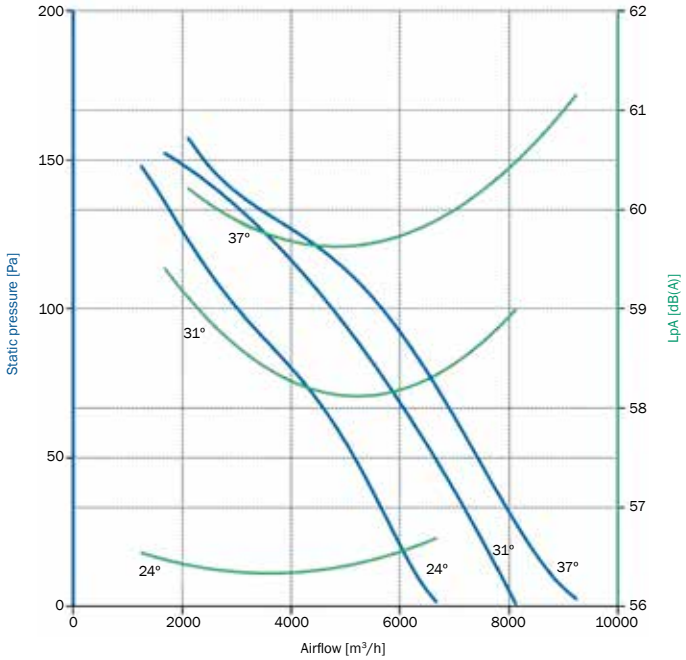


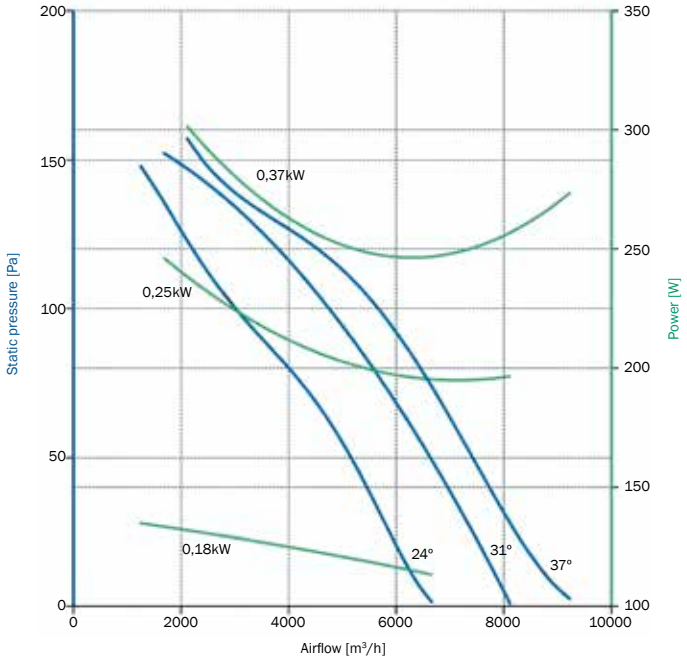
4 Poles - Ø1250



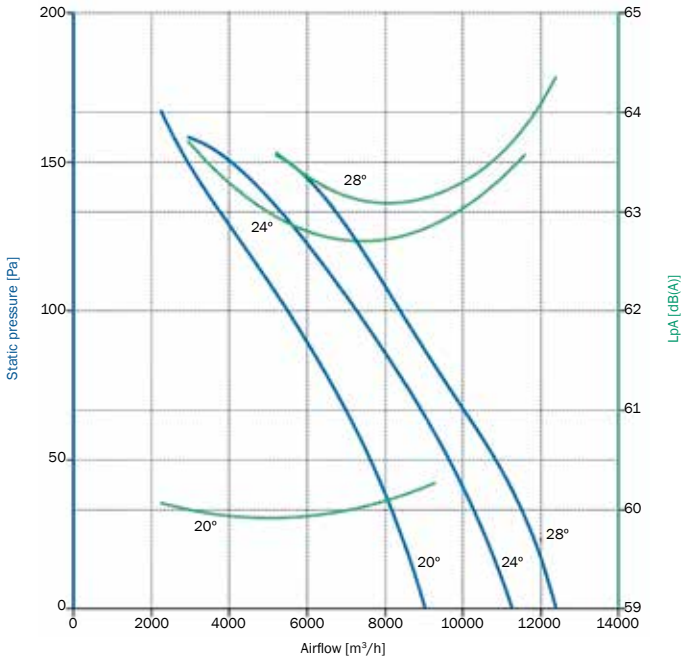


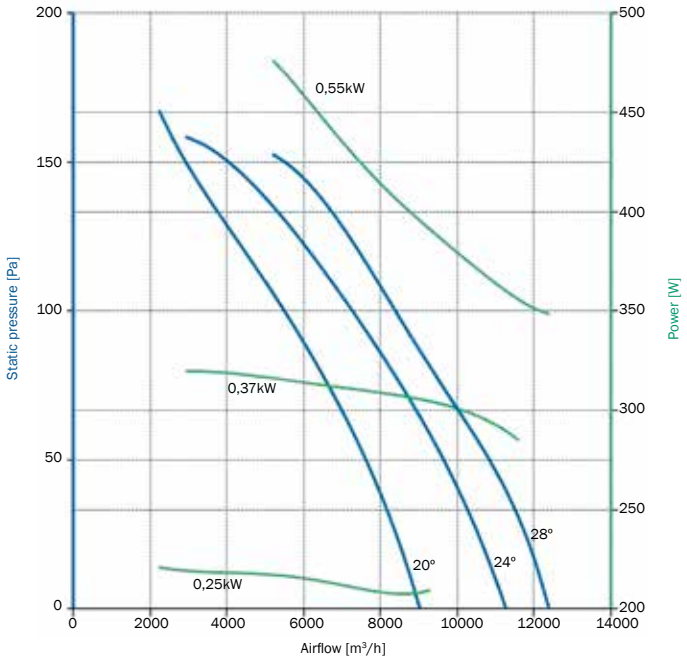
6 Poles - Ø560



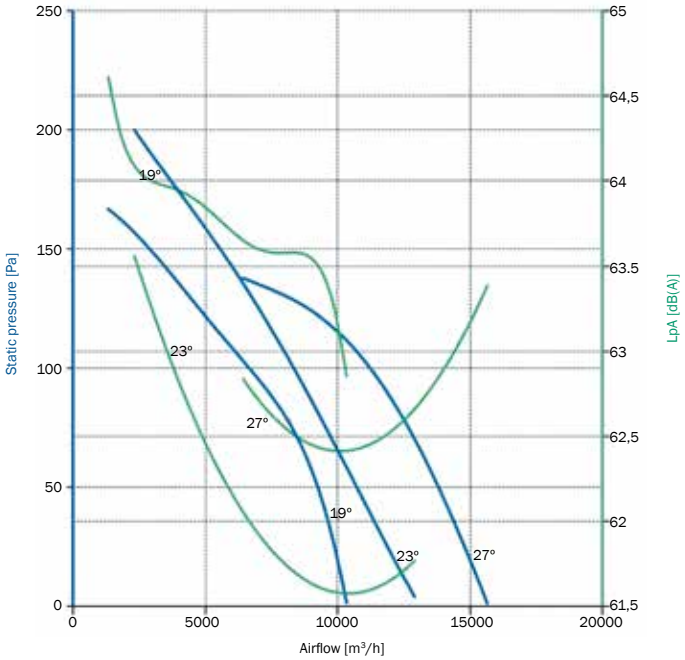


