KONČAR

MOTORS AND ELECTRICAL SYSTEMS

AXIAL FANS
for transformer cooling

ABOUT US

KONČAR-MES Ltd., a proud member of KONČAR Group, builds on a legacy exceeding a century. We serve a global customer base with a diverse and robust product portfolio, underpinned by in-house R&D, advanced manufacturing technologies, and top-tier customer service. These elements are the pillars of our long-term strategic vision. Driven by a focused business strategy, we are committed to reinforcing our position among the world's foremost manufacturers in drive technology. Our strength lies in our skilled and knowledgeable team, especially our engineers, whose technical expertise and innovative thinking are instrumental in advancing our product offerings and introducing pioneering solutions.

Our continuous growth is fueled by our dedication to exceeding customer expectations and meeting the evolving demands of the global market. At the core of our business is a commitment to excellence in electric motor and drive system production, supported by ongoing investment in technological innovation and process optimization.


Bureau Veritas Certification

KONČAR Motori i električni sustavi d.o.o. za proizvodnju
KONČAR - MES d.o.o.
Fallerovo šetalište 22, 10000 Zagreb, Hrvatska

Bureau Veritas Certification potvrđuje da je proveden audit sustava upravljanja navedene organizacije te je utvrđena sukladnost sa zahtjevima slijedeće norme za sustave upravljanja

ISO 45001:2018

Opseg certifikacije

RAZVOJ, PROIZVODNJA I SERVISIRANJE ELEKTROMOTORA, VENTILATORA I POGONA ZA UPOTREBU U INDUSTRIJI, BRODOGRADNJI I EKSPLOZIVNIM ATMOSFERAMA.

Datum prve certifikacije: 14-12-2020
Istek valjanosti zadnjeg certifikata: 13-12-2023
Datum certifikacijske/recertifikacijske provjere: 15-11-2023
Datum početka certifikacijskog/recertifikacijskog ciklusa: 14-12-2023
Uz uvjet trajne zadovoljavajuće primjene sustava upravljanja organizacijom, ovaj certifikat vrijedi do: 13-12-2026

Broj certifikata: HR009743 Verzija br.: 1 Datum izdavanja: 12-12-2023

17021-HAA
4184
OHSMS

Lokalni ured: Ciottina 17a, 51000 Rijeka, Hrvatska

1/1


Bureau Veritas Certification

KONČAR Motori i električni sustavi d.o.o. za proizvodnju
KONČAR - MES d.o.o.
Fallerovo šetalište 22, 10000 Zagreb, Hrvatska

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ISO 14001:2015

Opseg certifikacije

RAZVOJ, PROIZVODNJA I SERVISIRANJE ELEKTROMOTORA, VENTILATORA I POGONA ZA UPOTREBU U INDUSTRIJI, BRODOGRADNJI I EKSPLOZIVNIM ATMOSFERAMA.

Datum prve certifikacije: 19-03-2003
Istek valjanosti zadnjeg certifikata: 18-03-2024
Datum certifikacijske/recertifikacijske provjere: 14-11-2023
Datum početka certifikacijskog/recertifikacijskog ciklusa: 19-03-2024
Uz uvjet trajne zadovoljavajuće primjene sustava upravljanja organizacijom, ovaj certifikat vrijedi do: 18-03-2027

Broj certifikata: HR009746 Verzija br.: 1 Datum izdavanja: 12-12-2023

17021-HAA
4184
EMS

Lokalni ured: Ciottina 17a, 51000 Rijeka, Hrvatska

1/1


Bureau Veritas Certification

KONČAR Motori i električni sustavi d.o.o. za proizvodnju
KONČAR - MES d.o.o.
Fallerovo šetalište 22, 10000 Zagreb, Hrvatska

Bureau Veritas Certification potvrđuje da je proveden audit sustava upravljanja navedene organizacije te je utvrđena sukladnost sa zahtjevima slijedeće norme za sustave upravljanja

ISO 9001:2015

Opseg certifikacije

RAZVOJ, PROIZVODNJA I SERVISIRANJE ELEKTROMOTORA, VENTILATORA I POGONA ZA UPOTREBU U INDUSTRIJI, BRODOGRADNJI I EKSPLOZIVNIM ATMOSFERAMA.

Datum prve certifikacije: 10-12-1999
Istek valjanosti zadnjeg certifikata: 09-12-2023
Datum certifikacijske/recertifikacijske provjere: 15-11-2023
Datum početka certifikacijskog/recertifikacijskog ciklusa: 10-12-2023
Uz uvjet trajne zadovoljavajuće primjene sustava upravljanja organizacijom, ovaj certifikat vrijedi do: 09-12-2026

Broj certifikata: HR009741 Verzija br.: 1 Datum izdavanja: 08-12-2023

17021-HAA
4184
QMS

Lokalni ured: Ciottina 17a, 51000 Rijeka, Hrvatska

1/1

Technical Specification Breakdown

Technical data											
1	2	3	4	5	6	7	8	9	10	11	12
FAN TYPE	2p=	n (1/min)	q_{v1} (m3/s)	PST (Pa)	P_e (kW)	Ir (A)	Ik (A)	P2 (kW)	In (A)	L_{wA5} dB(A)	L_{pA} dB(A)
		13			400 V (-10%/+10%), 50 Hz						
VAAZ C 470-2,3 m3/s-0Pa M71-4	4	1430	2,3	100	0,620	1,60	6,40	0,6	1,80	82	69

	Technical Specification Breakdown
1	Fan type (see Fan designation)
2	Number of motor poles
3	Rated speed
4	Airflow during free blowing (±5% acc. to ISO13348)
5	Max. static pressure (5% acc. to ISO13348)
6	Electrical power consumption, free blowing (8% acc. to ISO13348)
7	Operating Current, free blowing
8	Starting Current
9	Motor rated power
10	Motor rated current
11	A-weighted sound power level on the suction side, free blowing. The overall sound power level (LWA) is obtained by adding 3 dB to the suction side sound power level (+4 dB according to ISO 13348).
12	Sound pressure level on suction side on 2m, free blowing (+4dB)
Voltage (Tolerance of the rated voltage), Rated frequency (acc. to IEC 60034-1, category B)	
Performance Testing – Aerodynamic and acoustic test according to standards ISO 5801 and ISO 13348 with protection net on suction and pressure side	
Manufacturing Tolerances: DIN24166 accuracy class 2	

AXIAL FANS FOR TRANSFORMER COOLING

Our axial fans designed for transformer cooling form an integral part of KONČAR-MES air handling and cooling solutions portfolio. Engineered with a focus on performance, these fans deliver high airflow with low acoustic output, achieved through advanced blade aerodynamics and a purpose-built low-pressure housing design. The integrated casing incorporates an optimized intake mouth, motor support system, and protective mesh for enhanced operational safety and durability.

Leveraging decades of in-house experience in the development and production of electric motors and fan assemblies, we ensure a reliable, efficient, and versatile cooling solution tailored to the demands of power transformer applications.

Key Benefits:

- Low noise emissions with high-volume airflow
- High aerodynamic efficiency and reduced energy consumption
- Reliable operation in all climatic conditions
- Extended service life and long maintenance intervals
- Specialized corrosion protection for outdoor and coastal installations
- Performance tailored to meet the technical requirements of various transformer OEMs
- Compact fan casing with integrated intake geometry
- Universal mounting compatibility for any installation orientation
- Inlet and outlet protective grills for enhanced safety
- Lightweight construction for ease of handling and installation
- Extensive configurability of housings and motor types
- Fully compliant with ERP and EU Directive 2024/1834

Fan designation						
VAAZ	**C**	**800**	**7,4 m³/s**	**0 Pa**	**M100-6**	**C4**
A	B	C	D	E	F	G
Basic designations			**Additional designations**			

A		Fan type
	VAA	Axial fan with fixed blades
	VAAZ	Axial fan with adjustable blade angle of attack
B		Design Variant (Single letter or combination)
	A	Special mechanical design - construction
	B	Marine construction
	C	Design for cooling and air handling
	E	Special electrical design
	EC	Fan with EC motor
	CX	Fan for CX offshore corrosion system
	DC	Fan for Data Center application
C		Fan mark according to rotor type and diameter (approximative dimension) - size:
		470 - 500 - 630 - 710 - 800 - 900 - 1000 - 1250
D		Fan operating point - Volume flow in m3/s
E		Fan operating point - Static pressure in Pa
F		Electric motor data: IEC size and Polarity
G		Environmental Classification (C1 to C5-vh) acc. to EN ISO12944-2

CORROSION PROTECTION OF FANS			
Corrosivity classes acc to: ISO 12944-2	**Environmental classification**	**Dry film thickness**	
		Standard version:	**Optional:**
C3-m	Indoor environments such as factory interiors or building-mounted fans protected from direct exposure (e.g., rain, sun)	80µm	N/A
C4-m	Industrial areas and coastal areas with moderate salinity; Chemical plants, swimming pools, coastal ship and boatyards	80µm	120 / 160µm (C4-h)
C5-m	Highly humid industrial areas with aggressive atmospheres; locations with near-permanent condensation and high pollutant exposure	200µm	160/240µm
C5 - vh	Coastal regions with high salinity; environments subject to continuous condensation and severe pollution	320µm	

The corrosion protection level must be agreed upon during the quotation phase.

The table above provides reference values and common examples of corrosion protection systems applied to hot-dip galvanized steel components of the fan assembly.

AXIAL FANS FOR TRANSFORMER COOLING acc. to IEC 60076-22-6, Corrosion class acc. To EN 12944-2 – Class C4-m, fans for worldwide installation

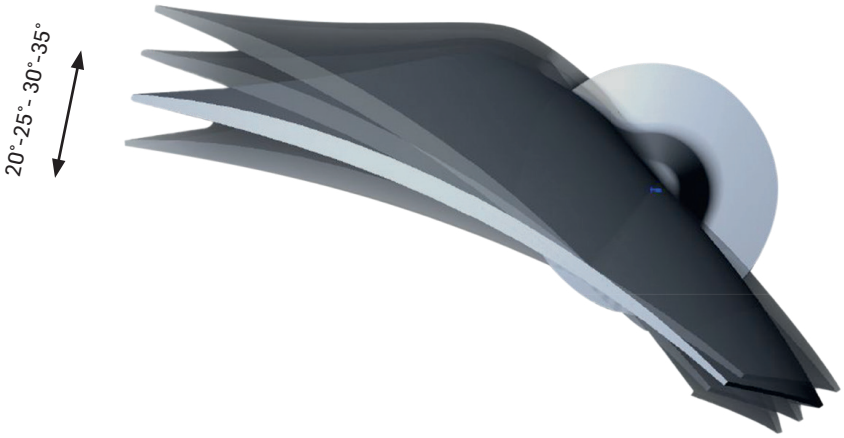
Standard design
FAN CASING AND MOTOR SUSPENSION
Casing material: Steel sheet with hot-dip galvanized zinc coating, minimum 5 m; finished with EP+PU coating = 80 m
Motor suspension: Steel sheet with zinc-galvanized surface protection, minimum 10 m
ELECTRIC MOTOR
Series: 5AZ, aluminum alloy AlSi12Cu, manufactured by KONČAR-MES, PU coating, 6 m
Mounting configuration: IM B30, Cooling: IC 418
Voltage/Frequency : 400V (±10%) / 50Hz (+3, -5%)
Ingress protection: IP55
Insulation class F (temperature rise in B)
Ambient temperature: -30 - +55 C for outdoor installation
IMPELLER
Blade material is aluminum AlSi12Cu
Balancing: class G 6, 3 according to ISO 14694 / ISO 10816-3
Stainless steel fasteners - AISI316 – A4
Unpainted
PROTECTION GRILLE
Mounted on the intake side
Mounted on the exhaust side
Material: Stainless steel AISI 304 (A2), coated EP+PU = m
Pressure relief plug to prevent condensation
Configurable for vertical upward or horizontal airflow
Mounting material: stainless steel AISI316 – A4
Options
FAN
Adjustable blade pitch allows fine-tuning of aerodynamic and acoustic performance to meet specific operating conditions as per customer requirements
Different lengths and mounting dimensions
Operating temperature range: -60°C/-50°C and +60°C/+70°C/+80°C
Corrosion class acc. to EN 12944-2: C3-m, C4-m/h, C5-m/vh
Custom grille materials: stainless steel AISI316 A4
Optional color tones or special surface coatings available
ELECTRIC MOTOR
Other voltages and frequencies upon request
Motor certified according to ETL 5030568 and insulation system acc. to UL directives for USA and Canadian market (certificated insulation system KONČAR-MES 155 – UL mark E254469)
Alternate motor pole configurations or multi-speed motors available
Thermal protection (PTC thermistor or TP thermal switch)
Winding heaters
Supply over frequency inverter - VFD
Protection index: IP66, rotor corrosion protected and tropicalized winding

KONČAR MES NEW SICKLE BLADE DESIGN

In response to evolving customer demands, KONČAR-MES has developed a new generation of sickle-shaped blades, the MA 1000 and MA 800. These blades are engineered to deliver high aerodynamic efficiency, reduced noise emissions, enhanced corrosion resistance, and cost-effective performance. In addition to the redesigned blade profile, a custom retaining ring and hub were developed to ensure secure assembly and precise blade positioning. This innovation allows for fine-tuning of fan performance characteristics, with angle adjustment available in defined 5° increments.

The MA 1000 sickle blade is supplied as standard on the MA 1000 5-5 25° impeller.

New MA 1000 sickle blade

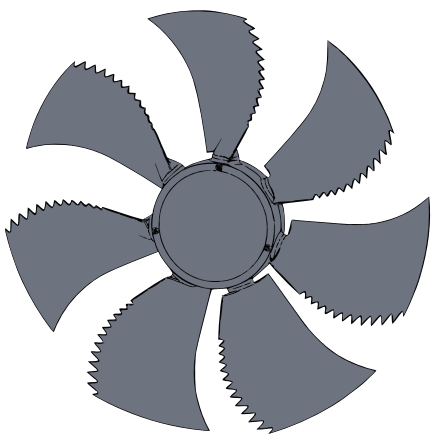


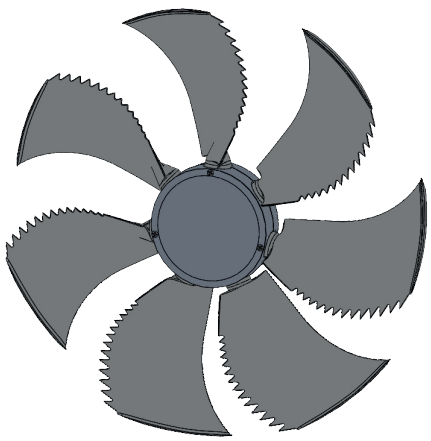
Angle pitch adjustment with 5° step

AXIAL FANS TYPE VAAZ C 470 & 500

Technical data											
1	2	3	4	5	6	7	8	9	10	11	12
FAN TYPE	2p=	n (1/min)	q_{v1} (m3/s)	PST (Pa)	P_e (kW)	Ir (A)	Ik (A)	P2 (kW)	In (A)	L_{wA5} dB(A)	L_{pA} dB(A)
		13			400 V (-10%/+10%), 50 Hz						
VAAZ C 470-2,3 m3/s-0Pa M71-4	4	1430	2,3	100	0,620	1,60	6,40	0,6	1,80	82	69
VAAZ C 470-1,6 m3/s-0Pa M71-6	6	960	1,60	45	0,240	0,80	2,50	0,22	0,85	73	60
VAAZ C 470-1,2 m3/s-0Pa M71-8	8	700	1,20	30	0,120	0,45	0,80	0,09	0,45	67	53
VAAZ C 470-0,95 m3/s-0Pa M71-10	10	550	0,95	20	0,080	0,22	0,50	0,035	0,24	61	48
VAAZ C 470-0,76 m3/s-0Pa M71-12	12	460	0,76	16	0,075	0,23	0,40	0,030	0,25	55	39
VAAZ C 500- 2,5 m3/s-0Pa M71-4	4	1420	2,5	165	0,650	1,60	6,40	0,60	1,80	79	67
VAAZ C 500- 1,7 m3/s-0Pa M80-6	6	960	1,7	75	0,210	0,55	2,00	0,20	0,63	71	58
VAAZ C 500- 1,27m3/s-0Pa M71-8	8	710	1,27	45	0,124	0,45	0,80	0,09	0,45	64	51
VAAZ C 500- 1,0 m3/s-0Pa M71-10	10	575	1,00	30	0,83	0,20	0,50	0,035	0,24	59	46
VAAZ C 500-0,82 m3/s-0Pa M71-12	12	460	0,82	20	0,075	0,25	0,40	0,030	0,25	55	42

Versions compatible with 380–400–415 V / 60 Hz and 440–460–480 V / 60 Hz power supplies are available upon request.

