Wind Engineering

WESPA-750KW Wind Turbine

IEC Class II

A robust and proven turbine with over 10 years of operational experience

WESPA 750KW, Background A Robust and Proven Turbine

The WESPA 750KW turbine

The 750kW turbine has over 100 installations and has been in operation for over 10 years; demonstrating continued demand as a safe investment across a wide range of projects and wind conditions based on its track record of proven reliability, performance and low operating costs.

The WESPA 750kW is Active Stall Regulated (ASR) Wind Turbine with a rotor diameter of 47m. The turbine is characterized by simplicity in terms of its design and usage of proven technology, resulting in low maintenance costs. Given the on-going trend for higher capacity machines, the WESPA 750kW is perfectly positioned for wind farms at locations where demand for electricity is moderate or where bigger turbines are simply not an option due to issues such as planning or access restrictions.

Full service and maintenance contract :

The WESPA 750kW wind turbine is offered with an additional full service and maintenance contract covering components, labour and machine availability for up to 15years, minimizing risks to the client.

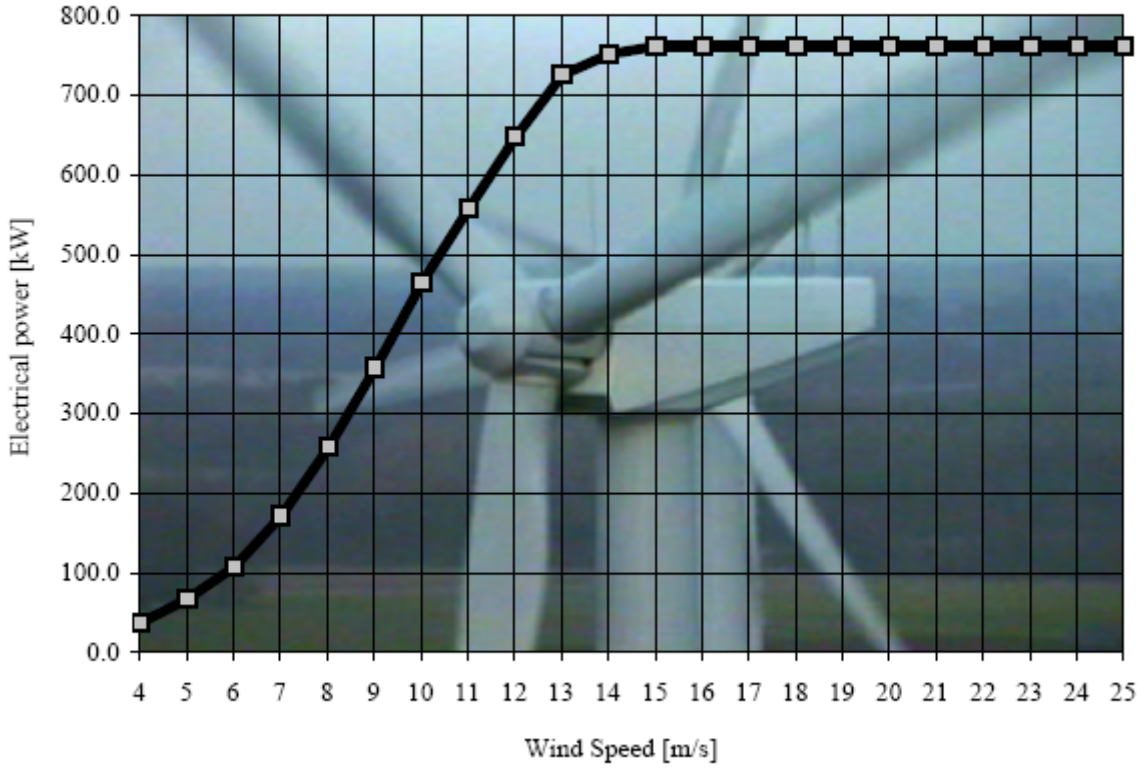
Certification and power curve measurement :

WESPA 750KW turbine is certified as per IEC 61400-1 Turbine Class.

Power curve WESPA 750kW Specifications:

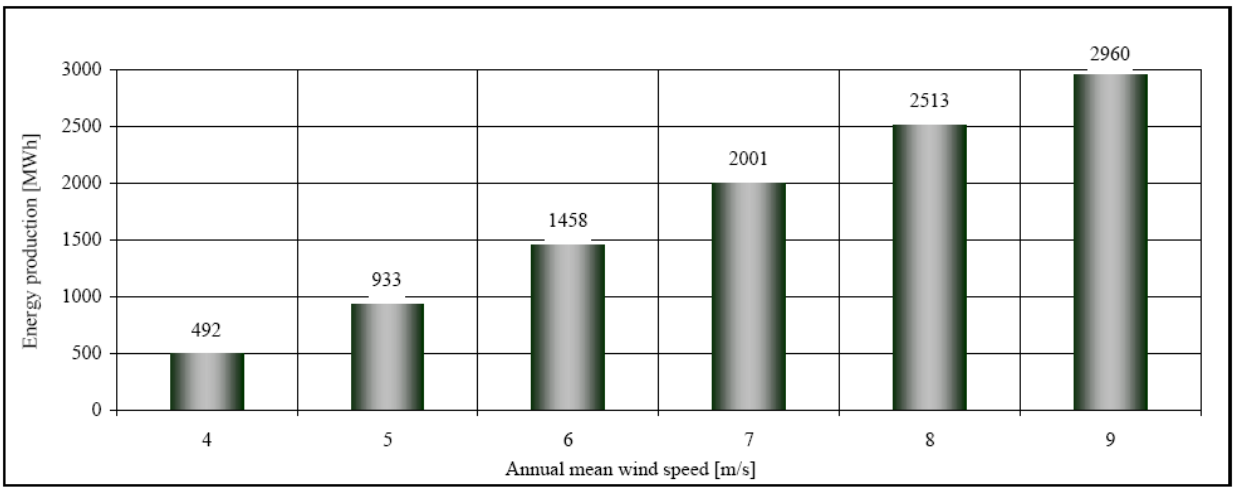
The power curve is for our 750 kW turbine, with a rotor diameter of 47, double generator and featuring Active Stall Regulation. A system that among others compensate for the natural variations of the stall level due to variations in air density and pollution of the blades.

The power curve is valid for : 1.225 kg/m3 air density, clean blades and undisturbed horizontal indflow.



Wind Speed [m/s]	Elect. Power [kW]
3	4
4	25
5	55
6	96
7	160
8	246
9	345
10	453
11	546
12	635
13	714
14	740
15	750
16	750
17	750
18	750
19	750
20	750
21	750
22	750
23	750
24	750
25	750

The annual energy production is calculated for different annual mean wind speed in hub height.
A Rayleigh wind speed distribution and 100 % availability is assumed



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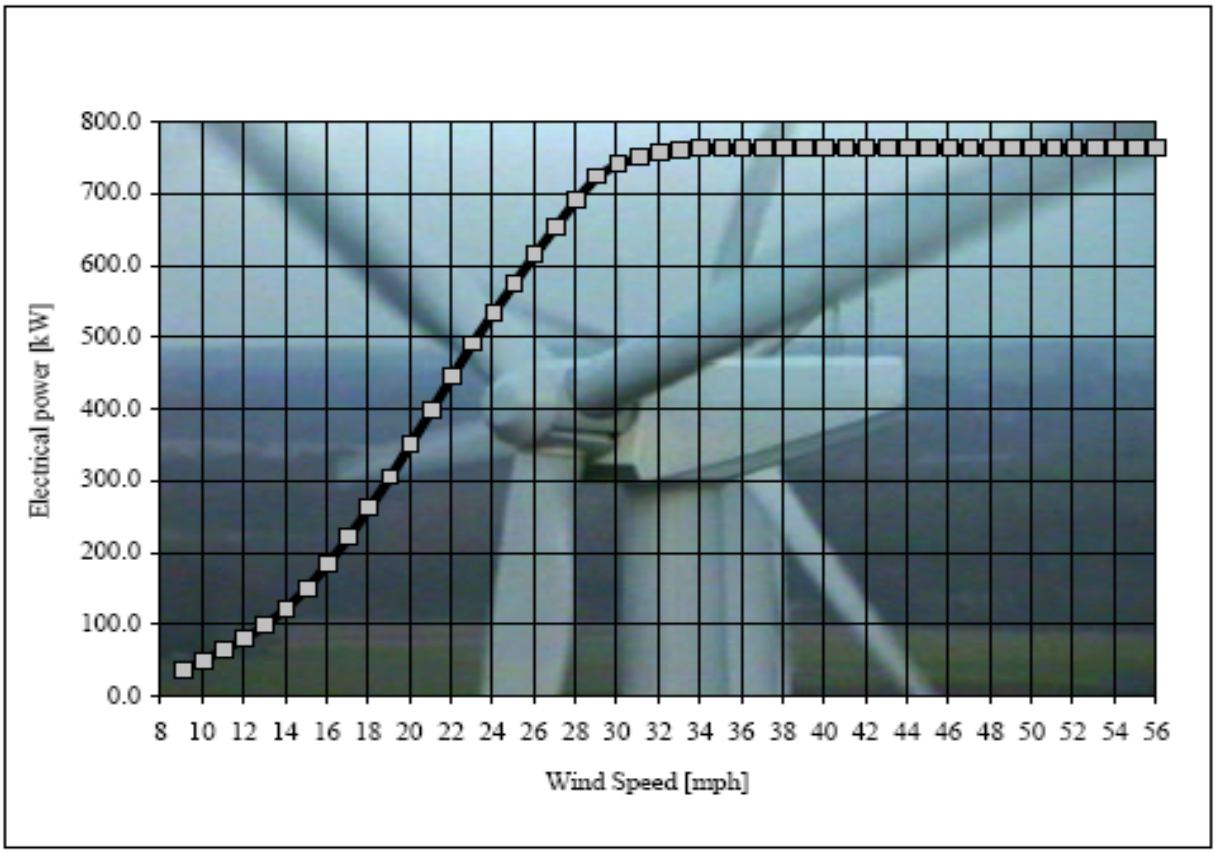