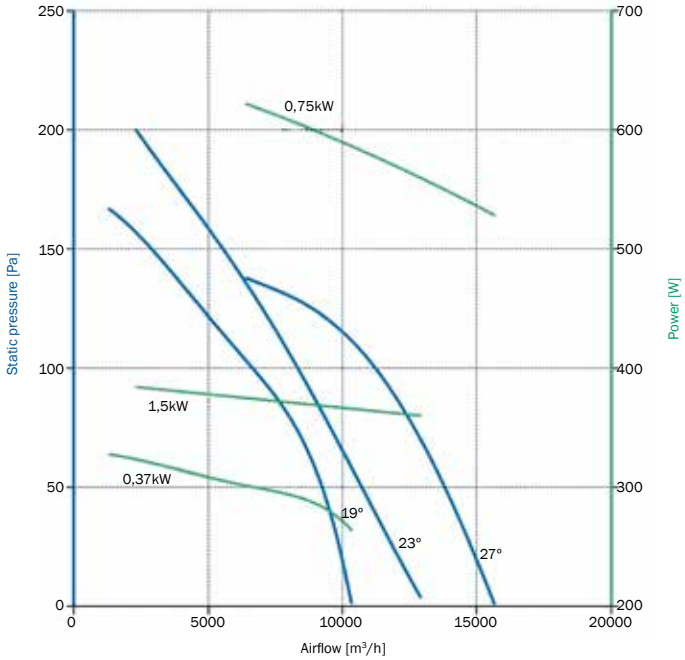
6 Poles - Ø630



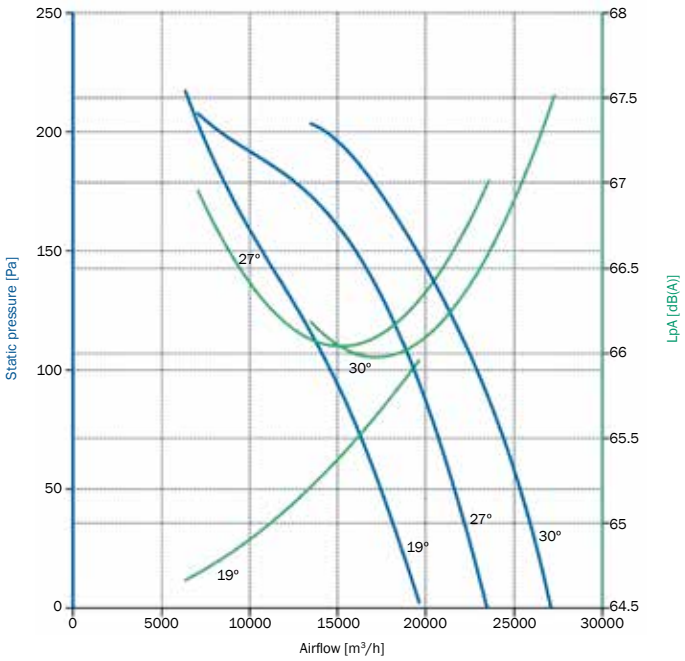


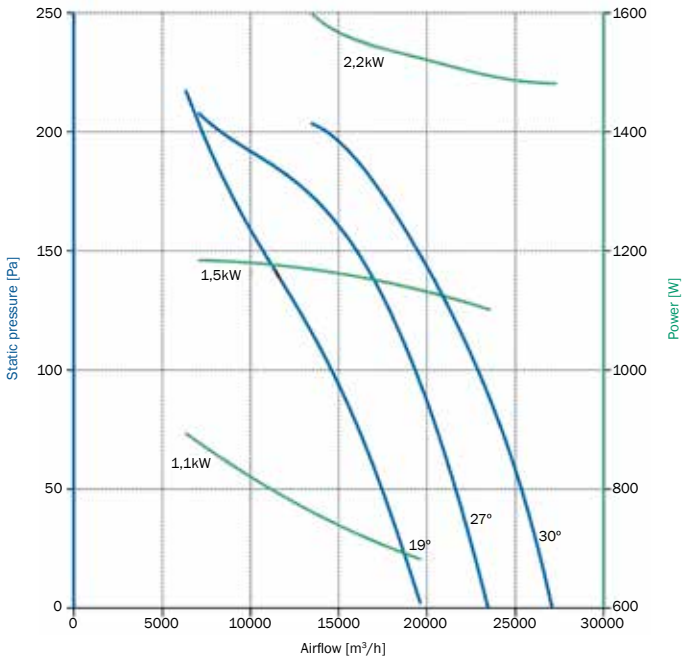
6 Poles - Ø710



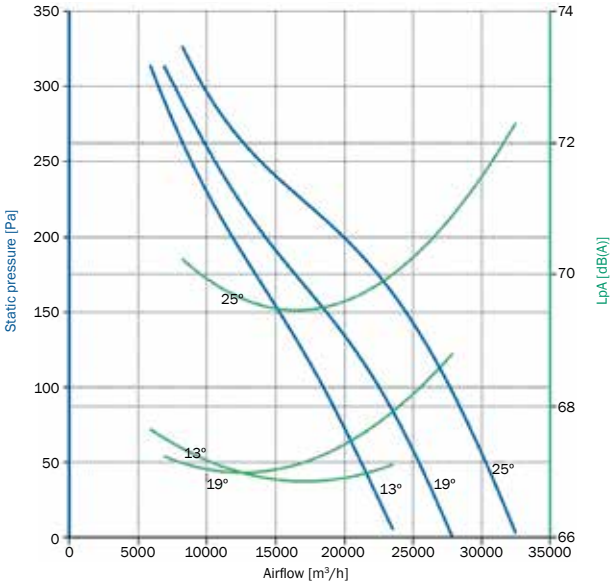