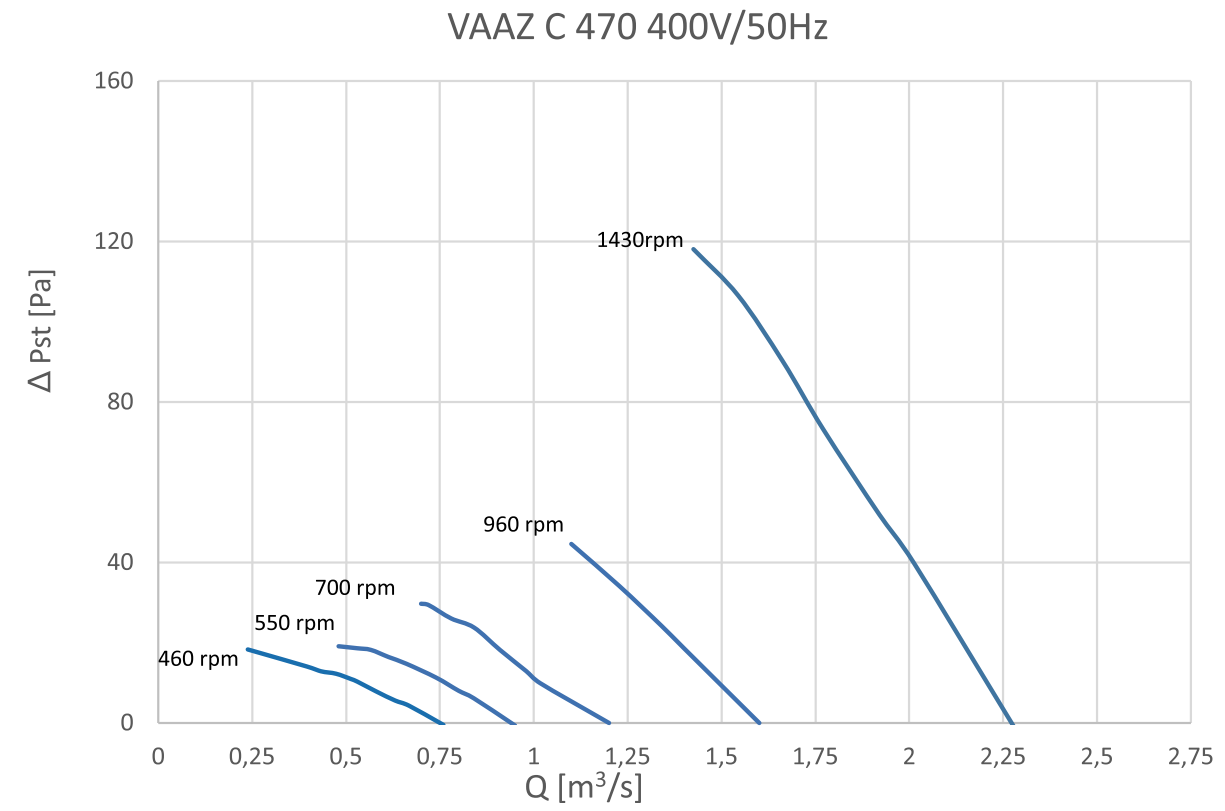


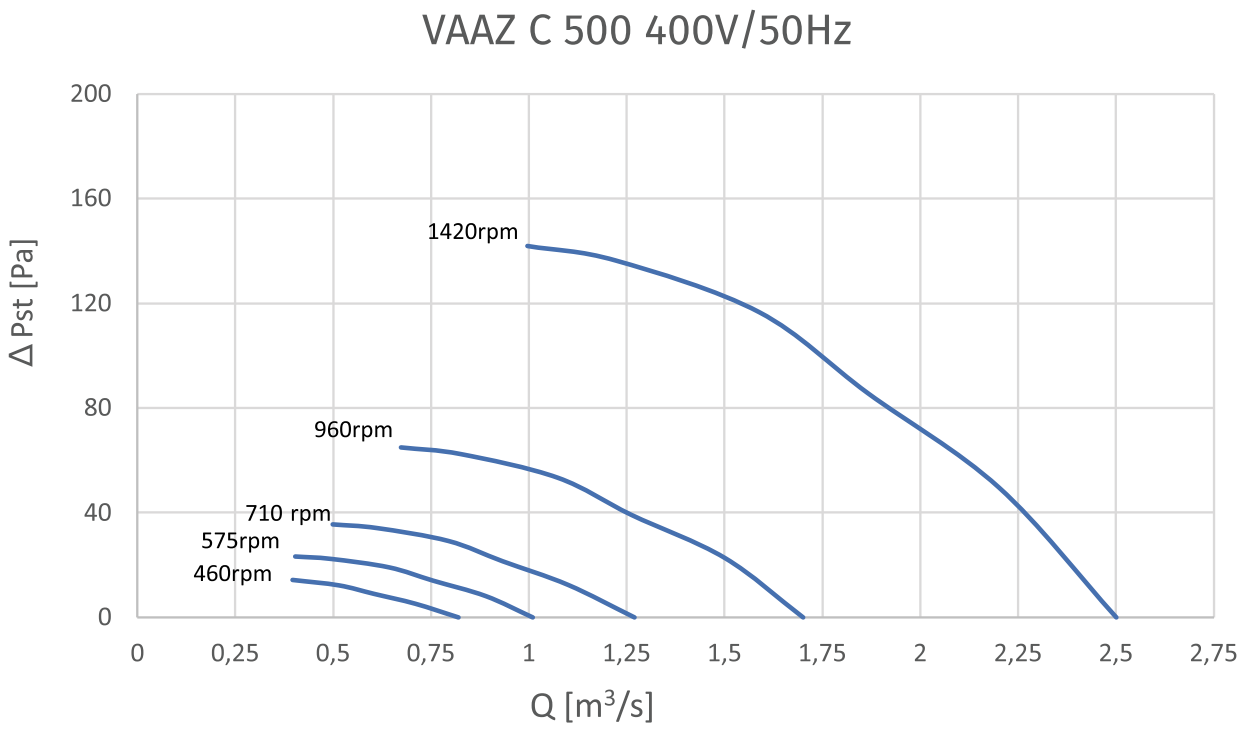


The performance data above was obtained using the MA 7-7 30° impeller for the 470 model and the MA 7-7 25° impeller for the 500 model.

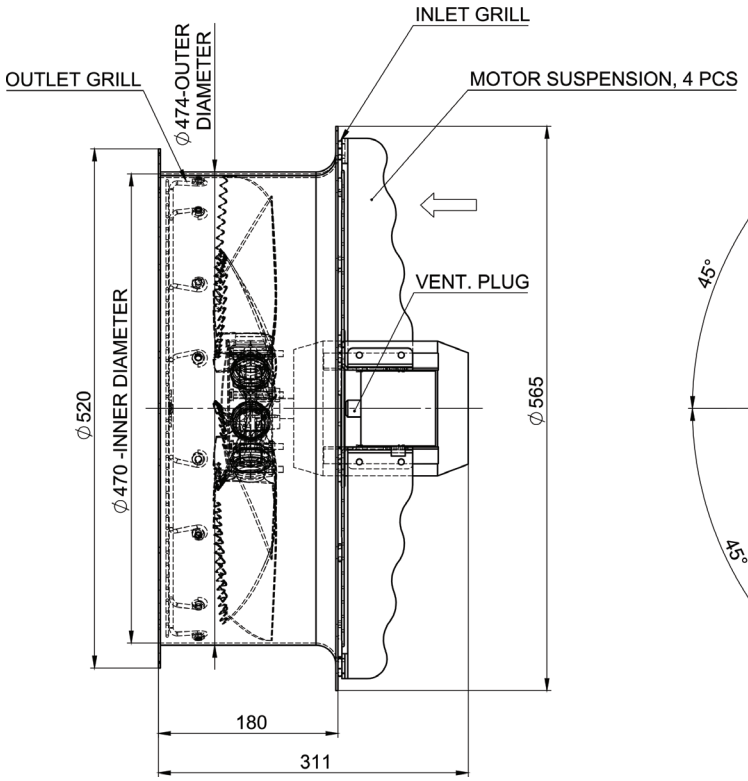
Additional blade angle options are available upon request, including 25°, 28.5°, 30°, 32.5°, and 35°.

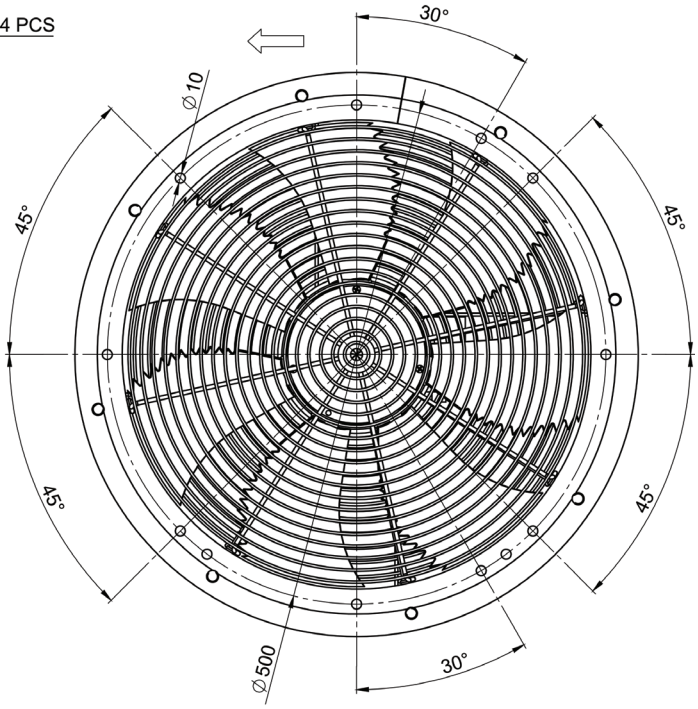
The technical data provided herein is for informational purposes only and is subject to change without prior notice.



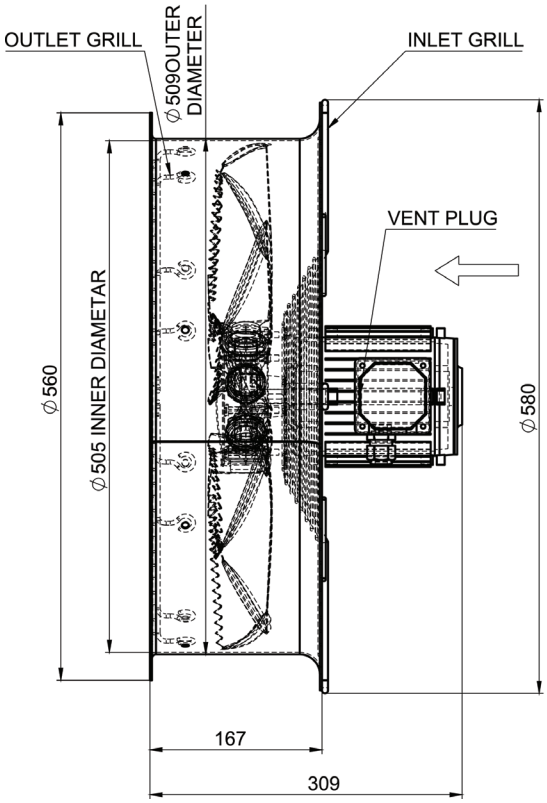


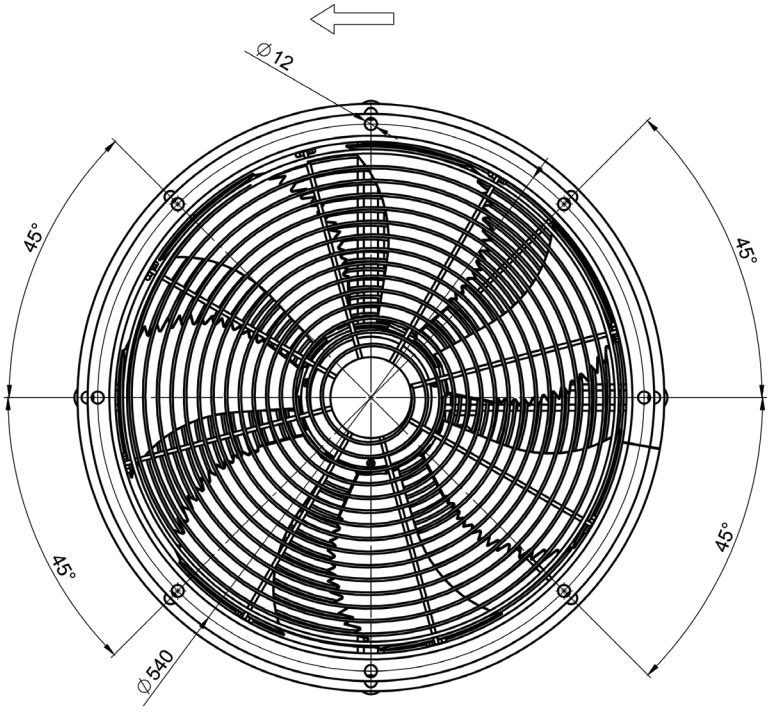
470 – B30 execution (only for 2p=4)



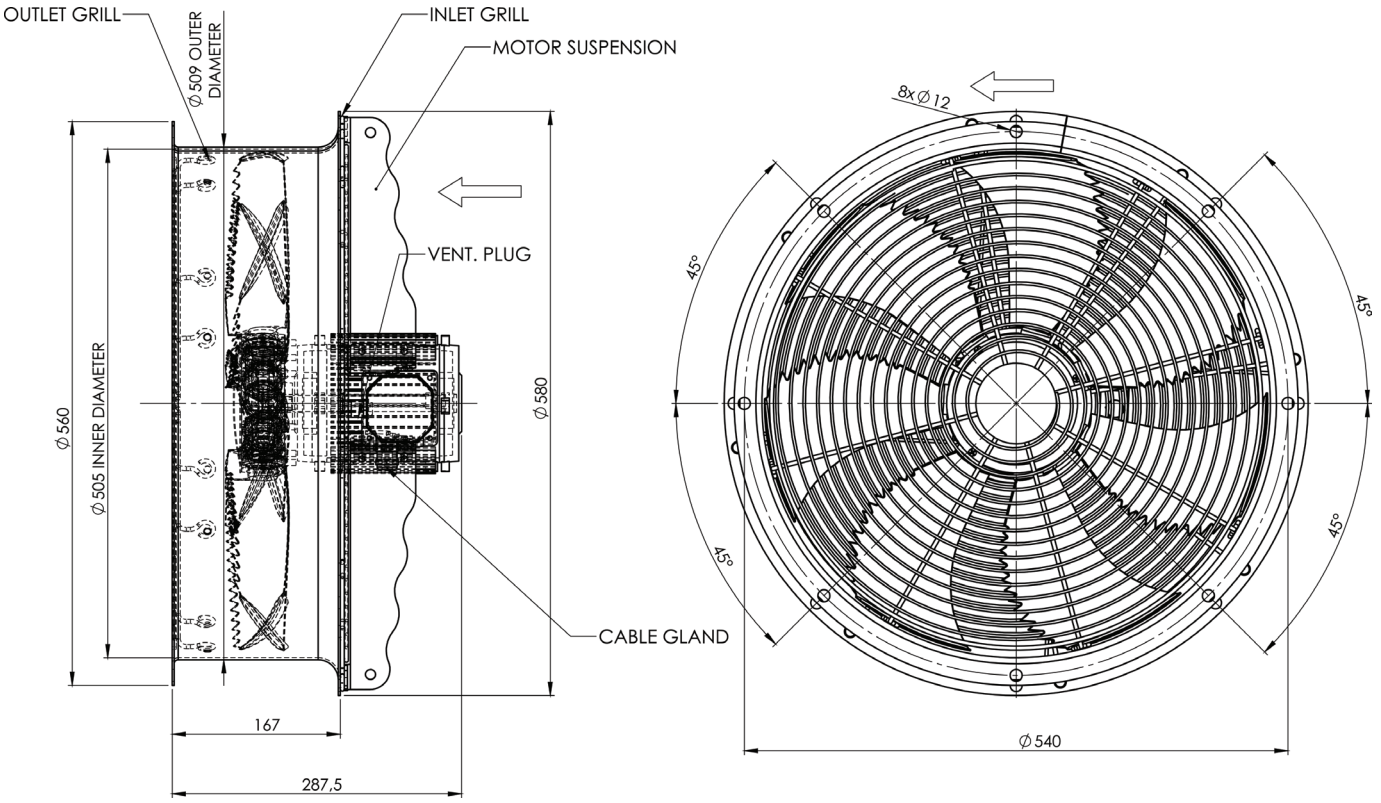


470 – B14 execution (for 2p≥6)