Wind Speed	Elect. Power
[mph]	[kW]
7	6
8	16
9	25
10	38
11	53
12	68
13	86
14	110
15	139
16	172
17	209
18	250
19	293
20	339
21	386
22	434
23	479

24	522
25	563
26	603
27	641
28	679
29	711
30	729
31	737
32	744
33	748
34	750
35	750
36	750
37	750
38	750
39	750
40	750
-	-
-	-
56	750

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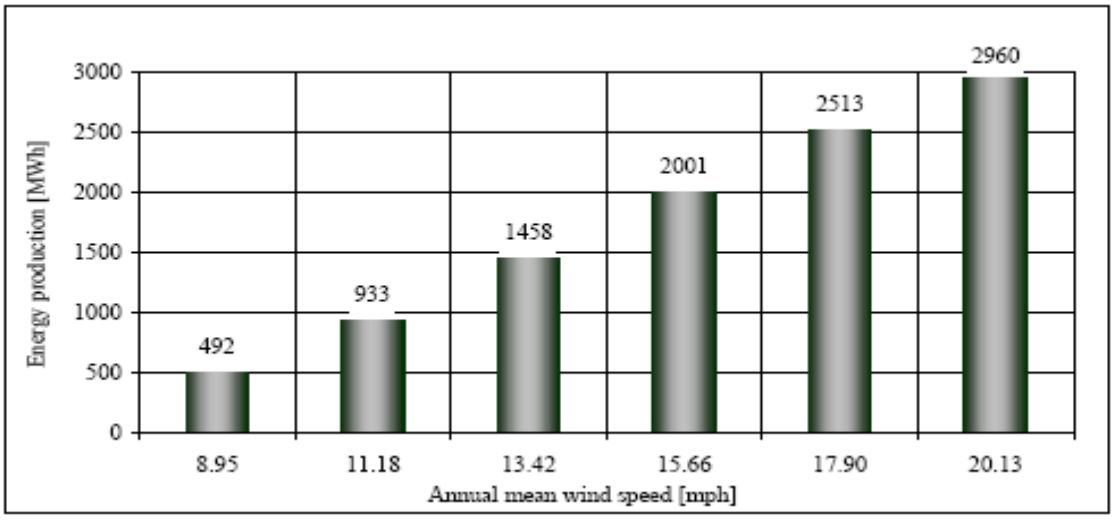

WESPA 750KW, Technical Data A Robust and Proven Turbine

General		
Model	:	750kW
Rated power (nominal electric power)	:	125/600 kW or 180/750 kW.
Rotor diameter	:	47m
Turbine concept	:	Gearbox, with Active Stall power Regulation (ASR)
Rotor		
Type	:	3 bladed, upwind rotor
Diameter	:	47m
Swept area	:	1735m^2
Rotor speed	:	25.5rpm at full load
Power regulation	:	Active Stall Power Regulation
Blade length / type	:	21m
Blade material	:	Fibreglass / epoxy
Tilt angle	:	4°
Coning angle	:	3.0° forward
Blades make	:	LM 21.0 P
Tip speed	:	62 – 63m/s at full load
Lightening Protection	:	Blade Integrated, Direct to Structure
Generator		
Type	:	Asynchronous double wound, 6/4poles induction generator
Configuration	:	Closed, 4-pole, double wound, induction, IP54
Rated Capacity	:	750kw
Speed	:	1000/1500 (50 Hz) or 1200/1800 (60 Hz) rpm synchronous
Loss in generator	:	3 %
Generator cut-in	:	Thyristor controlled gradual cut-in

Gear Box

Type	:	Planetary/Helical
Ratio	:	1 : 59,385
Stages	:	3

Yaw System

Yaw motor	:	4 pcs. With electrical brakes built in
Yaw brakes	:	4 pcs. Hydraulic brakes of disk brake type
Yaw bearing	:	4-point ball bearing

Pitch System

Pitch angle	:	ASR
Pitch bearings	:	4-point ball bearings
Nominal pitch speed	:	7.5 °/sec

Grid connection

Grid connection	:	Direct Grid Tie at 50Hz, 400V

Hub / Tower

Type	:	Conical steel Tubular Tower/Hub
Hub height	:	50/ 55/ 65m hub height
Access to hub	:	Internal ladder support system with Platforms for safe climbing

Special devices

Air brake, normal	:	Pitch to -20°, actuated by the ASR regulation
Air brake, emergency	:	Pitch to -85° fail safe, activated by accumulators in hub
Mechanical brake	:	A fail-safe type disk brake
Brake torque	:	1, 8 times of nominal torque
RPM max. Value	:	1600 (50 Hz) or 1920 (60 Hz) observed on the high-speed shaft
Control System	:	CC–Electronic / Mita Teknik

Operational data

Cut in wind speed	:	3-4 m/s, based on 10min average
Cut out wind speed	:	25 m/s, based on 10min average

Mass Data

Mass of blade	:	(3) 6.600 kg
Mass of hub	:	8.000 kg
Mass of nacelle	:	24.000 kg
Mass total, excl tower	:	38.600 kg
Maximum noise level	:	100dBA