



DET NORSKE VERITAS

TYPE CERTIFICATE

Vestas V112-3.3 MW IEC 2A

TC-230903-A-0 Rev. 1
Type Certificate number

2013-12-12
Date of issue

Manufacturer:
Vestas Wind Systems A/S
Hedeager 44
8200 Aarhus N

Valid until: 2018-12-12

Conformity evaluation has been carried out according to **IEC 61400-22: 2010 "Wind Turbines - Part 22: Conformity Testing and Certification"**. This certificate attests compliance with IEC 61400-1 ed. 3: 2005 incl. A1 and IEC 61400-22 concerning the design and manufacture .

Reference documents:

Final Evaluation Report:	PD-2309-18CGY6P-17 Rev. 1
Design Basis Conformity Statement:	DB-230903-A-1
Design Evaluation Conformity Statement:	DE-230903-A-0
Type Test Conformity Statement:	TT-230903-A-0
Manufacturing Conformity Statement:	MC-230903-A-0

Wind Turbine specification :

IEC WT class: S (IIA/IIIA). For further information see Appendix 1 of this Certificate.

Date: 2013-12-12

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PROD Reg. no. 7031

Date: 2013-12-12

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APPENDIX 1 - WIND TURBINE TYPE SPECIFICATION

General:

IEC WT class acc. to IEC 61400-1 ed. 3: 2005 incl. A1:	IIA (HH 84, 94 m) IIIA (HH 119 m) except for temperature ranges
Rotor diameter:	112 m
Rated power:	3300 kW
Rated wind speed V_r :	11.4 m/s
Hub height(s):	84, 94, 119 m
Operating wind speed range V_{in} - V_{out} :	3 – 25 m/s
Design life time:	20 years

Wind conditions:

V_{ref} (hub height):	42.5 m/s (IEC IIA) 37.5 m/s (IEC IIIA)
V_{ave} (hub height):	8.5 m/s (IEC IIA) 7.5 m/s (IEC IIIA)
I_{ref}	16 %
Mean flow inclination:	8°

Electrical network conditions:

Normal supply voltage and range:	3 x 650 V 10.5-35 kV \pm 10 %
Normal supply frequency and range:	50 or 60 Hz \pm 6 %
Voltage imbalance:	IEC 61000-3-6 TR max 2 %
Maximum duration of electrical power network outages:	Two 3 months periods
Number of annual electrical network outages:	Max 52 per year

Other environmental conditions (where taken into account):

Air density:	1.225 kg/m ³
Standard temperature:	Normal: -20 °C to +45 °C Extreme: -40 °C to +50 °C
Low temperature option:	Normal: -30 °C to +45 °C Extreme: -40 °C to +50 °C
Relative humidity:	100% (max 40% of time) and 90% (rest of life time)
Solar radiation:	1000 W/m ²
Salinity:	ISO 9223: Airborne salinity S3 (Offshore conditions)
Description of lightning protection system:	Designed acc. to IEC 61400-24, Protection Level 1 and IEC 61312-1

**Main components:**

Blade type:	Vestas, 55 m, Airfoil shells bonded to a supporting beam
Gear box type:	Winergy, PZAB 3530.1, i=112.6
Main bearing:	SKF 240/950 CA/C3LW33VQ113
Generator type:	3-phase IG, Siemens, JGWA-560LM-06A
Transformer type:	10.5-35 kV, SGB and Siemens, 50 and 60 Hz
Yaw gear type:	Bevel gear, Liebherr and Comer
Service lift:	Avanti Shark or Power Lift Sherpa-SD
Internal crane/hoist:	Star 071/95 Liftket
	Lifting capacity: 800 kg
Controller	VMP Global