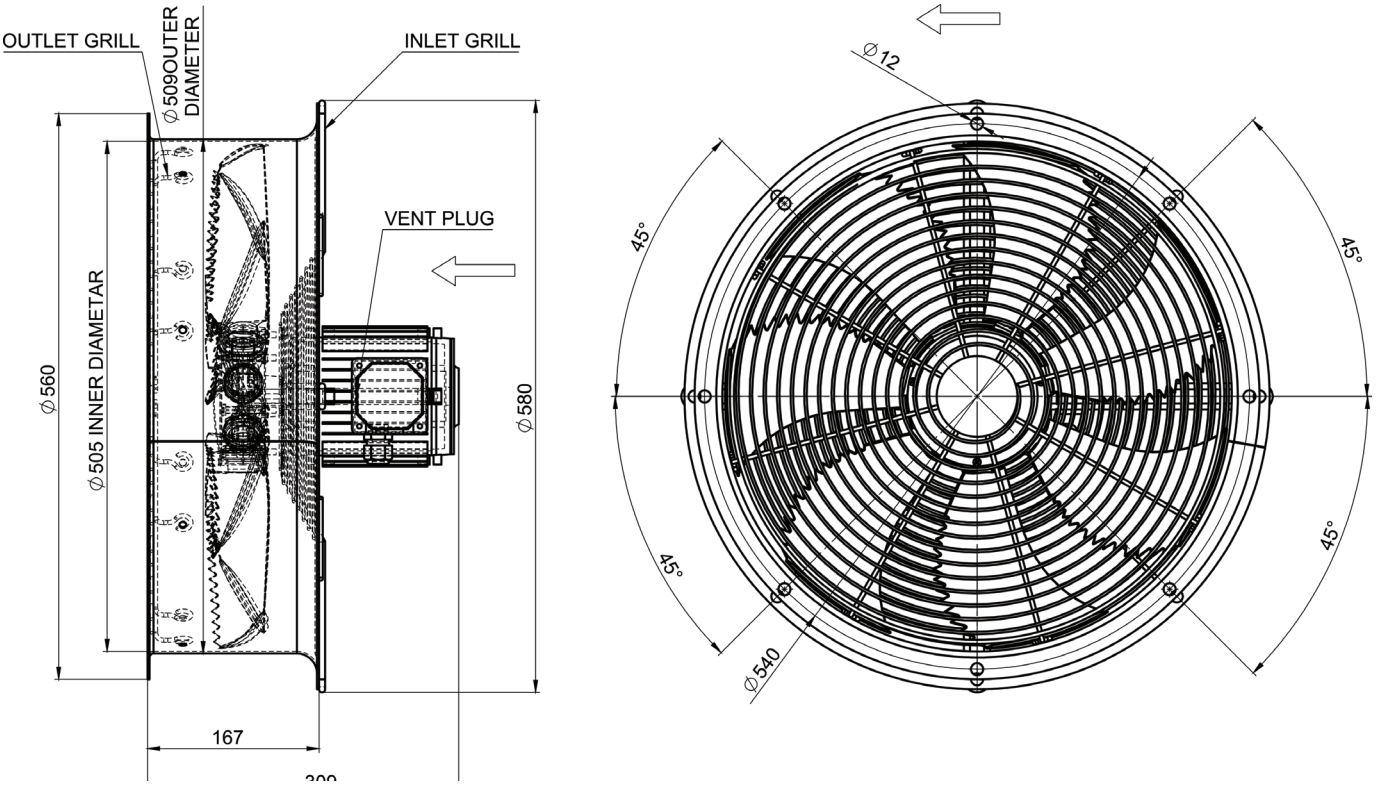




500 – B30 execution (only for 2p=4)



470 – B14 execution (for 2p≥6)



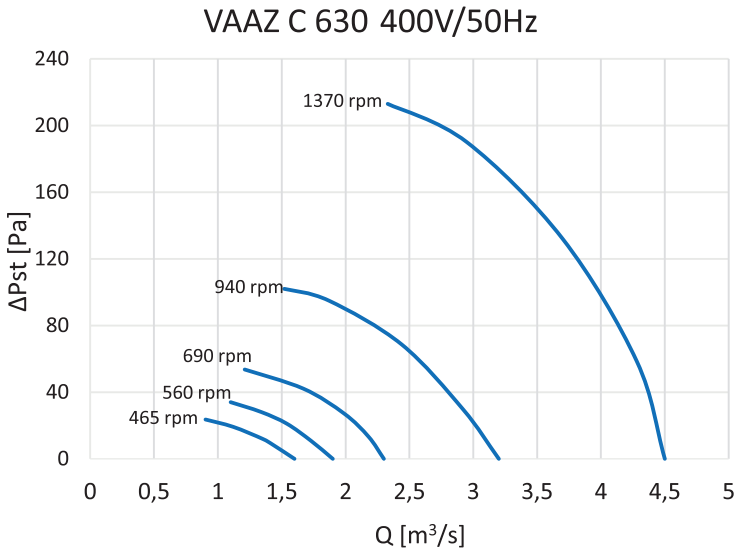
AXIAL FANS TYPE VAAZ C 630

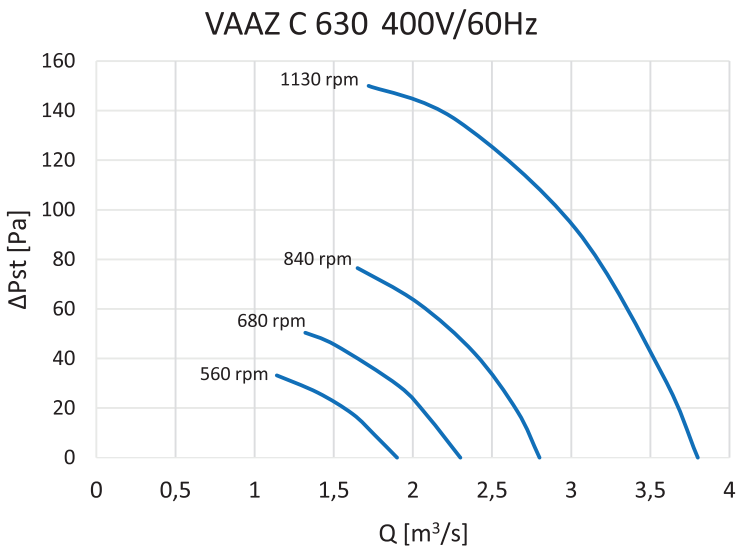
Technical data											
1	2	3	4	5	6	7	8	9	10	11	12
FAN TYPE	2p=	n (1/min)	q_{v1} (m3/s)	PST (Pa)	P_e (kW)	Ir (A)	Ik (A)	P2 (kW)	In (A)	L_{wA5} dB(A)	L_{pA} dB(A)
	13		**400 V (-10%/+10%), 50 Hz**								
VAAZ C 630 - 4,5 m3/s- 0 Pa M80-4	4	1370	4,5	240	1,20	2,80	12,0	1,1	3,00	91	78
VAAZ C 630 - 3,2 m3/s- 0 Pa M80-6	6	940	3,2	110	0,50	1,20	3,8	0,37	1,20	81	68
VAAZ C 630 - 2,3 m3/s- 0 Pa M80-8	8	690	2,3	70	0,28	0,90	2,6	0,25	1,0	76	62
VAAZ C 630 - 1,9 m3/s- 0 Pa M80-10	10	560	1,9	50	0,26	0,80	1,6	0,14	0,80	71	58
VAAZ C 630 - 1,6 m3/s- 0 Pa M80-12	12	465	1,6	35	0,15	0,43	0,8	0,05	0,44	69	56
	13		**400 V (-10%/+10%), 60 Hz**								
VAAZ C 630 - 3,8 m3/s- 0 Pa M80-6	6	1130	3,8	165	0,76	1,70	6,1	0,6	1,75	84	72
VAAZ C 630 - 2,8 m3/s- 0 Pa M80-8	8	840	2,8	95	0,35	0,90	2,4	0,3	0,95	78	65
VAAZ C 630 - 2,3 m3/s- 0 Pa M80-10	10	680	2,3	65	0,26	0,80	2,0	0,18	0,85	74	61
VAAZ C 630 - 1,9 m3/s- 0 Pa M80-12	12	560	1,9	50	0,20	0,60	1,2	0,09	0,60	71	58
	13		**460 V (-10%/+10%), 60 Hz**								
VAAZ C 630-3,9 m3/s-0Pa M80-6	6	1150	3,9	170	0,82	1,90	7,3	0,60	1,90	86	73
VAAZ C 630-2,9 m3/s-0Pa M80-8	8	850	2,9	100	0,39	0,90	2,8	0,30	0,95	80	66
VAAZ C 630-2,3 m3/s-0Pa M80-10	10	690	2,3	70	0,31	0,95	2,3	0,18	1,00	75	61
VAAZ C 630-1,9 m3/s-0Pa M80-12	12	570	1,9	50	0,23	0,70	1,4	0,09	0,70	71	58

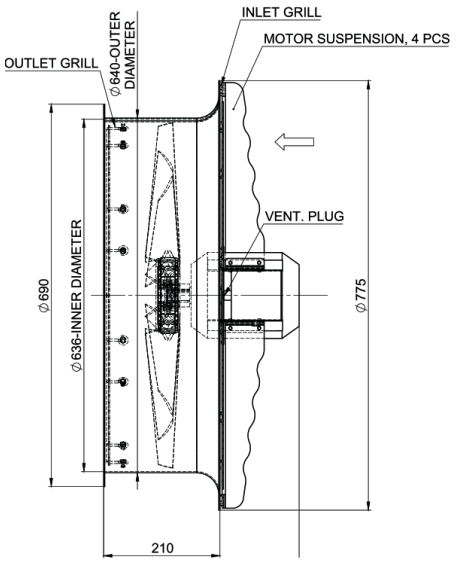
The data above was obtained using the 3H 8-8 impeller with a 45° blade angle.

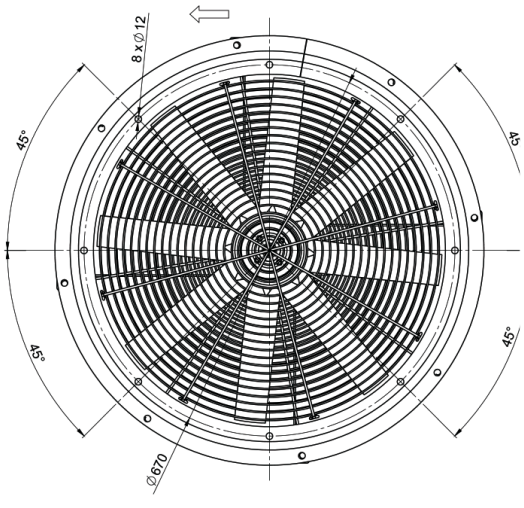
Additional blade angle options are available upon request, including 25°, 30°, 40°, and 50°.

The technical data provided herein is for informational purposes only and is subject to change without prior notice.





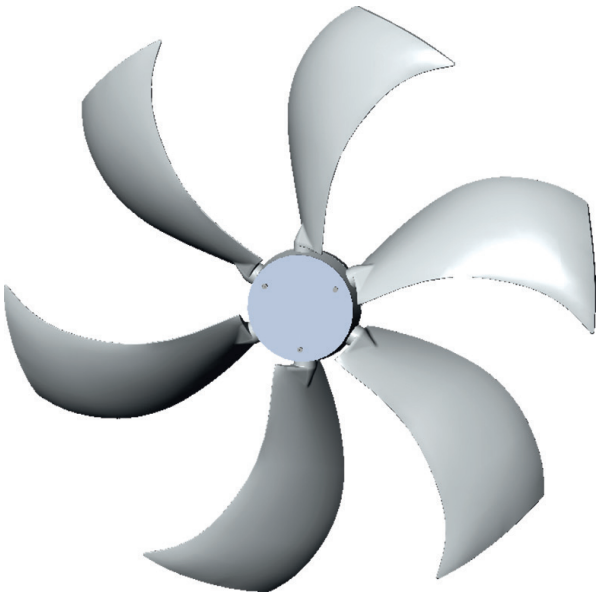




AXIAL FANS TYPE VAAZ C 710

Technical data											
1	2	3	4	5	6	7	8	9	10	11	12
FAN TYPE	2p=	n (1/ min)	q_{v1} (m3/s)	PST (Pa)	P_e (kW)	Ir (A)	Ik (A)	P2 (kW)	In (A)	L_{wA5} dB(A)	L_{pA} dB(A)
	13		400 V (-10%/+10%), 50 Hz								
VAAZ C 710-5,5 m3/s-0Pa M90-6	6	940	5,5	139	1,50	3,0	11,3	1,20	3,1	86	72
VAAZ C 710-4,1 m3/s-0Pa M90-8	8	690	4,1	75	0,80	2,3	5,6	0,55	2,4	81	68
VAAZ C 710-3,5 m3/s-0Pa M90-10	10	560	3,5	49	0,62	2,50	4,6	0,37	2,5	73	60
VAAZ C 710-2,8m3/s-0Pa M90-12	12	470	2,8	35	0,33	1,4	2,7	0,20	1,5	68	54
VAAZ C 710-2,2 m3/s-0Pa M90-16	16	350	2,2	26	0,32	1,0	1,6	0,06	1,2	61	49

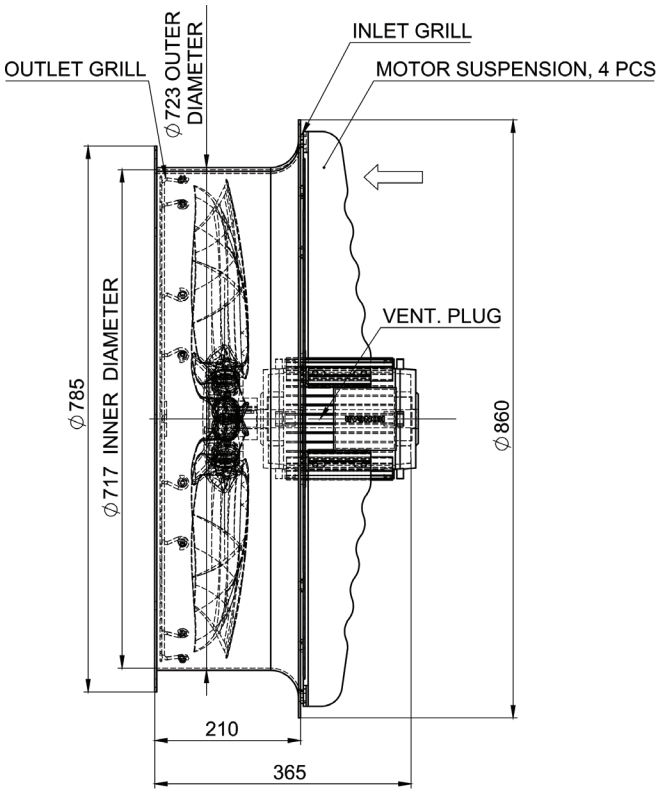
Versions compatible with 380–400–415 V / 60 Hz and 440–460–480 V / 60 Hz power supplies are available upon request.

