

VENSYS 112 2500 112.0 !O!

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Company VENSYS Certified IEC IIIa, DIBt WZ 2
 Type/Version 112
 Rated power 2 500,0 kW
 Secondary generator 0,0 kW
 Rotor diameter 112,0 m
 Tower Tubular
 Grid connection 50 Hz



Origin country DE
 Blade type LM 48.8P
 Generator type Variable
 Rpm, rated power 13,6 rpm
 Rpm, initial 6,5 rpm
 Hub height(s) 93,5; 140,0 m
 Maximum blade width 0,00 m
 Blade width for 90% radius 0,00 m
 Valid Yes
 Creator EMD
 Created 2013-11-14 11:20
 Edited 2013-11-14 11:20

Power curve: Level 0 - Calculated - - 11/2013

Source VENSYS

Source date	Creator	Created	Edited	Default	Stop windSpeed [m/s]	Air density [kg/m3]	Tip angle [°]	Power control	CT curve type
2013-11-14 11:21	EMD	2013-11-14 11:21	2013-11-14 11:22	Yes	25,0	1,225	0,0	Pitch	User defined

PC_VENSYS112_P25_SI55V2_EN

Power curve

Wind speed [m/s]	3,00	3,50	4,00	4,50	5,00	5,50	6,00	6,50	7,00	7,50	8,00	8,50	9,00	9,50	10,00	10,50	11,00
Power [kW]	41	90	151	224	314	424	555	708	886	1 088	1 320	1 574	1 839	2 088	2 278	2 402	2 463
Ce	0,249	0,348	0,391	0,408	0,417	0,422	0,426	0,427	0,428	0,428	0,427	0,425	0,418	0,404	0,377	0,344	0,307

Wind speed [m/s]	11,50	12,00	12,50	13,00	25,00
Power [kW]	2 488	2 498	2 497	2 499	2 500
Ce	0,271	0,240	0,212	0,189	0,027

Ct curve

Wind speed [m/s]	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
Ct	1,095	0,885	0,804	0,804	0,805	0,805	0,791	0,699	0,449	0,331	0,255	0,202	0,164	0,135	0,114	0,097	0,083

Wind speed [m/s]	20,00	21,00	22,00	23,00	24,00	25,00
Ct	0,072	0,063	0,056	0,050	0,045	0,040

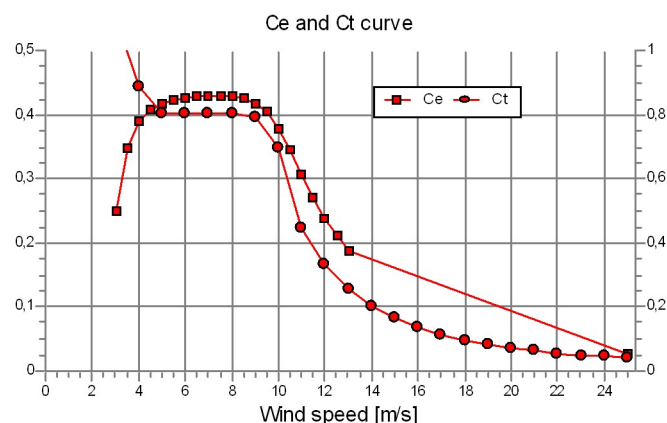
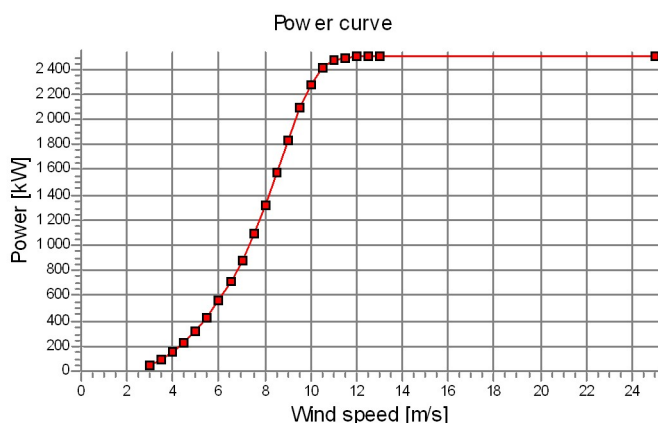
HP curve comparison

Vmean	[m/s]	5	6	7	8	9	10
HP value	[MWh]	4 834	7 163	9 328	11 200	12 743	13 953

Level 0 - Calculated - - 11/2013	[MWh]	4 663	6 948	9 098	10 971	12 518	13 726
Check value	[%]	4	3	3	2	2	2

The table shows comparison between annual energy production calculated on basis of simplified "HP-curves" which assume that all WTGs 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. Updated in WindPRO 2.8, Feb. 2012, see details in manual!