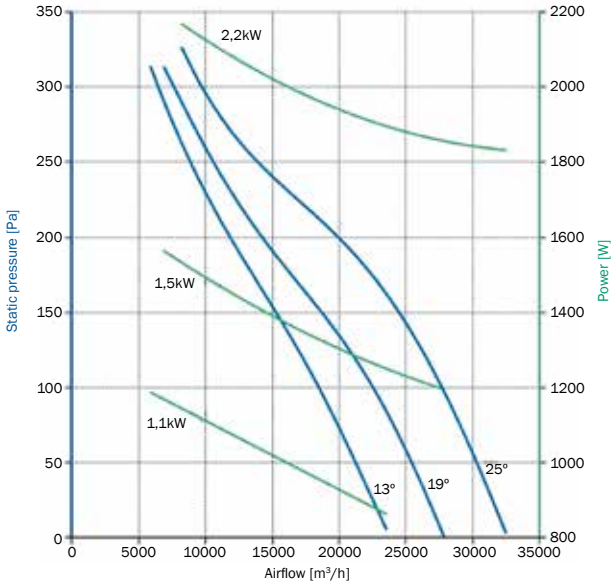
6 Poles - Ø800



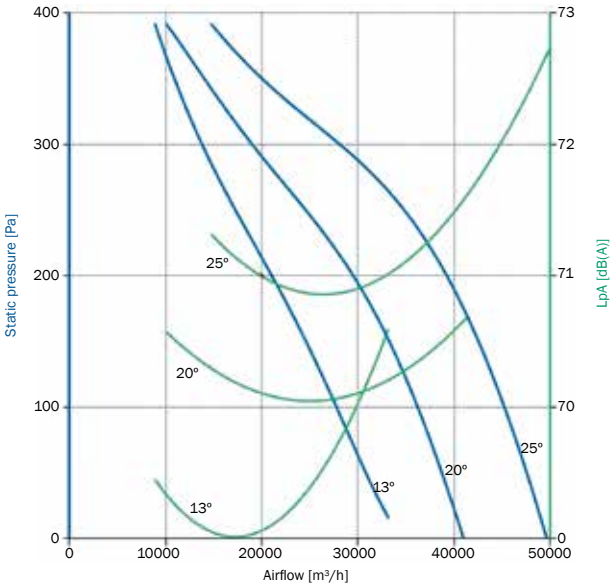


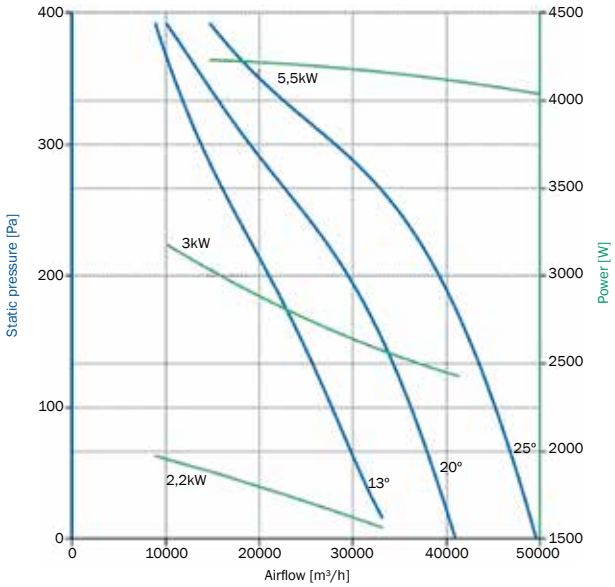
6 Poles - Ø900



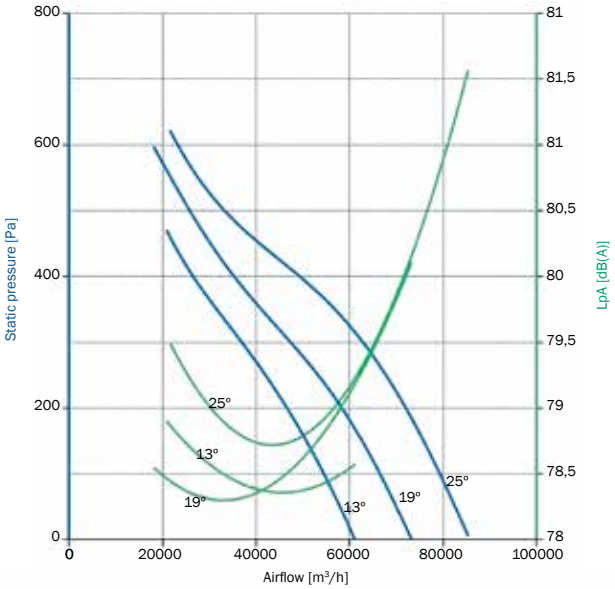


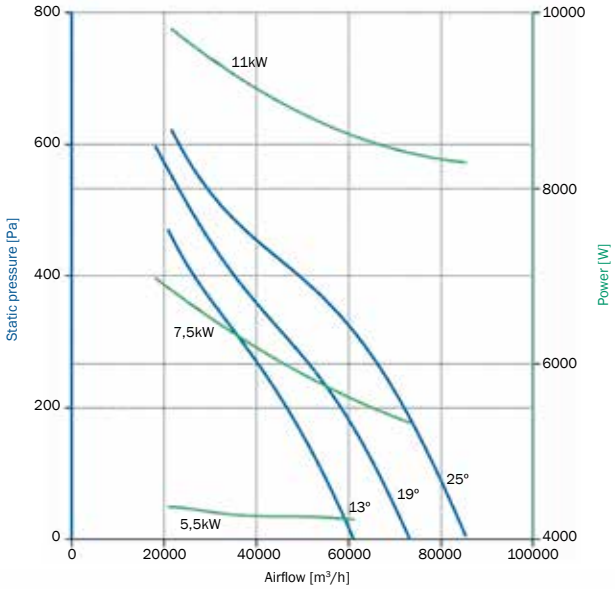