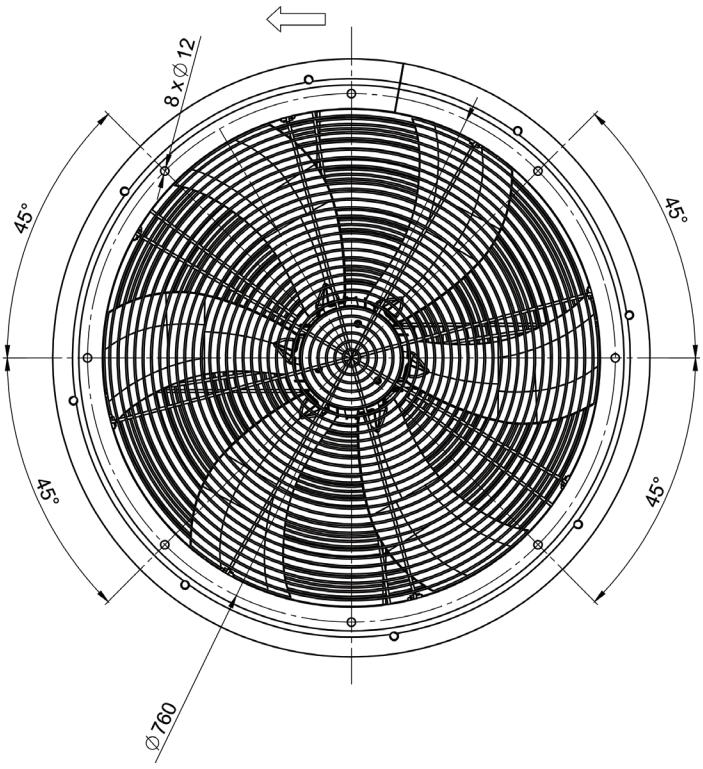


The data above was obtained using the WF 6-6 impeller with a 25° blade angle.

Additional blade angle options are available upon request, including 20° and 30°.

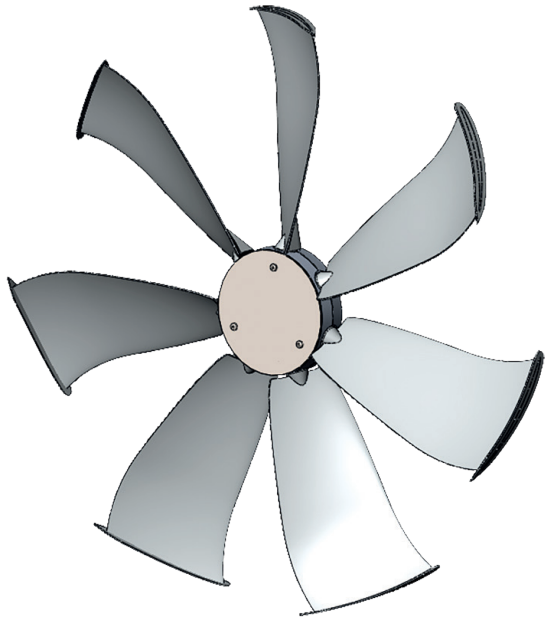
The technical data provided herein is for informational purposes only and is subject to change without prior notice.





AXIAL FANS TYPE VAAZ C 800

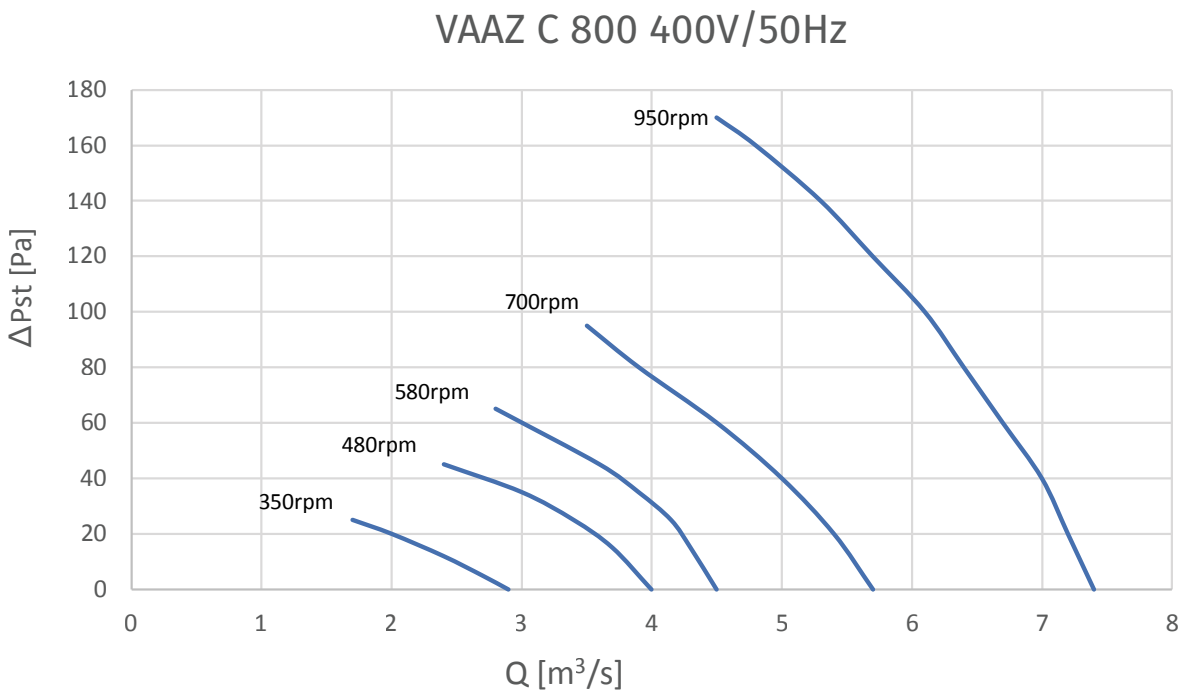
Technical data											
1	2	3	4	5	6	7	8	9	10	11	12
FAN TYPE	2p=	n (1/min)	q_{v1} (m3/s)	PST (Pa)	P_e (kW)	Ir (A)	Ik (A)	P2 (kW)	In (A)	L_{wA5} dB(A)	L_{pA} dB(A)
	13		**400 V (-10%/+10%), 50 Hz**								
VAAZ C 800-7,4 m3/s-0Pa M100-6	6	950	7,4	170	1,95	4,5	21,5	1,80	4,6	90	77
VAAZ C 800-5,7 m3/s-0Pa M100-8	8	700	5,7	95	0,95	2,7	10,7	0,90	2,8	81	66
VAAZ C 800-4,5 m3/s-0Pa M100-10	10	580	4,5	65	0,60	2,3	6,4	0,45	2,5	76	62
VAAZ C 800-4,0m3/s-0Pa M100-12	12	480	4,0	45	0,36	1,55	3,7	0,37	1,6	70	55
VAAZ C 800-2,9 m3/s-0Pa M100-16	16	350	2,9	25	0,27	1,0	1,5	0,090	1,0	63	48
	13		**400 V (-10%/+10%), 60 Hz**								
VAAZ C 800-6,4 m3/s-0Pa M100-8	8	820	6,4	135	1,42	3,0	9,6	1,10	3,2	85	70
VAAZ C 800-5,3 m3/s-0Pa M100-10	10	680	5,3	95	0,85	2,3	6,3	0,75	2,7	79	64
VAAZ C 800-4,4 m3/s-0Pa M100-12	12	555	4,4	60	0,51	1,5	3,0	0,37	1,55	74	59
VAAZ C 800-3,4 m3/s-0Pa M100-16	16	430	3,4	40	0,47	1,5	2,4	0,13	1,5	68	53
	13		**460 V (-10%/+10%), 60 Hz**								
VAAZ C 800-6,5 m3/s-0Pa M100-8	8	860	6,5	135	1,52	3,20	10,0	1,30	3,3	85	71
VAAZ C 800-5,4 m3/s-0Pa M100-10	10	690	5,4	95	0,87	2,5	7,5	0,75	2,7	80	64
VAAZ C 800-4,5 m3/s-0Pa M100-12	12	570	4,5	65	0,54	1,55	3,6	0,37	1,55	74	60
VAAZ C 800-3,4 m3/s-0Pa M100-16	16	430	3,4	35	0,60	1,75	2,8	0,15	1,75	68	53

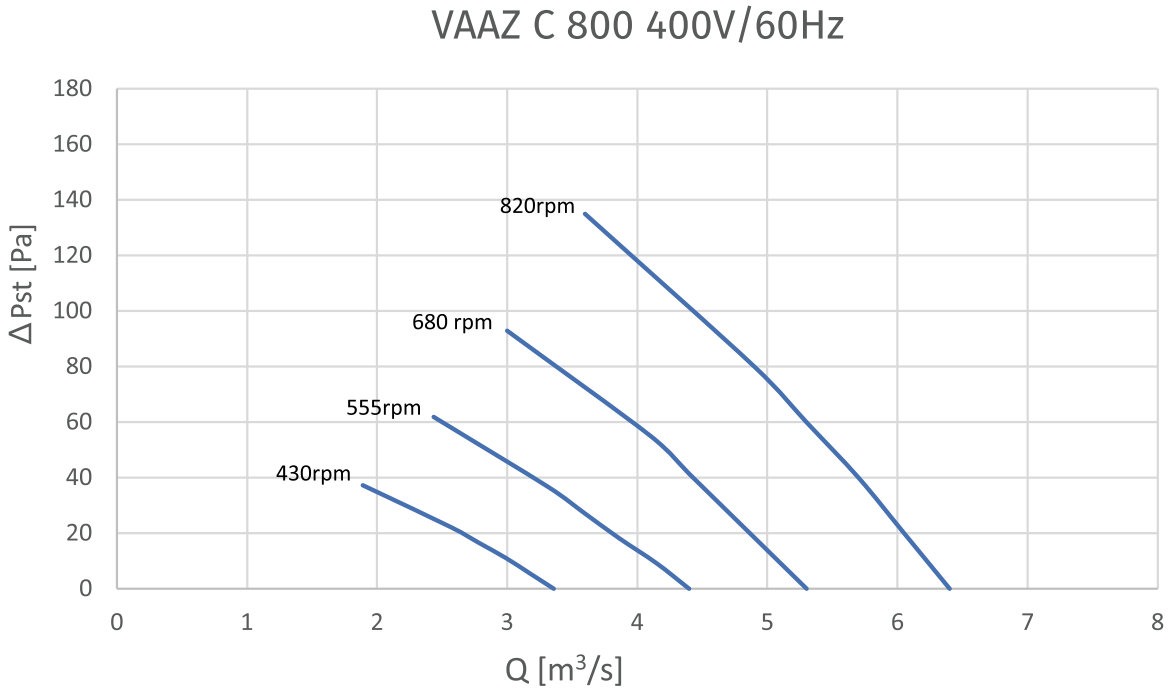


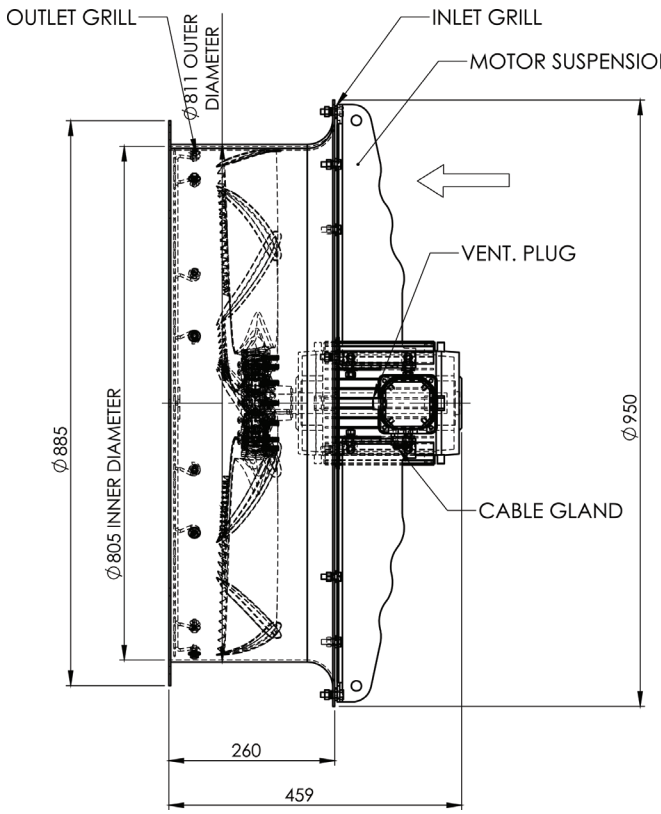
The data above was obtained using the MA 7-7 impeller with a 30° blade angle (28.5° used exclusively for the 100-8 model at 60 Hz).

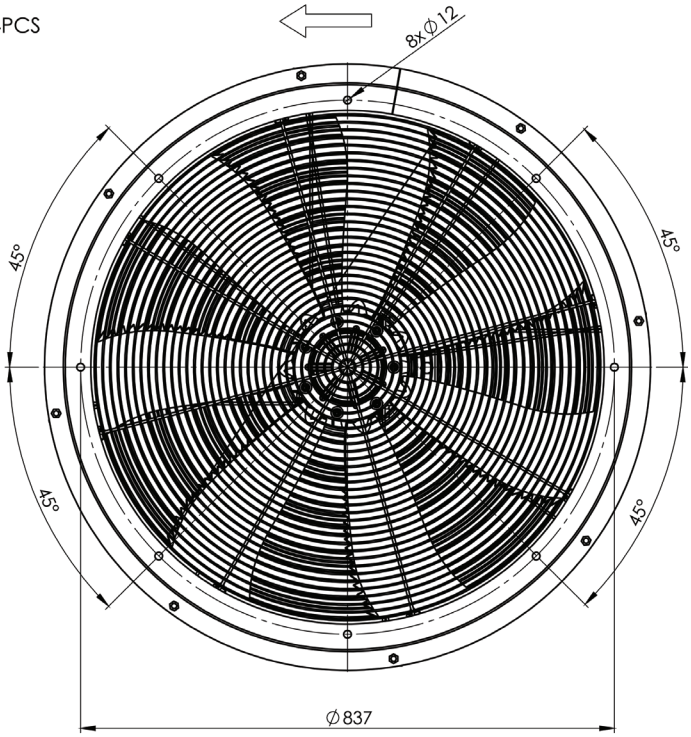
Additional blade angle options are available upon request, including 25°, 28.5°, 30°, 32.5°, and 35°.

The technical data provided herein is for informational purposes only and is subject to change without prior notice.



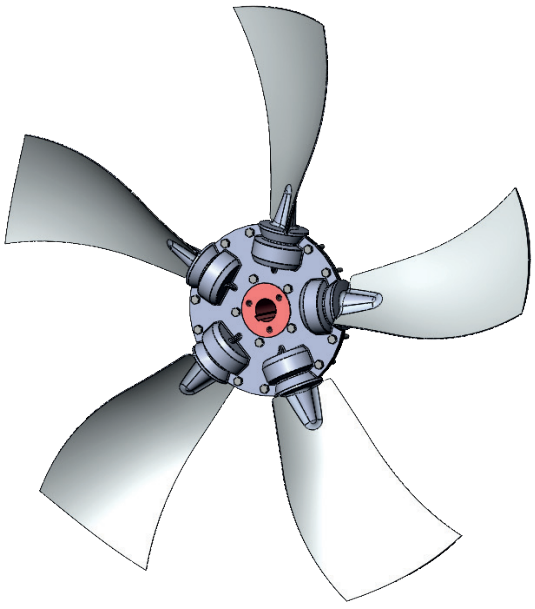



OUTLET GRILL
Ø811 OUTER DIAMETER
INLET GRILL
MOTOR SUSPENSION 4PCS
VENT. PLUG
CABLE GLAND
Ø885
Ø805 INNER DIAMETER
Ø950
260
459


