

BONUS MK IV 600-120 44.0 !O!

File C:\WindPRO Data\WTGs2.5\BONUS MK IV 600-120 44.0 !O!.wtg

Company BONUS
 Type/Version MK IV
 Rated power 600,0 kW
 Secondary generator 120,0 kW
 Rotor diameter 44,0 m
 Tower Tubular
 Grid connection 50 Hz
 Origin country DK
 Blade type LM 19,1
 Generator type Two generator
 Rpm, rated power 27,0 rpm
 Rpm, initial 18,0 rpm
 Hub height(s) 40,0; 45,0; 50,0 m
 Maximum blade width 0,00 m
 Blade width for 90% radius 0,00 m
 Valid No
 Creator EMD
 Created 2000-09-25 00:00
 Edited 2000-09-25 00:00



Power curve: WICO 06/98 1.225 25.0 0.00
 Source WIND-consult GmbH WICO 028LK298

Source date	Creator	Created	Edited	Default	Stop windSpeed [m/s]	Air density [kg/m3]	Tip angle [°]	Power control	CT curve type
1998-06-16 00:00	EMD	2001-09-03 09:26	2002-03-08 13:53	Yes	25,0	1,225	0,0	Stall	Standard stall

Power curve according to report no. WICO 028LK298 dated 16-06-2001. Power curve is measured. Bonus recommend not using this power curve.

Power curve

Wind speed [m/s]	3,10	3,53	3,99	4,47	5,00	5,49	6,01	6,52	7,01	7,49	7,98	8,50	9,01	9,48	9,98
Power [kW]	0,00	6,73	17,82	29,89	42,45	52,96	72,06	97,10	127,36	160,71	197,68	237,27	272,63	312,03	349,69
Ce	0,000	0,164	0,301	0,359	0,365	0,344	0,356	0,376	0,397	0,411	0,418	0,415	0,400	0,393	0,378
Wind speed [m/s]	10,51	10,96	11,49	11,99	12,49	13,00	13,49	14,01	14,50	15,00	15,48	15,98	16,50	16,98	17,53
Power [kW]	394,33	434,22	480,19	519,55	550,01	582,73	602,16	609,25	627,72	620,11	613,04	606,15	594,73	590,84	585,04
Ce	0,365	0,354	0,340	0,324	0,303	0,285	0,263	0,238	0,221	0,197	0,177	0,159	0,142	0,130	0,117
Wind speed [m/s]	17,91	18,45	19,00												
Power [kW]	591,76	584,08	571,79												
Ce	0,111	0,100	0,090												

Ct curve

Wind speed [m/s]	1,00	2,00	3,00	4,00	5,00	6,00	7,00	8,00	9,00	10,00	11,00	12,00	13,00	14,00	15,00	16,00	17,00	18,00	19,00	20,00	21,00	22,00	23,00	24,00	25,00	26,00	27,00	28,00	29,00
Ct	0,10	0,10	0,10	0,80	0,82	0,85	0,82	0,78	0,74	0,68	0,62	0,55	0,49	0,43	0,38	0,32	0,28	0,25	0,21	0,20	0,19	0,17	0,16	0,15	0,14	0,13	0,12	0,11	0,10

HP curve comparison

Vmean [m/s]		5	6	7	8	9	10
HP value [MWh]		730	1 167	1 626	2 054	2 437	2 775
WICO 06/98 1.225 25.0 0.00 [MWh]		699	1 126	1 578	2 011	2 398	2 723
Check value [%]		4	4	3	2	2	2

The table shows comparison between annual energy production calculated on basis of simplified "HP-curves" which assume that all WTC's performs quite similar - only specific power loading (kW/m²) and single/dual speed or stall/pitch decides the calculated values. Productions are without wake losses. For further details, ask at the Danish Energy Agency for project report J.nr. 51171/00-0016 or see WindPRO manual chapter 3.5.2. The method is refined in EMD report "20 Detailed Case Studies comparing Project Design Calculations and actual Energy Productions for Wind Energy Projects worldwide", jan 2003. Use the table to evaluate if the given power curve is reasonable - if the check value are lower than -5%, the power curve probably is too optimistic due to uncertainty in power curve measurement.

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