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Noise: Level 0 - Estimated - - 08-2012

Source Manufacturer

Source date	Creator	Created	Edited	Default
2012-08-06 13:33	EMD	2012-08-06 14:59	2012-08-16 13:37	No

Hub height [m]	Wind speed [m/s]	Lwa,ref [dB(A)]	Wind speed dependency [dB(A)/m/s]	Pure tones
All	95%	106,0		1,0 No

Estimated

Visual data

Name Steel Tower 93,5m

Source Manufacturer

Hub height [m]	Source date	Creator	Created	Edited	Default
100,000	2011-11-16 13:41	EMD	2012-07-30 16:39	2012-08-16 14:29	Yes

Tower

Height [m]	Bottom diameter [m]	Top diameter [m]
17,2	3,7	3,3
22,4	4,3	3,7
20,6	4,3	4,3
17,7	4,3	4,3
11,9	4,3	4,3

Cabin

Distance cabin front (rotor) to tower center: 32 %

Shape	Height front [m]	Height back [m]	Width front [m]	Width back [m]	Length bottom [m]	Length top [m]	Front offset [m]	Rear offset [m]
Box	2,50	0,20	4,06	3,74	1,25	1,25	0,50	1,45
Box	3,14	2,50	4,07	4,06	0,81	0,81	0,25	0,50
Box	3,59	3,14	4,30	4,07	3,16	3,16	0,25	0,25
Box	3,60	3,58	4,30	4,30	1,00	1,00	0,25	0,25
Box	3,60	3,60	4,30	4,30	0,94	0,94	0,25	0,25
Box	3,37	3,60	4,30	4,30	0,63	0,63	0,25	0,25
Cylinder	4,93	4,93	4,93	4,93	1,46	1,46	0,25	0,25

Rotor and hub

Distance cabin front (rotor) to tower center: 32 %

Number of blades

3

Blade position (center to cabin)

1,85 m

Chord max

3,85 m

Rotor position relative to tower

Up wind

Hub length (cabin to spinner tip)

3,71 m

Spinner length (0 = no spinner)

1,86 m

Hub diameter (2xradius from hub center to blade root)

2,00 m

Spinner max diameter

4,00 m

Shaft radius

4,00 m

Hub tilt angle

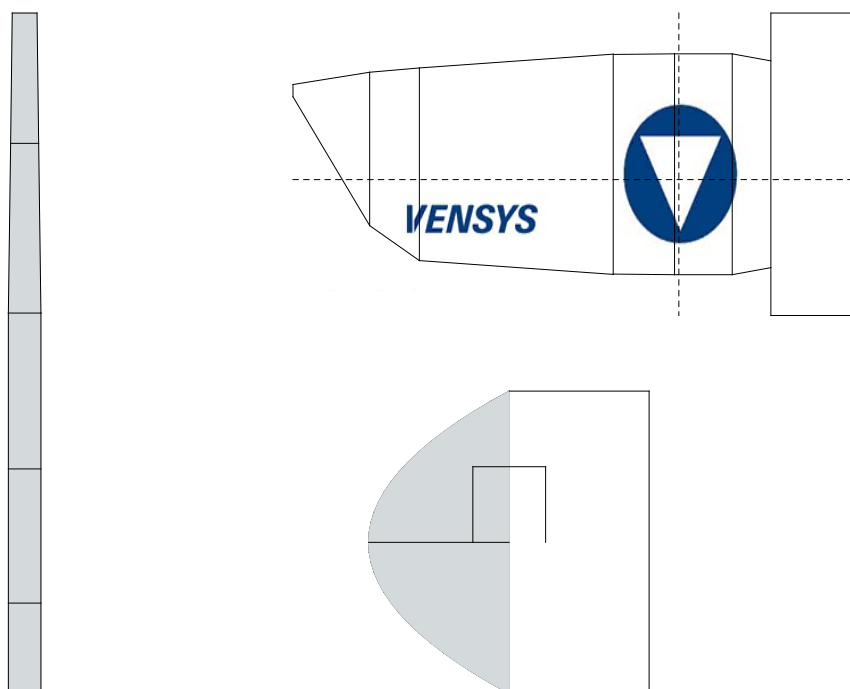
3,0 °

Blade cone angle

0,0 °

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Visual data

Name Tubular Tower 140m
Source Manufacturer

Hub height [m]	Source date	Creator	Created	Edited	Default
140,000	2012-08-07 13:41	EMD	2012-07-30 16:39	2012-08-16 14:29	No

Tower

Height [m]	Bottom diameter [m]	Top diameter [m]
19,9	3,8	3,3
16,5	4,3	3,8
17,4	4,3	4,3
2,8	4,4	4,3
19,0	4,4	4,4
19,0	5,2	4,4
3,8	5,3	5,2
3,8	5,5	5,3
34,2	9,6	5,5

Cabin

Distance cabin front (rotor) to tower center: 32 %

Shape	Height front [m]	Height back [m]	Width front [m]	Width back [m]	Length bottom [m]	Length top [m]	Front offset [m]	Rear offset [m]
Box	2,50	0,20	4,06	3,74	1,25	1,25	0,50	1,45
Box	3,14	2,50	4,07	4,06	0,81	0,81	0,25	0,50
Box	3,59	3,14	4,30	4,07	3,16	3,16	0,25	0,25
Box	3,60	3,58	4,30	4,30	1,00	1,00	0,25	0,25
Box	3,60	3,60	4,30	4,30	0,94	0,94	0,25	0,25
Box	3,37	3,60	4,30	4,30	0,63	0,63	0,25	0,25
Cylinder	4,93	4,93	4,93	4,93	1,46	1,46	0,25	0,25

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Rotor and hub

Distance cabin front (rotor) to tower center: 32 %

Number of blades 3

Blade position (center to cabin) 1,85 m

Chord max 3,95 m

Rotor position relative to tower Up wind

Hub length (cabin to spinner tip) 3,71 m

Spinner length (0 = no spinner) 1,86 m

Hub diameter (2xradius from hub center to blade root) 2,00 m

Spinner max diameter 4,00 m

Shaft radius 4,00 m

Hub tilt angle 3,0 °

Blade cone angle 0,0 °