8xØ12
45°
45°
45°
45°
Ø837

AXIAL FANS TYPE VAAZ C 1000

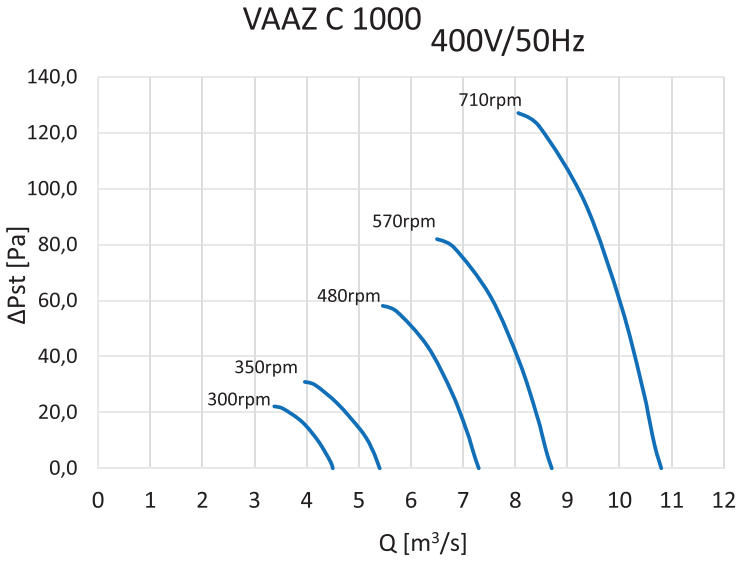
Technical data											
1	2	3	4	5	6	7	8	9	10	11	12
FAN TYPE	2p=	n (1/min)	q_{v1} (m3/s)	PST (Pa)	P_e (kW)	Ir (A)	Ik (A)	P2 (kW)	In (A)	L_{wA5} dB(A)	L_{pA} dB(A)
	13		**400 V (-10%/+10%), 50 Hz**								
VAAZ C 1000-10,8 m3/s-0Pa M132-8	8	710	10,8	155	2,80	5,6	22,0	2,20	5,70	90	75
VAAZ C 1000-8,7 m3/s-0Pa M132-10	10	570	8,7	100	1,60	4,5	16,5	1,50	4,75	83	69
VAAZ C 1000-7,3 m3/s-0Pa M132-12	12	480	7,3	75	1,05	4,2	9,6	0,75	4,30	78	63
VAAZ C 1000-5,4 m3/s-0Pa M132-16	16	350	5,4	55	0,52	1,8	4,0	0,30	1,9	70	55
VAAZ C 1000-4,5 m3/s-0Pa M132-16	16	300	4,5	45	0,36	0,87	1,3	0,15	0,95	66	51
	13		**400 V (-10%/+10%), 60 Hz**								
VAAZ C 1000-9,8 m3/s-0Pa M132-10	10	630	9,8	130	2,30	4,8	13,5	1,70	4,90	87	72
VAAZ C 1000-8,5 m3/s-0Pa M132-12	12	560	8,5	90	1,60	5,1	11,0	1,30	5,20	82	67
VAAZ C 1000-6,7 m3/s-0Pa M132-16	16	440	6,7	70	0,82	3,2	7,0	0,55	3,30	76	62
	13		**460 V (-10%/+10%), 60 Hz**								
VAAZ C 1000-10,3 m3/s-0Pa M132-10	10	675	10,3	130	2,40	4,2	11,6	1,70	4,20	89	75
VAAZ C 1000-8,7 m3/s-0Pa M132-12	12	570	8,7	90	1,70	5,7	13,5	1,50	5,80	83	69
VAAZ C 1000-6,7 m3/s-0Pa M132-16	16	440	6,7	70	0,94	3,75	8,5	0,55	3,75	76	61

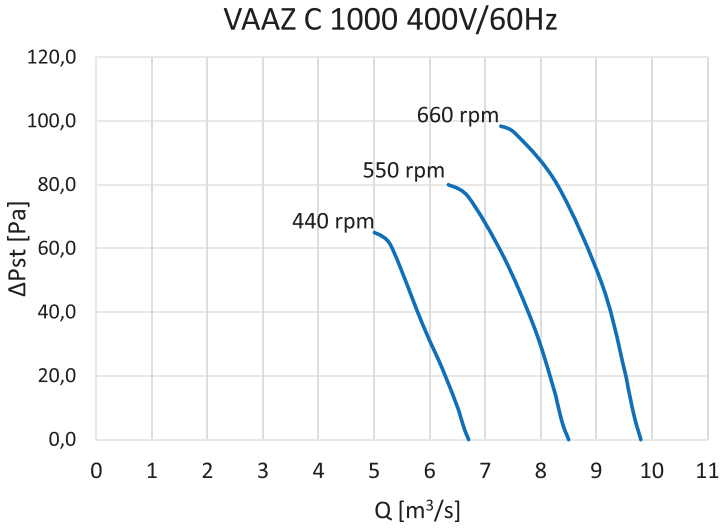


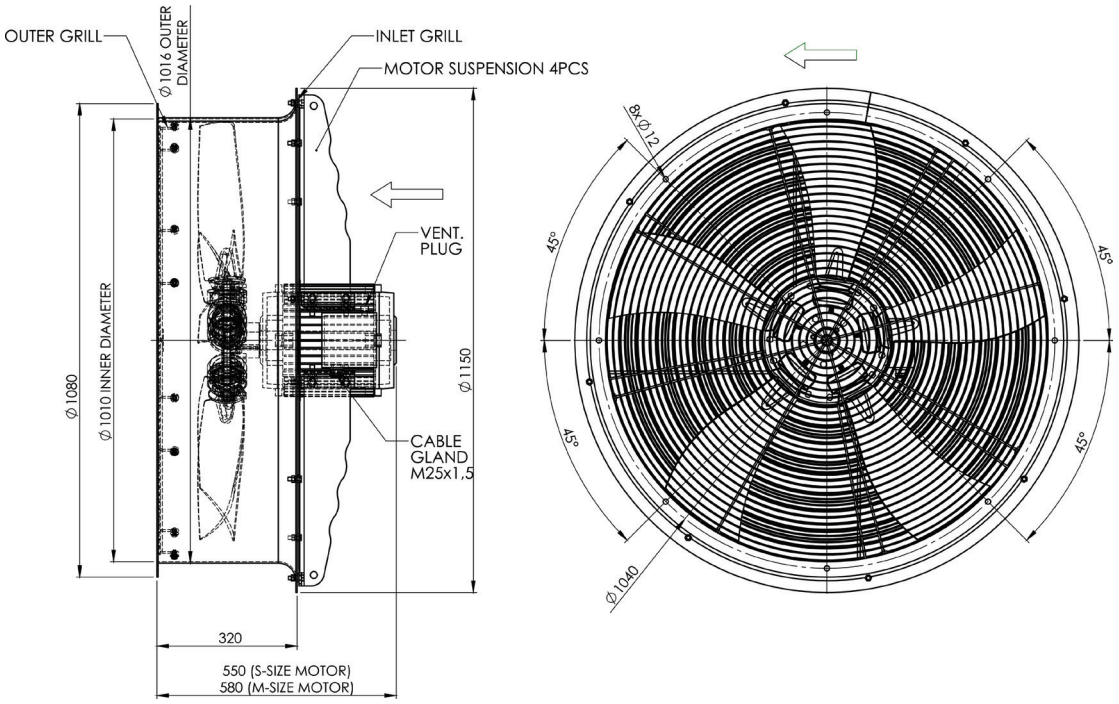
The data above was obtained using the MA 5-5 impeller with a 25° blade angle, featuring the new sickle blade design.

Additional blade angle options are available upon request, ranging from 20° to 30°.

The technical data provided herein is for informational purposes only and is subject to change without prior notice.



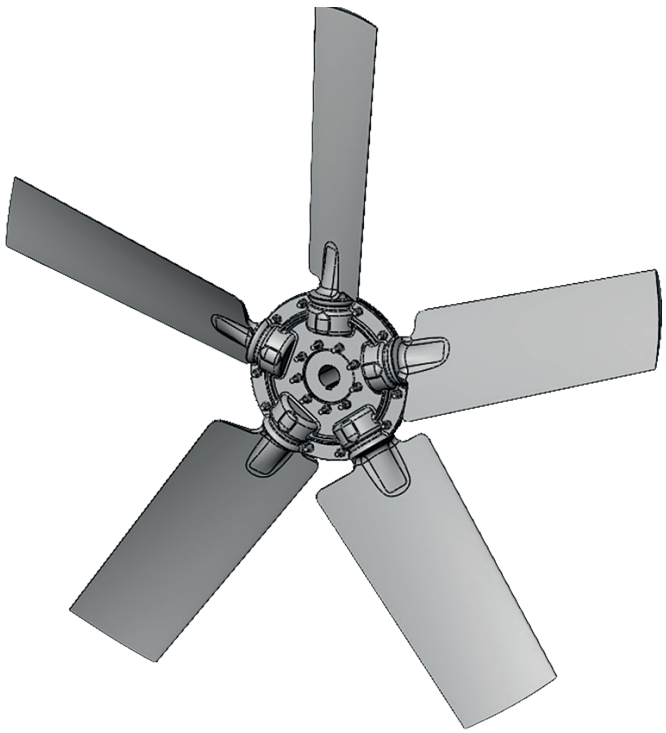




AXIAL FANS TYPE VAAZ C 1250

Technical data											
1	2	3	4	5	6	7	8	9	10	11	12
FAN TYPE	2p=	n (1/ min)	q_{v1} (m3/s)	PST (Pa)	P_e (kW)	Ir (A)	Ik (A)	P2 (kW)	In (A)	L_{wA5} dB(A)	L_{pA} dB(A)
	13		400 V (-10%/+10%), 50 Hz								
VAAZ C 1250-15,0 m3/s-0Pa M132-10	10	570	15,0	110	3,15	7,70	29,5	2,50	7,90	83,0	69
VAAZ C 1250-12,5 m3/s-0Pa M132-12	12	470	12,5	80	1,90	6,70	17,5	1,50	8,30	79,0	64
VAAZ C 1250-9,4 m3/s-0Pa M132-16	16	350	9,4	40	0,95	3,30	8,0	0,75	3,60	72,5	58
VAAZ C 1250-8,9 m3/s-0Pa M132-12T	12	330	8,9	37	1,15	3,00	3,7	0,50	3,00	71,5	57

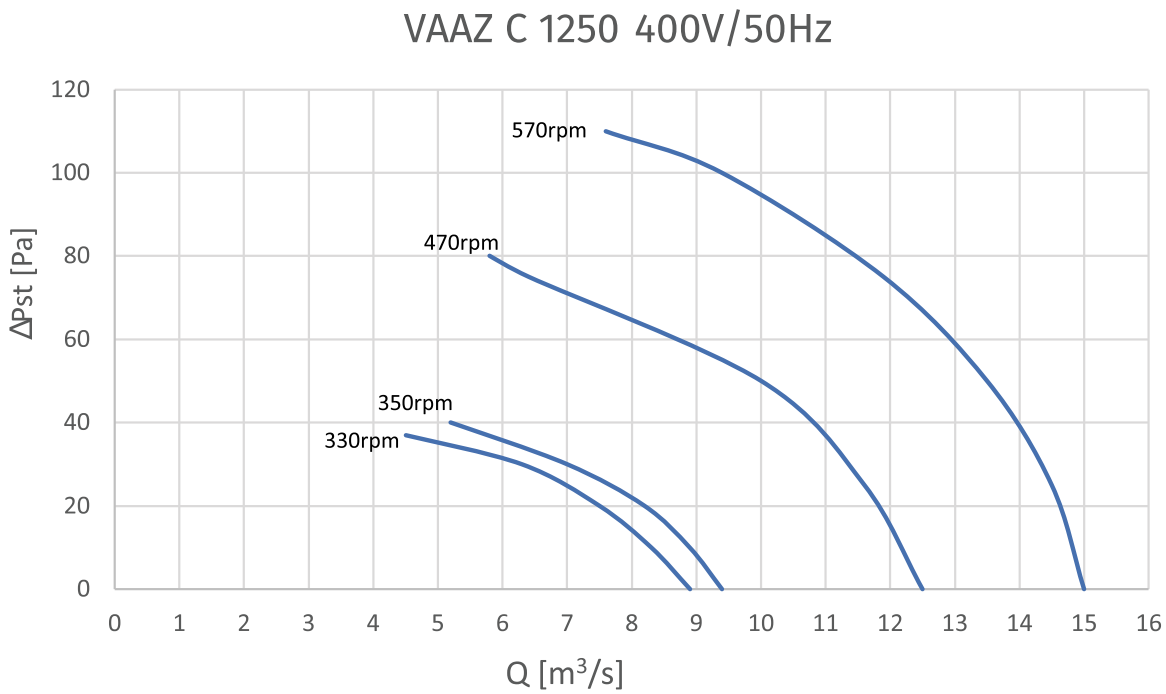
Versions compatible with 380–400–415 V / 60 Hz and 440–460–480 V / 60 Hz power supplies are available upon request.

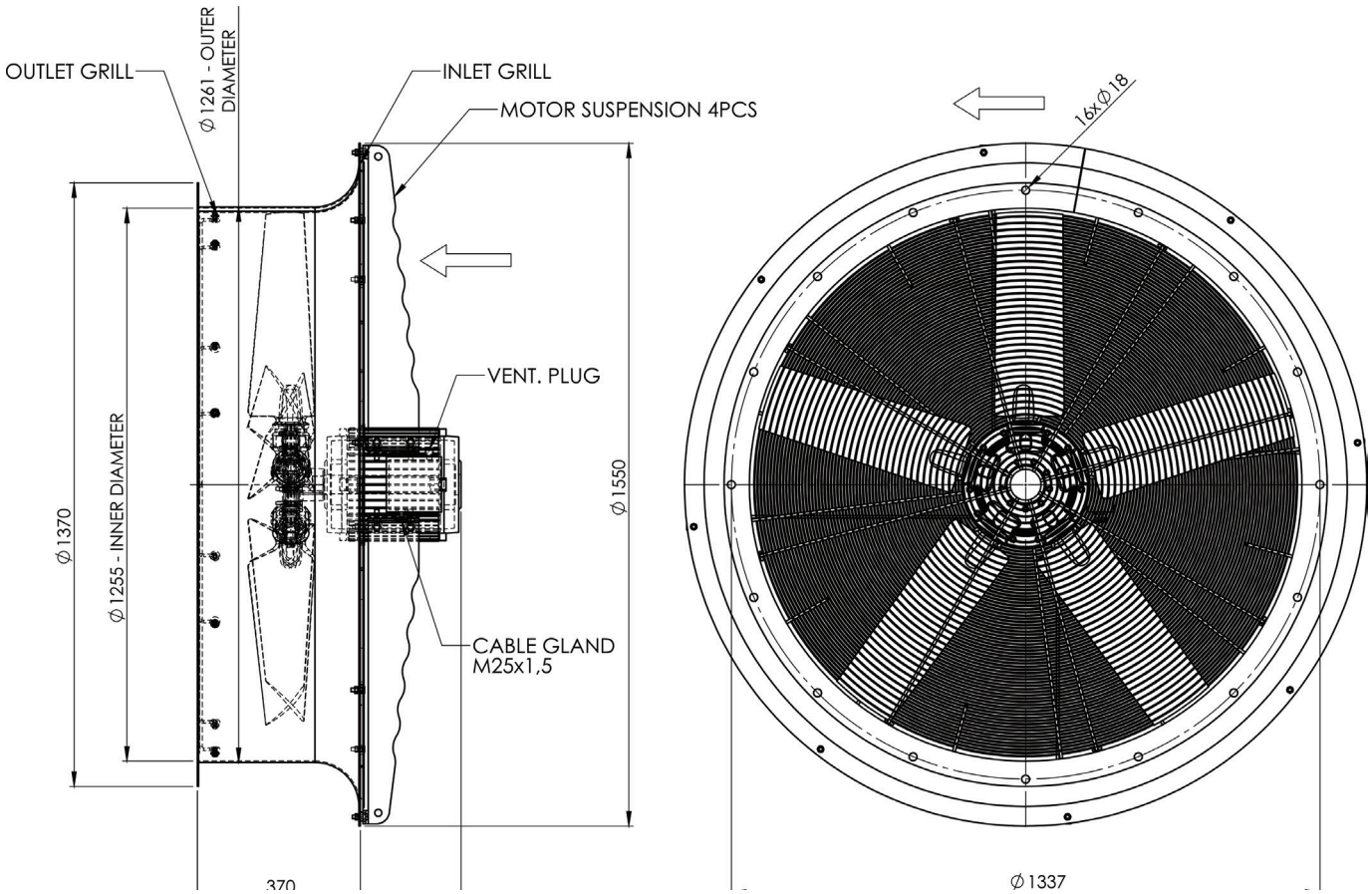


The data above was obtained using the 6WL 5-5 impeller with a 42° blade angle.

Additional blade angle options are available upon request, with a tolerance range of ±1% from the reference angle.

The technical data provided herein is for informational purposes only and is subject to change without prior notice.





VAAZ C SERIES AXIAL FANS

Engineered Cooling for Power Transformers
470–1250 mm | ETL-Approved Motors | North American Market-Ready

National Electrical Manufacturers Association

PRODUCT OVERVIEW

The **VAAZ C Series** axial fans are engineered specifically for **transformer radiator cooling** applications. Designed for optimal performance in outdoor environments, the VAAZ C Series offers high static efficiency, robust mechanical design, and reliability over continuous-duty cycles.

The fans are currently offered with **ETL-approved motors**, conforming to **UL and CSA safety standards**, and the **complete fan assembly is designed to meet North American compliance** requirements, positioning it for direct use in UL/ETL-governed installations.