6 Poles - Ø1000

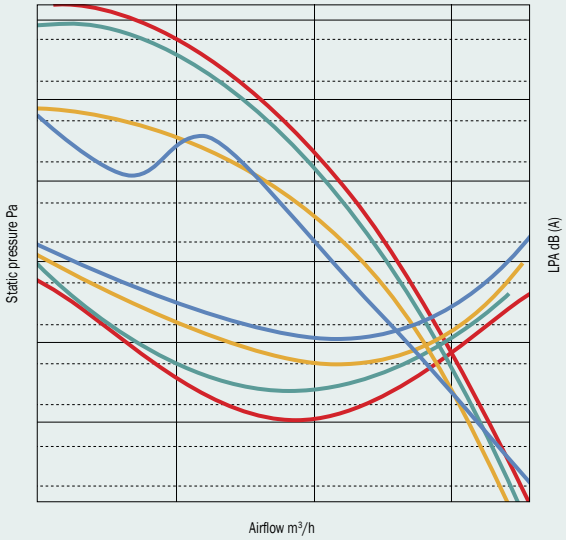




6 Poles - Ø1250







- Conventional impeller
- Impeller with sickle form
- Impeller with sickle form with winglet
- Impeller with sickle form with winglet and serrated profile (WINDER)

Better performances with less sound level

On this graph, we can be observed the advantages of the winder impellers versus the traditional ones. The **sickle form from the blade** (A) will enable better performances.

