

TYPE CERTIFICATE

Certificate No.:
TC-DNVGL-SE-0074-00373-7

Issued:
2016-12-09

Valid until:
2021-11-09

Issued for:

Envision EN115 2.3MW IEC IIIA

Specified in Annex 1

Issued to:

Envision Energy (Jiangsu) Co., Ltd.

No. 3 Shenzhuang Road, Lingang New City Low-Carbon Industrial Park, Jiangyin,
Jiangsu, 214443 P.R. China.

According to:

IEC 61400-22:2010, Wind turbines – Part 22: Conformity Testing and Certification

Based on the document:

DB-DNVGL-SE-0074-01801-3
DE-DNVGL-SE-0074-01802-5
ME-DNVGL-SE-0074-01803-5
TT-DNVGL-SE-0074-01804-3
20628-CC-02-1

Design Basis Conformity Statement, dated 2016-09-14
Design Evaluation Conformity Statement, dated 2016-12-09
Manufacturing Evaluation Conformity Statement, dated 2016-11-28
Type Testing Conformity Statement, dated 2016-09-14
Component Certificate issued by Bureau Veritas Certification
France: Rotor blade LM 56.8 P, dated 2016-05-24
(DNV GL takes no responsibility for the work covered by this component certificate)

CC-DNVGL-SE-0074-01249-1

Component Certificate: Gearbox Winergy PEAB 4450, dated 2016-07-06

FER-DNVGL-SE-0074-00373-6

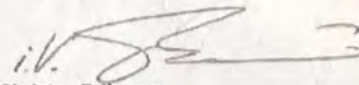
Final Evaluation Report, dated 2016-12-09

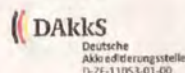
Changes of the system design are to be approved by DNV GL.



Hamburg, 2016-12-09

For DNV GL Renewables Certification

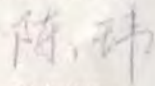

Christer Eriksson
Service Line Leader Type Certification



By DAkkS according DIN EN IEC/ISO 17065
accredited Certification Body for products. The
accreditation is valid for the fields of certification
listed in the certificate.

Hamburg, 2016-12-09

For DNV GL Renewables Certification


Dr. Wei Chen
Senior Project Manager

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General

IEC WT class
 Power regulation
 Rotor orientation
 Rotor tilt
 Cone angle
 Rated power
 Rated wind speed v_r
 Rotor diameter
 Hub height
 Hub height operating wind speed range $v_{in} - v_{out}$
 Design life time
 Software version

IEC IIIA -
 pitch-controlled
 upwind
 6 °
 2.6 °
 2300 kW
 9.4 m/s
 115.9 m
 90.324 m
 3 to 20 m/s
 20 years
 ExtCon_Version EN23_LM115
 BH 2015R1.112 &
 Para_Version EN23_LM115
 BH 2015R1.DB121

Wind conditions

Characteristic turbulence intensity I_{ref} at $v_{hub} = 15$ m/s
 Annual average wind speed at hub height v_{ave}
 Reference wind speed v_{ref}
 Mean flow inclination
 Hub height extreme wind speed v_{e50}

0.16
 7.5 m/s
 37.5 m/s
 8 °
 52.5 m/s

Electrical network conditions

Normal supply voltage and range
 Normal supply frequency and range
 Maximum duration of electrical power network outages
 Number of electrical network outages

690 V ($\pm 10\%$)
 50 Hz ($\pm 5\%$)
 6 h acc. To IEC 61400-1
 20 per year acc. To IEC
 61400-1

Other environmental conditions

Normal temperature ranges
 Extreme temperature range
 Relative humidity of the air
 Air density
 Description of lightning protection system

-10 °C to 40 °C
 -20 °C to 50 °C
 Up to 95%
 1.225 kg/m³
 Designed acc. to IEC 61400-
 24, Protection Level I



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Major components

Blade	Type Manufacturer Blade length Number of blades Specification	LM 56.8 P LM Wind Power 56800 mm $\pm 0.1\%$ 3 BS-00350/A6
Blade bearing	Type Manufacturer Drawing / Data sheet / Part no.	Rothe Erde 46-94251 Rothe Erde 092.50.2418/00.050116.1
Pitch system	Type Manufacturer Controller type Motor / Actuator	C081-300-005 MOOG MSC-R PMC6-L45/G970-E40
Main shaft	Type Material Drawing / Data sheet / Part no.	Flanged shaft Forged steel ENV22110002, Rev. 0
Main bearing	Type Manufacturer Drawing / Data sheet / Part no.	Spherical roller bearing SKF 240/750ECA/CNLW 33
Gearbox	Type Manufacturer Gear ratio Drawing / Data sheet / Part no.	One planetary stage and two helical gear stages Winergy 1:80,861 6407854, Rev. F
Yaw system	Drive type Drive manufacturer Drawing / Data sheet / Part no. Bearing type Bearing manufacturer Drawing / Data sheet / Part no. Gear type Gear manufacturer Drawing / Data sheet / Part no. Brake type Brake manufacturer Drawing / Data sheet / Part no.	4 stage planetary helical gear NGC FDX206B08-02-00R1 plain bearing JHS VA001306 & VA001287 helical gear Rothe Erde 401.22.1599.042.03.0132 motor brake JHS FDX206B08-02-00R1
Generator	Type Manufacturer Rated power Rated frequency Rated speed Rated voltage Rated current Insulation class Degree of protection	AML 560M6A BAFT Doubly-fed induction generator (DFIG) ABB 2600 kW 50 Hz 1200 rpm 690 V / 394 V (Stator/Rotor) 1822 A / 704 A (Stator/Rotor) F IP 54/23 (Machine/Slipring)



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	Drawing / Data sheet / Part no.	3GYB3843180, Rev.B
	Type	JFRA-560MQ-06A Doubly-fed induction generator (DFIG)
	Manufacturer	Siemens
	Rated power	2600 kW
	Rated frequency	50 Hz
	Rated speed	1200 rpm
	Rated voltage	690 V / 690 V (Stator/Rotor)
	Rated current	1800 A / 640 A (Stator/Rotor)
	Insulation class	F
	Degree of protection	IP 54/23 (Machine/Slipring)
	Drawing / Data sheet / Part no.	AGT395607-4A, Rev.AA
Converter	Type	ENVERT-1DA-2.X
	Manufacturer	Envision
	Rated voltage	690 V
	Rated current	grid side: 450 A generator side: 900 A
	Degree of protection	Power cabinet: IP20 Control cabinet: IP54 Drive cabinet: IP20
	Drawing / Data sheet / Part no.	YJ11110005, Rev. 0
Tower	Type	Tubular steel tower
	Number of sections	4
	Length	87.3 m
	Drawing / Data sheet / Part no.	EN25-110-90HH-V03
Manuals	Maintenance manual	PRC-2MP0011 rev 1.1
	Operation manual	PRC-2CS0009 rev 1.1
	Transport manual	2LT0007 rev A 2LT0006 rev A 2LT0008 rev A 2LT0009 rev A
	Installation	PRC-2RD0037 rev 1.3 TS-0004950 rev B
	Commissioning manual	PRC-3IM001110 rev D