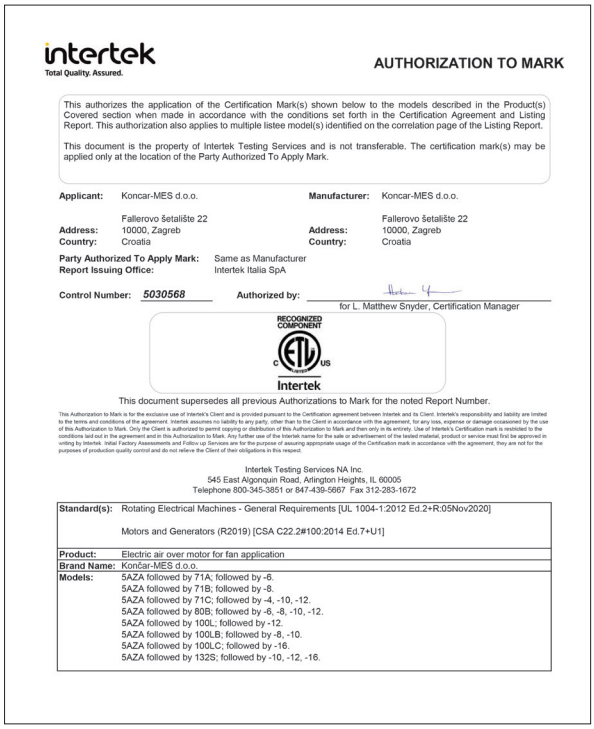
TECHNICAL SPECIFICATIONS	
Parameter	**Specification**
Model Series	VAAZ C
Fan Diameters	470 mm – 1250 mm
Blade Material	Aluminum
Operating Temperature	-30/+55°C
Motor Types	Single-phase and three-phase asynchronous motors
Motor Protection	Rainproof
Voltage / Frequency	Y480V / 60Hz

CERTIFICATION

- **Motors:** Fully ETL-recognized (UL 1004-1, CSA C22.2 No. 100)
- **Fan Units:** Designed and prepared for full ETL/UL compliance (UL 507, CSA C22.2 No. 60335-2-80:17)
- **OSHA, RoHS & CE compliant components**
- **Manufactured under ISO 9001 Quality Standards**

WHY VAAZ C FOR TRANSFORMER COOLING?

- Optimized for transformer radiator air resistance profiles
- Low vibration and acoustic output, ideal for noise-sensitive substation environments
- Extended operational lifespan with minimal maintenance requirements
- Fully North America-ready, with all major certification processes completed or nearing finalization



intertek
Total Quality. Assured.

AUTHORIZATION TO MARK

This authorizes the application of the Certification Mark(s) shown below to the models described in the Product(s) Covered section when made in accordance with the conditions set forth in the Certification Agreement and Listing Report. This authorization also applies to multiple listee model(s) identified on the correlation page of the Listing Report.

This document is the property of Intertek Testing Services and is not transferable. The certification mark(s) may be applied only at the location of the Party Authorized To Apply Mark.

Applicant: Koncar-MES d.o.o.
Fallerovo šetalište 22
Address: 10000, Zagreb
Country: Croatia

Manufacturer: Koncar-MES d.o.o.
Fallerovo šetalište 22
Address: 10000, Zagreb
Country: Croatia

Party Authorized To Apply Mark: Same as Manufacturer
Report Issuing Office: Intertek Italia SpA

Control Number: 5030568 **Authorized by:**
for L. Matthew Snyder, Certification Manager

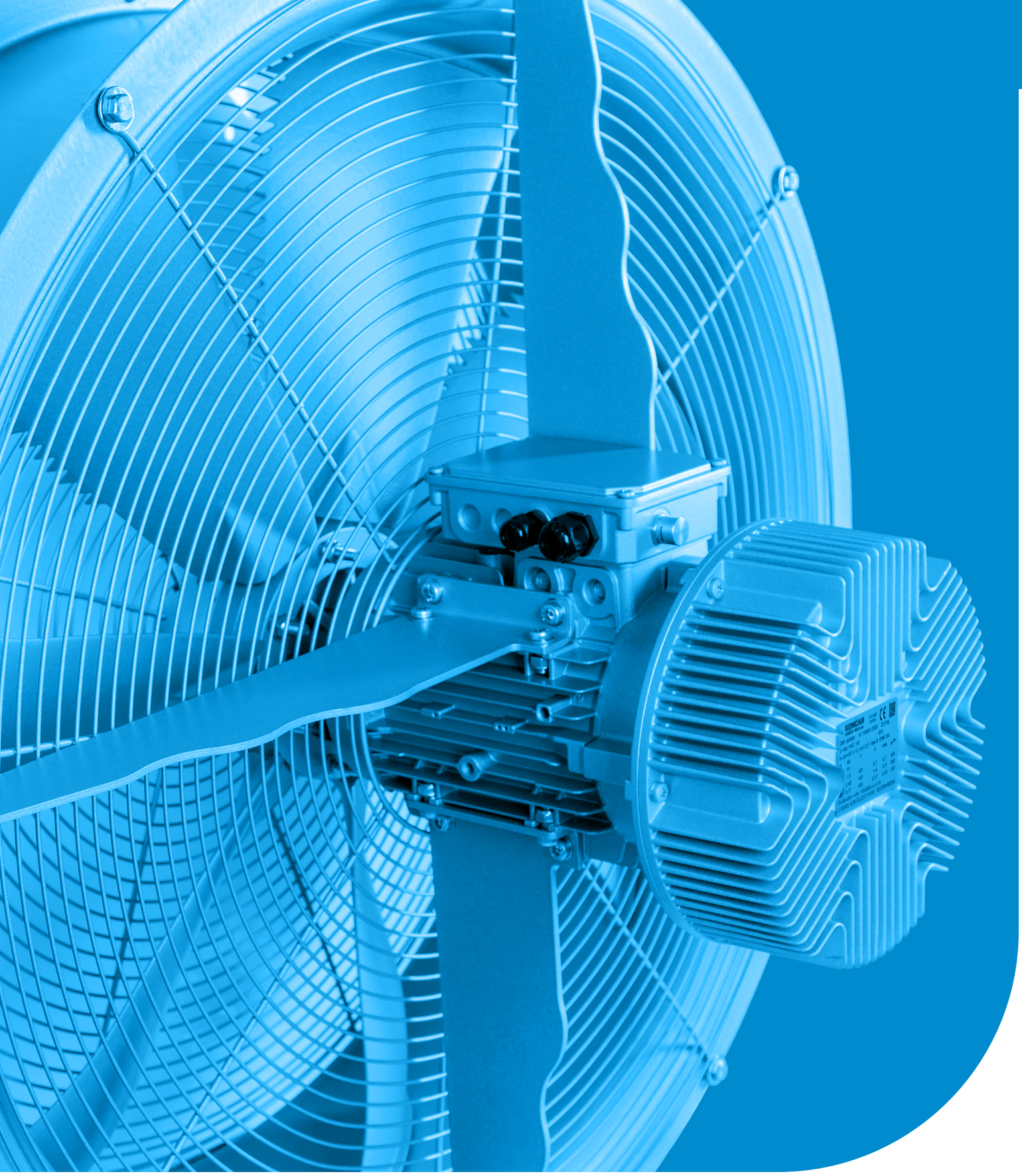
RECOGNIZED COMPONENT
Intertek

This document supersedes all previous Authorizations to Mark for the noted Report Number.

This Authorization to Mark is for the exclusive use of Intertek's Client and is provided pursuant to the Certification agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this Authorization to Mark. Only the Client is authorized to permit copying or distribution of this Authorization to Mark and then only in its entirety. Use of Intertek's Certification mark is restricted to the conditions laid out in the agreement and in this Authorization to Mark. Any further use of the Intertek name for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. Initial Factory Assessments and Follow up Services are for the purpose of assuring appropriate usage of the Certification mark in accordance with the agreement, they are not for the purposes of production quality control and do not relieve the Client of their obligations in this respect.

Intertek Testing Services NA Inc.
545 East Algonquin Road, Arlington Heights, IL 60005
Telephone 800-345-3851 or 847-439-5667 Fax 312-283-1672

Standard(s):	Rotating Electrical Machines - General Requirements [UL 1004-1:2012 Ed.2+R:05Nov2020] Motors and Generators (R2019) [CSA C22.2#100:2014 Ed.7+U1]
Product:	Electric air over motor for fan application
Brand Name:	Končar-MES d.o.o.
Models:	5AZA followed by 71A; followed by -6. 5AZA followed by 71B; followed by -8. 5AZA followed by 71C; followed by -4, -10, -12. 5AZA followed by 80B; followed by -6, -8, -10, -12. 5AZA followed by 100L; followed by -12. 5AZA followed by 100LB; followed by -8, -10. 5AZA followed by 100LC; followed by -16. 5AZA followed by 132S; followed by -10, -12, -16.



Cooling Technology Upgrades with **EC FANS**

Revolutionizing Transformer Cooling: EC Motors Advantage

Electronically Commutated (EC) fans represent advanced cooling technology, offering exceptional efficiency. Unlike traditional AC fans, EC fans feature integrated variable speed drives and advanced motor control, enabling precise regulation of speed and airflow. This results in optimized performance, reduced energy consumption, and improved operational efficiency. With their streamlined design and innovative electronics, EC fans have become the preferred choice for a wide range of cooling applications from HVAC systems to industrial equipment. They embody the future of thermal management by combining reliability, energy efficiency, and environmental sustainability. In the field of transformer cooling, our EC motors based on synchronous reluctance technology are redefining efficiency and reliability. Unlike magnet-based alternatives, such as Permanent Magnet Synchronous Motors (PMSMs), these motors generate torque through magnetic reluctance, achieving optimal performance with minimal energy usage and without relying on rare earth materials.

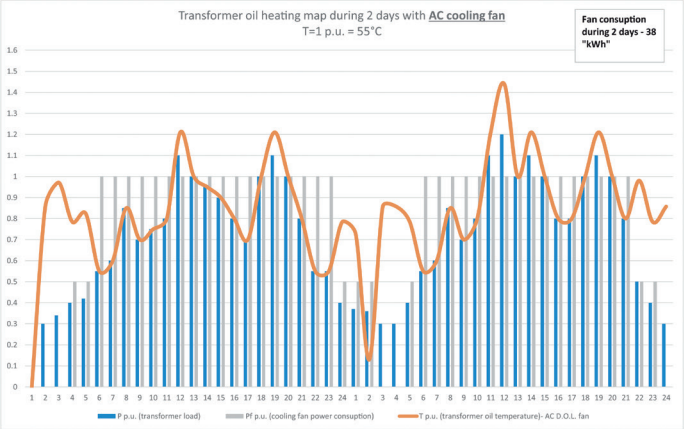
Synchronous reluctance motors offer several advantages over magnet-based counterparts:

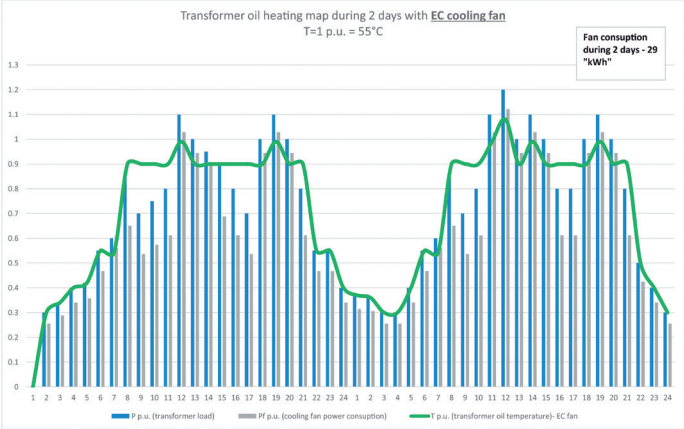
- Firstly, they eliminate the need for magnets, reducing potential supply chain dependencies. This not only streamlines manufacturing but also enhances environmental sustainability by reducing reliance on rare earth materials
- Synchronous reluctance motors exhibit superior thermal performance. Without magnets, they are less prone to demagnetization at high temperatures, ensuring consistent performance and longevity even in demanding operating conditions. This reliability translates into reduced maintenance requirements and enhanced operational uptime for transformer cooling systems
- Simplified maintenance, particularly for bearing replacement, due to their streamlined design similar to that of standard induction motor and absence of magnets, facilitating easier access and reducing downtime
- KONČAR - MES EC motors offer user-friendly design features, such as easy mechanical mounting and electrical connection at user applications. This streamlined process reduces installation time and costs, providing a competitive edge over cooling solutions from other manufacturers
- Integrated electronic drive provide precise control over speed, adapting seamlessly to varying cooling demands. This level of control allows for optimized energy efficiency and quieter operation
- Integration of EC motors with synchronous reluctance technology on our fans retains all other benefits from the standard fan program, including the possibility of IP66 protection, safeguarding against dust and water ingress for added durability in harsh environments and includes wide temperature range of -30°C to +55°C, ensuring reliable operation in diverse environmental conditions

CASE STUDY – TRANSFORMER COOLING OPTIMISATION

Temperature plays a critical role in determining a transformer's operational lifespan. Elevated temperatures are a leading cause of insulation degradation, which directly contributes to premature transformer failure. The insulation system is often the weakest link compromised by factors such as overloading, moisture ingress, substandard insulating materials, and extreme thermal conditions. A properly sized, installed, and maintained transformer is typically designed to operate for 20 to 30 years at its rated (nameplate) load. However, consistent operation above the nameplate rating significantly accelerates thermal aging, reducing service life. This case study presents a comparative analysis of transformer cooling using conventional AC fan systems versus the latest EC (Electronically Commutated) fan technology.

Case Study: Cooling a 100 MVA Transformer – Comparison of AC and EC Fan Technologies





Key benefits of EC cooling compared to conventional AC cooling:

LOWER TRANSFORMER OPERATING TEMPERATURE

EC fan technology ensures that transformer temperatures remain consistently below nominal thresholds. As demonstrated in the comparative graph, EC cooled systems maintain a lower average temperature than their AC counterparts. By precisely modulating fan speed and airflow based on thermal demand, EC fans enable smoother and more accurate temperature control. This results in overall temperature reductions of 15–20%, significantly minimizing thermal stress on critical components.

STABILIZED THERMAL CONDITIONS

Unlike conventional cooling systems that may cause abrupt temperature fluctuations, EC cooling provides a stable thermal environment. This minimizes the risk of condensation, mechanical fatigue from thermal expansion and contraction, and degradation of sensitive components, factors that can otherwise shorten equipment lifespan.

HOT SPOT MITIGATION

Thanks to continuous and adaptive cooling, EC fans prevent "hot spot" formation within the transformer. Traditional systems often rely on threshold-based activation, potentially leaving low-load transformers momentarily uncooled. In contrast, EC cooling maintains constant airflow, ensuring uniform heat dissipation and protecting vulnerable insulation zones from localized overheating.

ENHANCED OVERLOAD HANDLING CAPACITY

During overload conditions, EC fans demonstrate superior thermal management. For instance, a 20% overload results in only a 10% temperature increase with EC cooling compared to a 45% rise under AC cooling. Moreover, EC fans can be selected with variable airflow capabilities, allowing customization for anticipated overload scenarios without compromising nominal load efficiency. This adaptive response supports improved transformer resilience during peak demand.

SIGNIFICANT ENERGY SAVINGS

Energy efficiency is a core advantage of EC fan systems. Leveraging high-efficiency IE4/IE5 motor technology, EC fans can reduce power consumption by up to 30% compared to traditional AC fan systems. This translates into measurable cost savings and improved sustainability over the operational lifecycle.

IMPROVED TRANSFORMER EFFICIENCY

Lower core temperatures reduce copper losses by 15–20%, directly enhancing transformer efficiency. Combined with the lower energy draw of EC cooling systems, this contributes to a higher overall efficiency rating, aligning with modern expectations for high-performance, energy conscious equipment.

EXTENDED TRANSFORMER SERVICE LIFE

Above all, consistent thermal management extends transformer longevity. By reducing thermal cycling, eliminating hot spots, and improving insulation stability, EC cooling technology significantly increases the operational lifespan of power transformers, delivering long-term reliability and value.