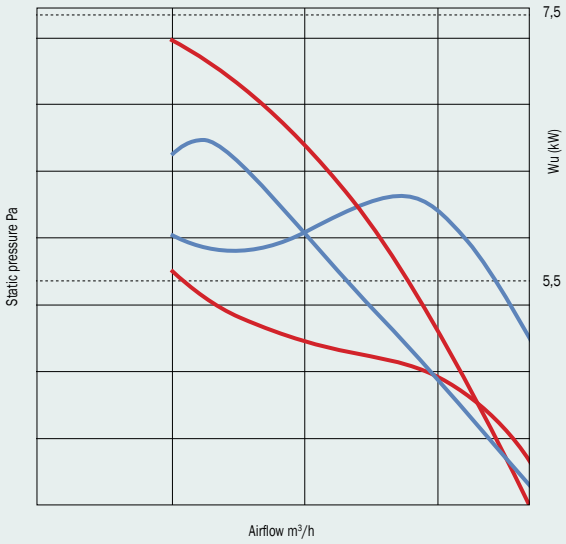
If we add to the sickle blade the **winglet** (B) we will get a high reduction in turbulences.

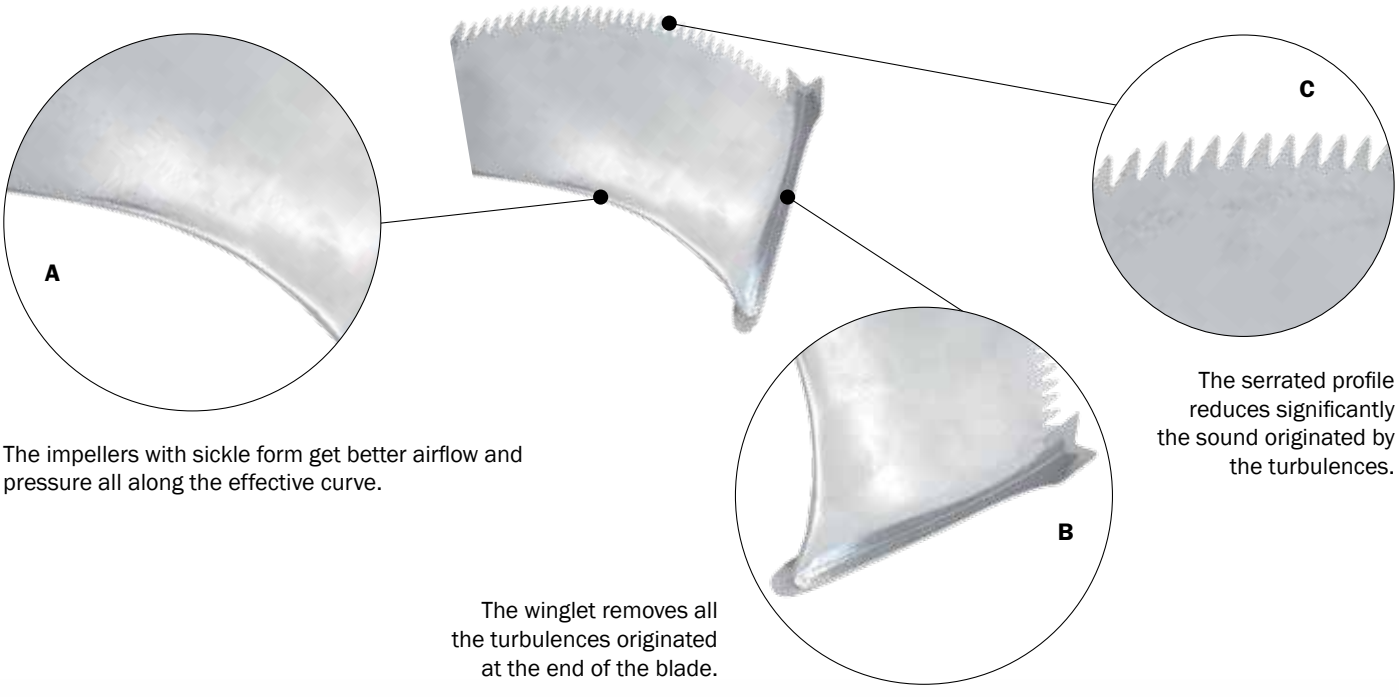
And finally, adding the serrated **profile** (C) we still increasing the performance and we reduce significantly the sound level.

The combination of the winglet, the **serrated profile** and the sickle form gets a better performance in airflow and pressure, decreasing the sound level.

