

VESTAS V29 225-50 29.0 !O!

File C:\WindPRO Data\WTGs2.5\VESTAS V29 225-50 29.0 !O!.wtg

Company VESTAS
 Type/Version V29
 Rated power 225,0 kW
 Secondary generator 50,0 kW
 Rotor diameter 29,0 m
 Tower Tubular
 Grid connection 50 Hz
 Origin country DK
 Blade type VESTAS 13
 Generator type Two generator
 Rpm, rated power 40,5 rpm
 Rpm, initial 30,5 rpm
 Hub height(s) 31,5; 35,0; 40,0 m
 Maximum blade width 0,00 m
 Blade width for 90% radius 0,00 m
 Valid No
 Creator EMD
 Created 1999-12-10 00:00
 Edited 1999-12-10 00:00



Power curve: Manufacturer 28-11-1996 1.225 25.00 0.00
 Source Manufacturer 28-11-1996

Source date	Creator	Created	Edited	Default	Stop windSpeed [m/s]	Air density [kg/m3]	Tip angle [°]	Power control	CT curve type
1899-12-30 00:00	EMD	2001-06-20 17:34	2000-11-15 14:20	No	25,0	1,225	0,0	Pitch	Standard pitch

Guaranteed power curve according to Item no.: 941520.R4. Measured power curve available from manufacturer on request.

Power curve	Wind speed [m/s]	3,00	3,50	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
Power [kW]		0,00	2,10	7,10	20,50	38,30	61,90	92,20	128,00	165,00	196,00	216,00	223,00	225,00	225,00	225,00
Ce		0,000	0,121	0,274	0,405	0,438	0,446	0,445	0,434	0,408	0,364	0,309	0,251	0,203	0,165	0,136

Power curve	Wind speed [m/s]	17,00	18,00	19,00	20,00	21,00	22,00	23,00	24,00	25,00
Power [kW]		225,00	225,00	225,00	225,00	225,00	225,00	225,00	225,00	225,00
Ce		0,113	0,095	0,081	0,070	0,060	0,052	0,046	0,040	0,036

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
Ct		0,10	0,10	0,10	0,80	0,82	0,84	0,79	0,72	0,66	0,59	0,53	0,46	0,40	0,33	0,28	0,23	0,20	0,16	0,13	0,12	0,12	0,11	0,11	0,10

HP curve comparison

Vmean [m/s]	5	6	7	8	9	10
HP value [MWh]	324	505	683	848	996	1 129
Manufacturer 28-11-1996 1.225 25.00 0.00 [MWh]	327	509	692	860	1 005	1 124
Check value [%]	-1	-1	-1	-1	-1	0

The table shows comparison between annual energy production calculated on basis of simplified "HP-curves" which assume that all WTG'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.