In conclusion, EC motors utilizing synchronous reluctance technology represent a shift in transformer cooling, boasting unparalleled efficiency and reliability. By eliminating the need for magnets and delivering superior thermal performance, they ensure consistent operation even in the most demanding conditions. Simplified maintenance, user-friendly design, a wide operating temperature range, and integrated control capabilities position them as a forward looking, high-performance solution for next generation transformer cooling systems.

KEY BENEFITS:

- **ENHANCED EFFICIENCY**
- **LOW NOISE OPERATION**
- **CONSISTENT RELIABILITY AND LONG-TERM DURABILITY**
- **SIMPLIFIED MAINTENANCE**
- **USER-FRIENDLY DESIGN**
- **EASY MOUNTING AND CABLE CONNECTION**
- **WIDE OPERATING TEMPERATURE RANGE**
- **SUPPLY CHAIN RESILIENCE**
- **ENVIRONMENTAL SUSTAINABILITY**
- **ADVANCED SPEED AND AIRFLOW CONTROL**
- **PROTECTION AGAINST DUST AND WATER**

Synchronous reluctance motors offer optimal performance with minimal energy consumption, leading to significant cost savings and reduced environmental impact.

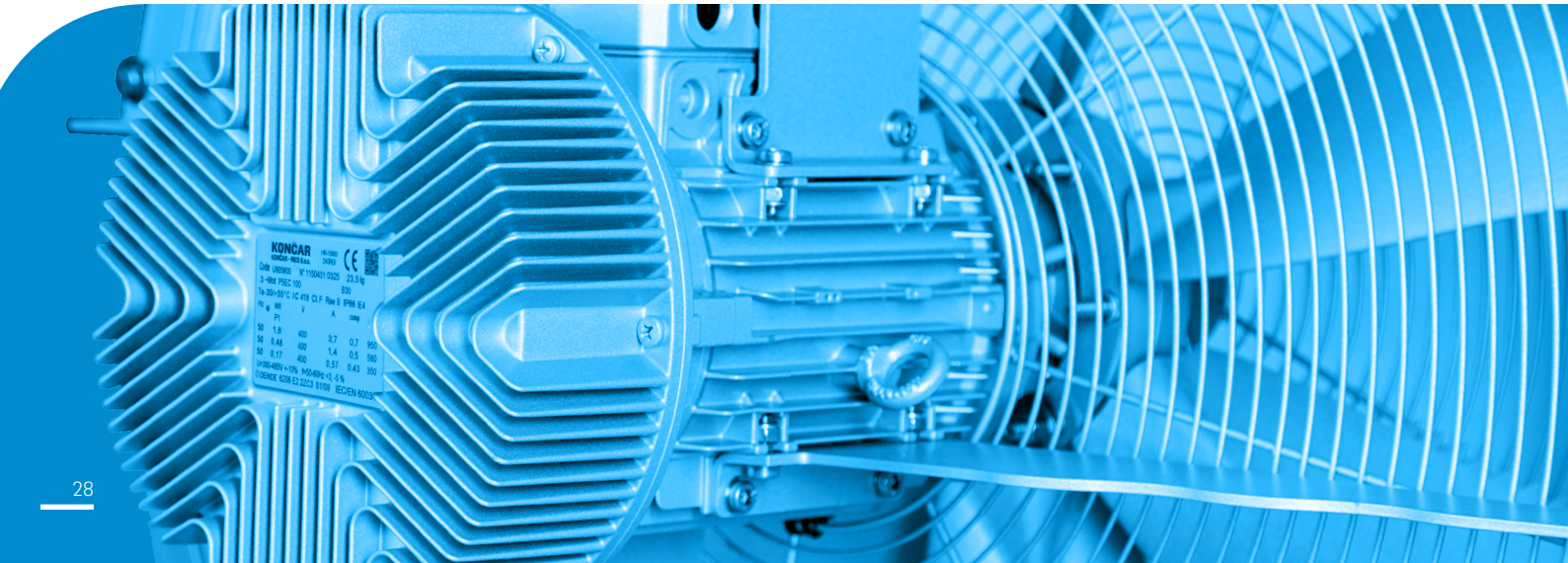
These motors exhibit superior thermal performance, ensuring consistent operation even in demanding conditions and minimizing the risk of downtime.

With a streamlined design and absence of magnets, maintenance tasks, such as bearing replacement, are easier to perform, reducing downtime and associated costs. Regular maintenance can be performed in any electric motor workshop or by onsite maintenance department.

Easy mechanical mounting and electrical connection at user application, simplifies installation and reduces time and cost.

Integrated electronic drive provide precise control over speed, allowing optimized energy efficiency and adaptability to varying cooling demands.

In addition to the benefits already outlined, in-house production of our complete fan assemblies provides a significant advantage in terms of quality assurance. By managing the entire process from manufacturing and assembly to final testing, we maintain full control over every stage of production. This end-to-end oversight ensures that each component meets our stringent quality standards, resulting in highly reliable and high-performing EC motors and fans. Ultimately, this level of control reinforces customer confidence in the durability, consistency, and long-term value of our transformer cooling solutions.



TECHNICAL CHARACTERISTICS:

- 3x 380-480V~, +-10%
- 50-60Hz, +3% -5%
- -30/+55°C (option -40/+60°C)
- Speed (airflow) regulation 0-10V input
- Speed (airflow) regulation over modbus
- Standard fixed speed operation (without airflow regulation)
- IP66 mechanical protection
- Without additional noise from EC motor VSD
- Integrated motor overcurrent protection
- 100-950rpm VAAZ 800 (0.9 - 7.4 m3/s)
- 100-700rpm VAAZ 1000 (1.5 – 10.8 m3/s)
- Up to C5M-h
- VSD: Integrated, space-saving design
- Easy installation

Voltage Compatibility: Operating seamlessly within the range of 380-480V~, with a tolerance of +-10%, ensuring stable performance even amidst fluctuations in power supply.

Frequency Flexibility: Adaptable to power systems operating at 50-60Hz, with frequency range tolerance of +3% to -5%, guaranteeing precise synchronization with varying grid frequencies.

Variable Speed Options: Tailor airflow precisely to requirements with speed ranges from 200 to 950rpm for VAAZ 800 (1.5 - 7.4 m3/s) and 200 to 710rpm for VAAZ 1000 (3 – 10.8 m3/s), providing optimal cooling efficiency across a wide range of transformer sizes.

Temperature Resilience: Functioning reliably in extreme temperatures ranging from -30°C to +55°C, with the option for enhanced resilience in harsh climates with an extended temperature range of -40°C to +60°C.

Versatile Regulation: Flexible airflow regulation through either 0-10V input or modbus interface, allowing for precise adjustment of cooling performance according to operational demands.

Mechanical Protection: Ensuring durability and longevity with standard IP66 mechanical protection, safeguarding against dust and water ingress even in challenging environments. Our transformer cooling solution offers unparalleled versatility and reliability, empowering your infrastructure with efficient and robust thermal management capabilities.

VAAZ EC 800 control characteristic

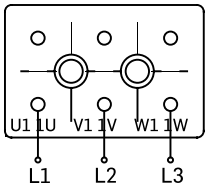
n (1/min)	Q (m3/s)	Pstat (Pa)	P1 (kW)	Ir (A)	Lwa5 dB(A)	Lwa dB(A)	Lpa dB(A)
950	7,4	170	1,78	3,72	89	92	74
720	5,7	95	0,842	2,13	80	83	65,5
580	4,5	65	0,48	1,384	74,5	77,5	59,5
480	4	45	0,31	0,958	69	72	54,4
350	2,9	25	0,17	0,572	61	64	46,6
150	1,3	10	0,085	0,31	48	51	34
100	0,9	5	0,078	0,29	45	48	31

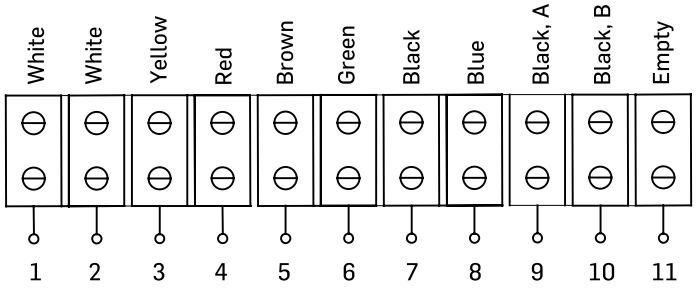
VAAZ EC 1000 control characteristic

n (1/min)	Q (m3/s)	Pstat (Pa)	P1 (kW)	Ir (A)	Lwa5 dB(A)	Lwa dB(A)	Lpa dB(A)
700	10,8	155	2,7	5,183	90	93	75
570	8,7	100	1,471	3,192	83	86	69
480	7,3	75	0,956	2,331	78	81	63
350	5,4	55	0,428	1,27	70	73	55
300	4,5	45	0,3	0,917	66	69	51
150	2,25	17	0,111	0,37	51	54	37
100	1,5	10	0,084	0,31	48	51	34

CONNECTION DIAGRAMS

380-480V +-10%
50/60Hz +3, -5%



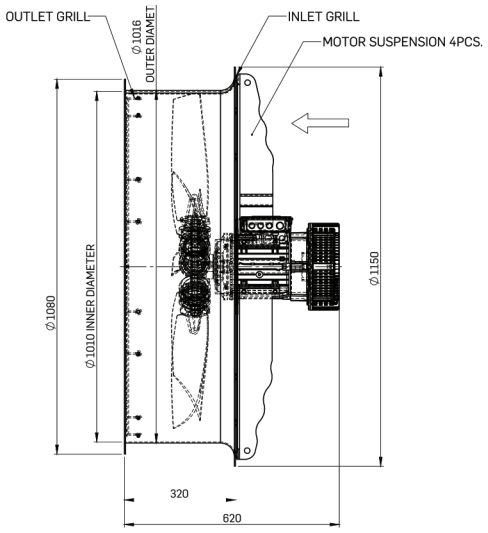


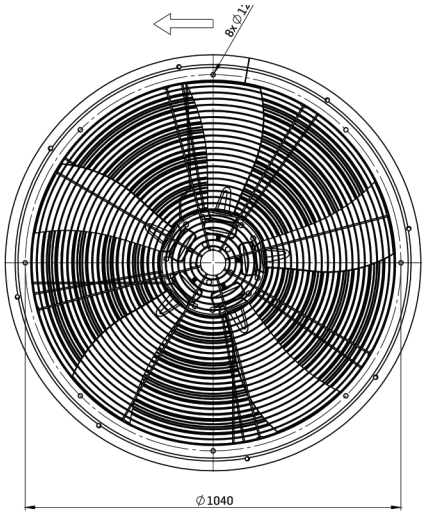
1-2 - Status relay
3 - 24VDC output
4 - 10VDC output
5 - Digital input 1 - START/STOP
6 - Analog input 0-10V
7 - Digital input 2
Emergency max airflow.
8 - GND
9 - MODBUS RTU A
10 - MODBUS RTU B
11 - Insulated terminal.
For MODBUS cable shield.

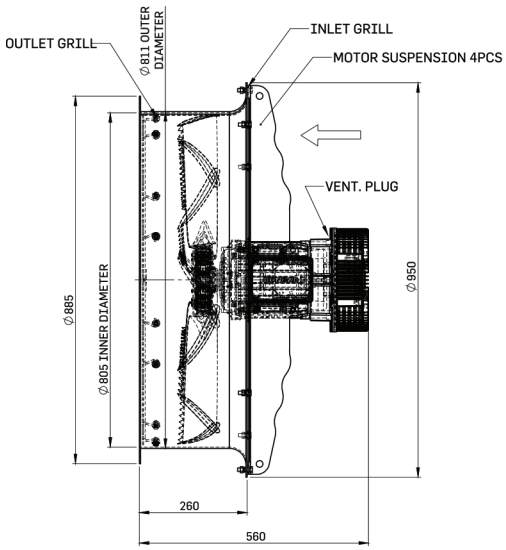
COMPLETE TEMPERATURE CONTROL SOLUTION

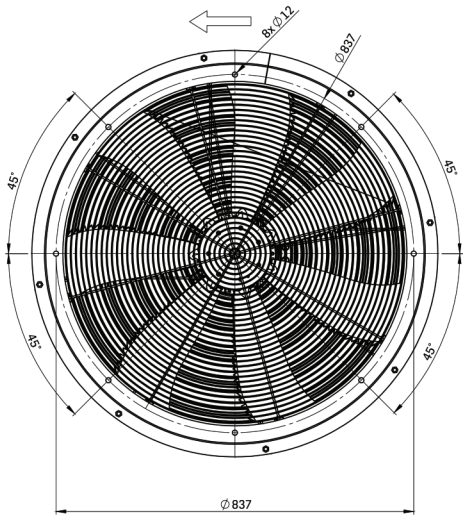
In addition to our high-efficiency EC fans, we offer preprogrammed PLCs with dedicated software for intuitive cooling control and fast setup, eliminating the need for complex programming or custom configuration. For a fully integrated solution, we also provide preassembled electrical cabinets equipped with all essential control components. Additional elements can be included based on specific customer requirements.