Better performances, less power needs

This graph shows a comparison between winder model and conventional fan using the same diameter and similar performance. Winder solution is able to provide more airflow with less consumption. Winder needs a 5,5 kW motor meanwhile conventional fan needs 7,5 kW motor as illustrated.



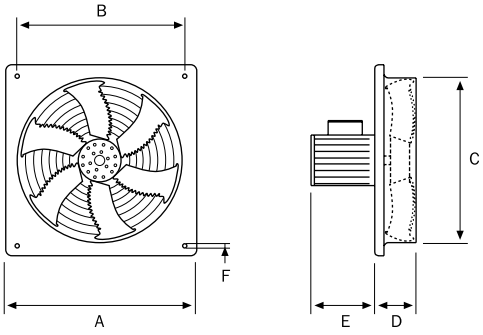


The impellers with sickle form get better airflow and pressure all along the effective curve.

The winglet removes all the turbulences originated at the end of the blade.

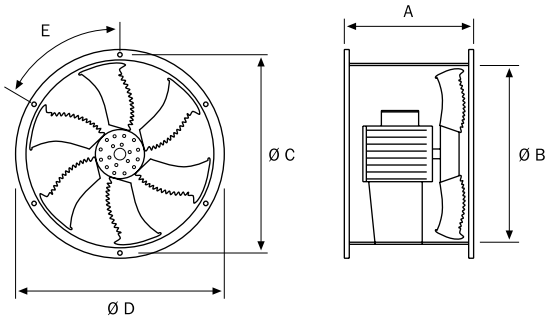
The serrated profile reduces significantly the sound originated by the turbulences.

Dimensions



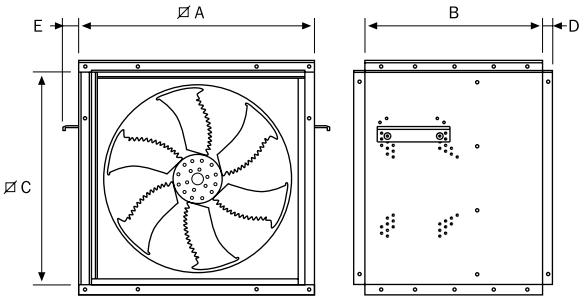
AXIAL WINDER

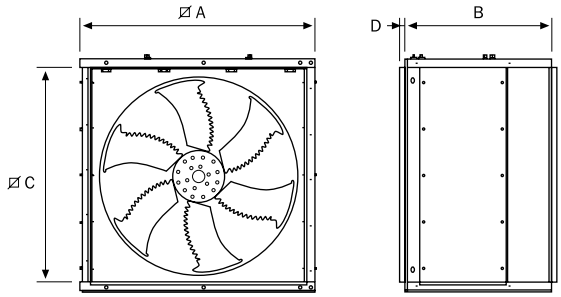
Ø	A	B	C	D	E	F
560	725	675	565	115	359	10,50
630	800	730	635	140	374	10,50
710	850	800	710	110	433	11,00
800	970	910	803	175	530	15,00
900	1.070	1.010	914	197	640	14,50
1000	1.200	1.140	1.003	205	725	12,00



AXITUB WINDER / AXITUB PIROS WINDER

	A	Ø B	Ø C	Ø D	E
560	400	565	620	648	12 x 30
630	400	640	690	720	12 x 30
710	500	720	770	800	12 x 30
800	600	807	860	900	16 x 22,5
900	700	910	970	1.010	16 x 22,5
1000	700	1.010	1.070	1.110	16 x 22,5
1250	700	1.265	1.315	1.355	16 x 22,5





PIROS BOX WINDER / AXI BOX WINDER

	A	B	C	D	E
560	695	530	630	30	40
630	790	600	725	30	40

	A	B	C	D
710	873	650	800	30
800	971	650	850	30
900	1.071	750	970	30
1000	1.203	750	1.070	30
1250	1.490	940	1.380	30

* Orientative dimensions.

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INNOVATIVE VENTILATION SYSTEM

Josep Finestres, 9 · 08030 BARCELONA · Spain · Tel. +34 93 278 82 77 · Fax +34 93 278 82 67
www.novovent.com · e-mail: novovent@novovent.com