MECHANICAL DIMENSIONS

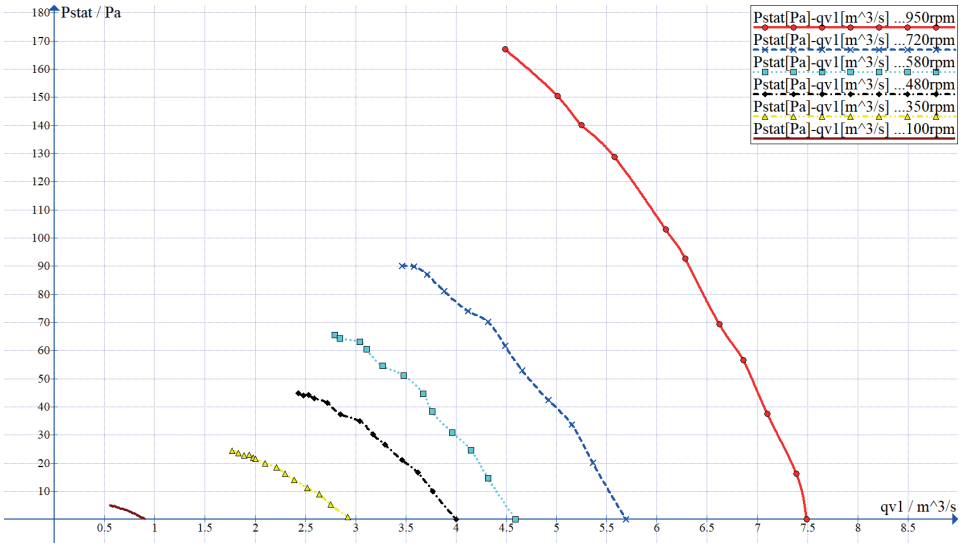


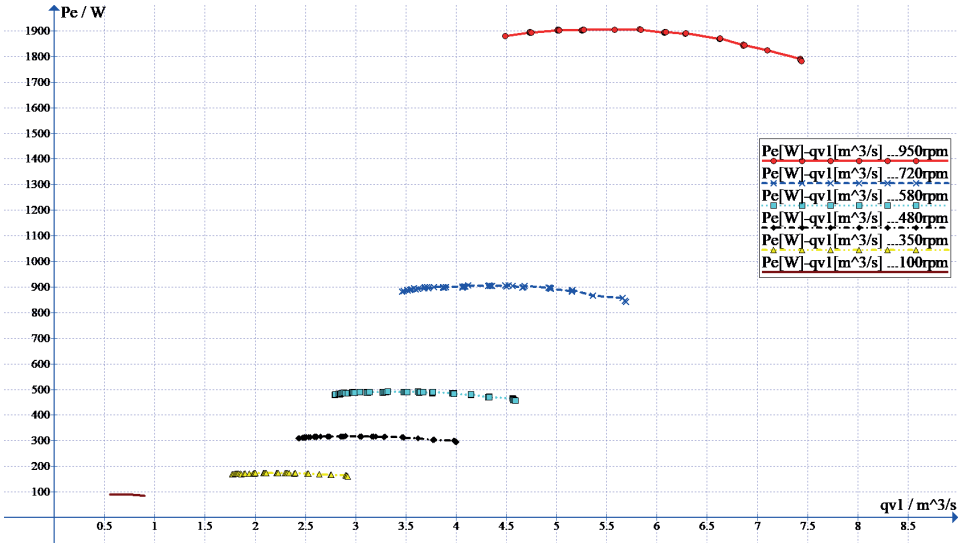


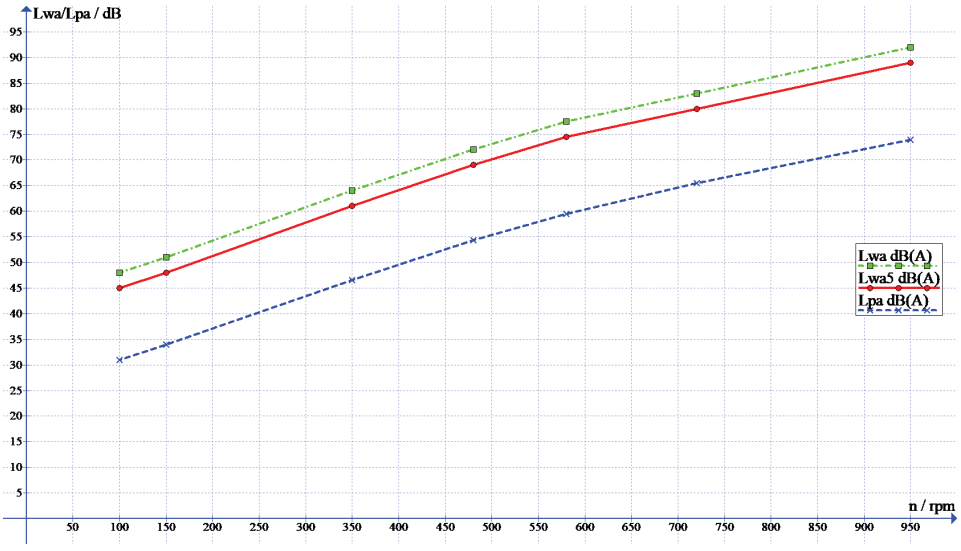




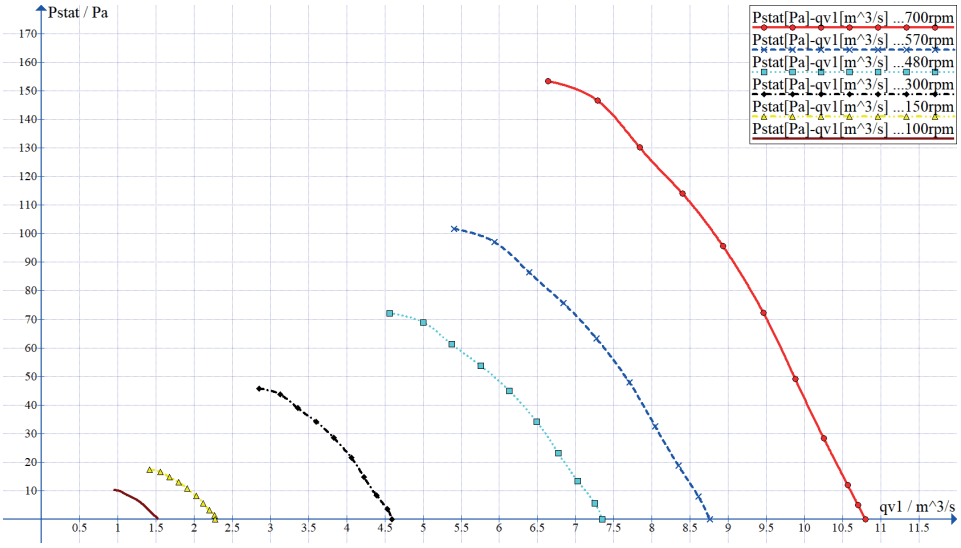
PERFORMANCE CURVES EC FAN 800

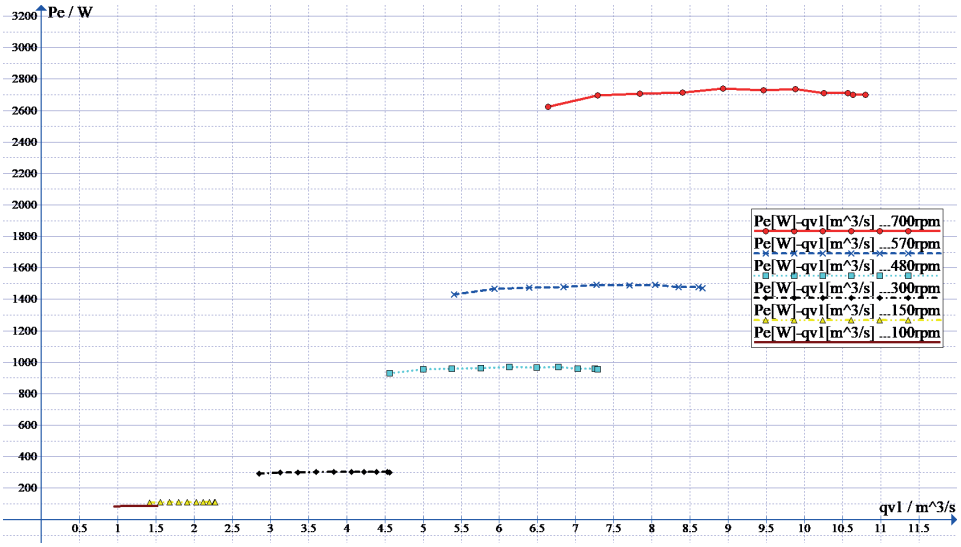


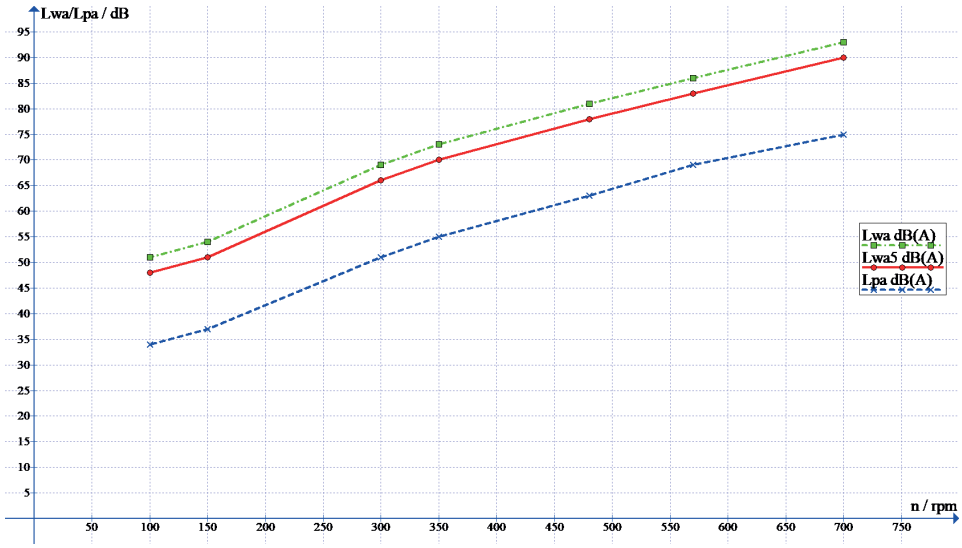




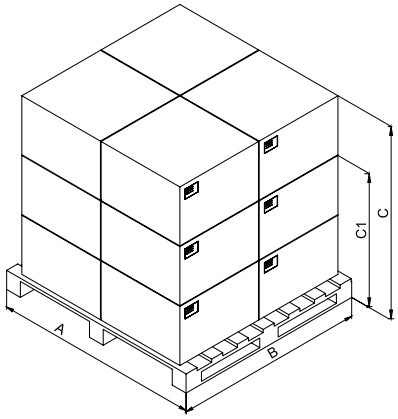
PERFORMANCE CURVES EC FAN 1000



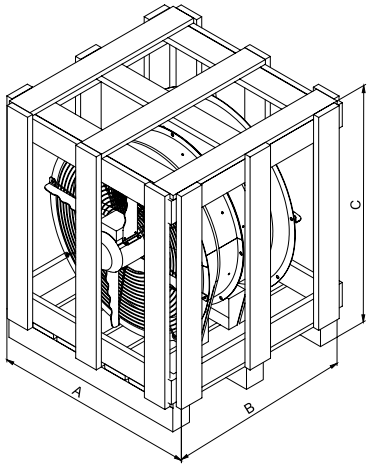




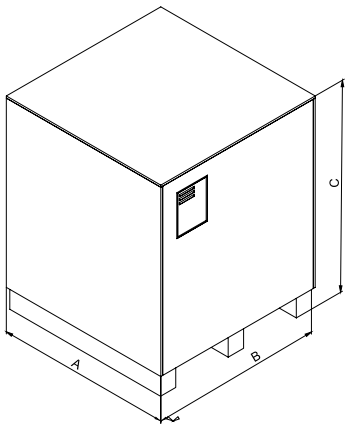
Packaging



Standard			
TYPE	"PALLETS AxBxC [mm]"	"PCS PALLETE"	"WEIGHT [kg]"
470	1300x1300x1650	16	300
470	800x800x1230	3	63
500	800x800x1240	3	73
500	1300x1300x1690	16	355
630	800x800x1316	3	94
630	1600x1600x1346	12	382
630	1600x1240x1716	8	268
710	950x950x993	2	109
710	950x950x489	1	59
800	950x950x1110	2	145
800	950x950x574	1	77
1000	1300x1200x1298	2	242
1000	1300x1200x720	1	125
1250	1600x1240x1710	2	357
1250	1600x1240x750	1	193



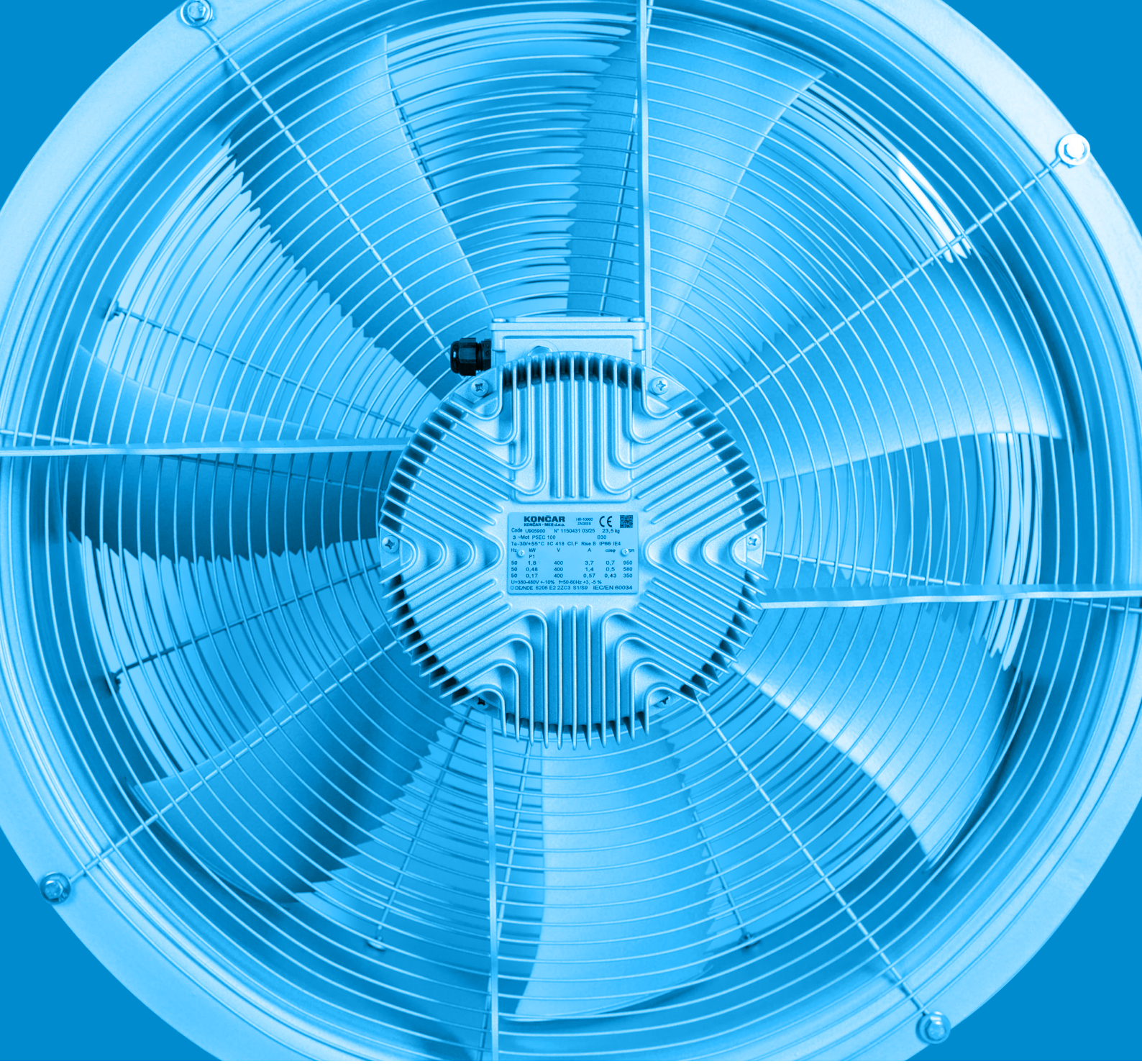
Wooden frame			
TYPE	"PALLETS AxBxC [mm]"	"PCS PALLETE"	"WEIGHT [kg]"
710	1000x1000x1160	2	135
710	1000x1000x670	1	79
800	1000x1000x1160	2	171
800	1000x1000x670	1	97
1000	1300x1200x1360	2	274
1000	1300x1200x815	1	153
1250	1600x1240x1780	2	429
1250	1600x1240x845	1	248



Wooden box			
TYPE	"PALLETS AxBxC [mm]"	"PCS PALLETE"	"WEIGHT [kg]"
710	1000x1000x1160	2	135
710	1000x1000x670	1	79
800	1000x1000x1160	2	171
800	1000x1000x670	1	97
1000	1300x1200x1360	2	274
1000	1300x1200x815	1	153
1250	1600x1240x1780	2	429
1250	1600x1240x845	1	248
710	950x950x489	1	59
800	950x950x1110	2	145
800	950x950x574	1	77
1000	1300x1200x1298	2	242
1000	1300x1200x720	1	125
1250	1600x1240x1710	2	357

OTHER PRODUCTS

Three phase electric motors	IEC standards Sizes 56-315 Powers up to 200 kW IE2 / IE3 / IE4 efficiency Aluminum or cast iron housing Electric motors with mounted brake Marine industry certificates Multi speed electric motors for the fans
Single phase motors	Up to size IEC 100 Powers up to 2,5 kW With single or dual capacitor configurations
ATEX electric motors **PROTECTION ENCLOSURE „d“ – AT series**	**Standard:** II 2G Ex db eb IIC Gb T4 **Size:** up to 315 **Power:** up to 200 kW **Options:** II 2G Ex db eb IIC Gb T4/T3 /T5/T6 Motor housing in “d”, terminal box in “e” II 2G Ex db IIC T4/T3 Motor housing and terminal box in “d” Without terminal box with cable gland and cable II 2D Ex tb IIIC Db T130 °C / T160 °C P6x (Zone 21) For dust in series 5 and 7 I M2 Ex db I Series 7 for surface mining
INCREASED SAFETY „e“ – AZS SERIES	II 2G Ex eb IIC Gb T3/T4 (Zone 1) II 2D Ex tb IIIC Db IP6x T130, (Zone21) **Size:** up to 112 **Powers:** up to 3,6 kW
NON SPARKING DEVICES „n“ for zones 2 and 22 – AZN series	II 3G Ex ec IIIC Gc T3,T4 (Zone 2); II 3D Ex tc IIIC Dc IP5x T135 °C (Zone 22) **Size:** up to 315 **Powers:** up to 3,6 kW For gas and dust
ADDITIONAL OPTIONS	Custom voltages and frequencies UL/CSA, according to NEMA standards BV, RINA, DNV, GL and other marine certificates Special flanges and shafts Special terminal box mounting arrangements (or without terminal box) Special design according to customer request IP56, IP65 and IP66 mechanical protection Insulation class H (standard F) Tropicalized winding and winding heaters S2-S10 duty types Frequency inverter driven ATEX motors (5-87Hz)
OTHER FAN TYPES - AXIAL FANS	Sizes: 315 – 1600 mm Air flow up to 70m3/s Static air pressure up to 1400 Pa Direct or belt driven ATEX and marine versions available
CENTRIFUGAL FANS	Sizes: 250 – 1120 mm Air flow up to 25m3/s Static air pressure up to 10000 Pa Direct or belt drive ATEX and marine versions available



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