

STATE OF NEW YORK
PUBLIC SERVICE COMMISSION

Application of Baron Winds LLC for a Certificate of Environmental Compatibility and Public Need to Construct a Major Electric Generating Facility in the Towns of Cohocton, Dansville, Fremont and Wayland, Steuben County, NY.	Case No. 15-F-0122
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COMPLIANCE FILING OF BARON WINDS LLC
CERTIFICATE CONDITION NO. 30
TYPE CERTIFICATES and CONFORMITY STATEMENT

Type Certificate

TC – 151103, Rev. 2

This certificate is issued to

Gamesa Innovation and Technology, S.L.U.
GIT Sarriguren Oficinas (I+D)
Avda. Ciudad de la Innovación 2
31621 Sarriguren (Navarra)
Spain

for the wind turbine

G114 2.5 MW / 2.625 MW IEC-IIA HH 68 m, 80 m, 93 m and 125 m, 50/60 Hz

This certificate attests compliance with

IEC 61400-1

"Wind turbines - Part 1: Design requirements", Edition 3.0, 2005-08
- Wind Turbine Class IIA

concerning the design and manufacture. It is based on the following reference documents:

STC – 151113	Design Evaluation Conformity Statement	DEWI-OCC, Rev. 2, 2016-10-24
STC – 151103	Manufacturing Conformity Statement	DEWI-OCC, Rev. 2, 2016-10-27
STC – 151104	Type Test Conformity Statement	DEWI-OCC, Rev. 2, 2016-10-27
STC – 160907	Type Characteristics Conformity Statement	DEWI-OCC, Rev. 1, 2016-10-27
R101196-12	Final Evaluation Report	DEWI-OCC, Rev. 2, 2016-10-27

The conformity evaluation was carried out according to IEC 61400-22, "Wind turbines - Part 22: Conformity testing and certification", Edition 1.0, 2010-05.

This Type Certificate is valid for the configurations provided in the annex of this certificate.

The main wind turbine characteristics are specified in the annex of the following conformity statement:

STC – 151113	Design Evaluation	DEWI-OCC, Rev. 2, 2016-10-24
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Changes in the system design or the manufacturer's quality system are to be approved by DEWI-OCC. Without approval, this certificate loses its validity.

This type certificate is valid until: 2021-10-26

Cuxhaven, 2016-10-27

A handwritten signature in blue ink, reading "Kai Grigutsch".

Kai Grigutsch, M.Sc.

Head of DEWI-OCC

Certification Body for Wind Turbines

CONFORMITY STATEMENT

Statement No.:
DE-DNVGL-SE-0074-04352-2

Issued:
2019-09-30

Issued for:

Design Evaluation

of

Vestas V150-4.0 MW / V150-4.2 MW

Specified in Annex 1

Issued to:

Vestas Wind Systems A/S

Hedeager 42
8200 Aarhus N
Denmark

According to:

DNVGL-SE-0074:2018-01 Type and component certification of wind turbines according to IEC 61400-22

Based on the document:

ER-DE-DNVGL-SE-0074-04352-2 Evaluation Report, dated 2019-09-30

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

Hellerup, 2019-09-30

For DNV GL Renewables Certification



Bente Vestergaard
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, 2019-09-30

For DNV GL Renewables Certification



Ramakrishna Parasarampuram
Project Manager

The accredited certification body is Germanischer Lloyd Industrial Services GmbH, Brooktorkai 18, 20457 Hamburg.

DNV GL Renewables Certification is the trading name of DNV GL's certification business in the renewable energy industry.

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CONFORMITY STATEMENT – ANNEX 1

Statement No.: DE-DNVGL-SE-0074-04352-2

Page 2 of 5

Basic standard

IEC 61400-1 ed. 3 + A1

General

Wind Turbine class

IEC 3B (V150-4.0 MW)

IEC S (V150-4.2 MW)

Power regulation

pitch-controlled

Rotor orientation

Upwind

Rotor tilt

6.0°

Cone angle

-5.5°

Rated power

4000 kW / 4200 kW

Rated wind speed v_r

9.7 m/s (V150-4.0 MW)

9.9 m/s (V150-4.2 MW)

Rotor diameter

150 m

Hub height(s)

105 m

Hub height operating wind speed range $v_{in} - v_{out}$

3 m/s – 24.5 m/s (with the following HWO wind speeds:

 $V_{HWO1} = 17.5$ m/s $V_{HWO2} = 21.5$ m/s $V_{HWO3} = 24.5$ m/s)

Design life time

20 years

Software version

2017.09

Wind conditions

Turbulence intensity I_{ref} at $v_{hub} = 15$ m/s

0.14

Annual average wind speed at hub height v_{ave}

7.5 m/s (V150-4.0 MW)

7.0 m/s (V150-4.2 MW)

Reference wind speed v_{ref}

37.5 m/s

Mean flow inclination

8°

Hub height extreme wind speed v_{e50}

52.5 m/s

Electrical network conditions

Normal supply voltage and range

720 V

Normal supply frequency and range

50 or 60 Hz ± 6 % Hz

Voltage imbalance

IEC 61000-3-6 TR max 2 %

Maximum duration of electrical power network outages

Two 3 months periods

Number of electrical network outages

Max 52 per year

Other environmental conditions

Standard temperature ranges

Normal: -20°C to +45°C*

Extreme: -40°C to +45°C

(*de-rating strategy above

+30°C for V150-4.0 MW

*de-rating strategy above

+20°C for V150-4.2 MW)

100% (max 40% of time)

and 90% (rest of life time)

Relative humidity of the air

1.225 kg/m³ (for normal operation)1.273 kg/m³ (for low temperature operation)

Air density

1000 W/m²

Solar radiation

Description of lightning protection system

Designed acc. to IEC 61400-24, Protection Level 1 and IEC 61312-1

CONFORMITY STATEMENT – ANNEX 1

Statement No.: DE-DNVGL-SE-0074-04352-2

Page 3 of 5

Major components

Blade	Type	Hybrid / Infused
	Manufacturer	Vestas Wind Systems A/S
	Material	Carbon fibre reinforced epoxy and glass fibre reinforced epoxy
	Blade length	73.65 m
Blade Aero Addons	Number of blades	3
	Drawing / Data sheet / Part no.	0069-0345, Rev. 1
	Type	STE's and RVG's
	Manufacturer	Vestas Wind Systems A/S
Blade bearing	Drawing / Data sheet / Part no.	STE Kit: 0072-2639, Rev. 0
	TPS no.	RVG: 0073-5893, Rev. 0
	Type	Triple row cylinder bearing
	Drawing / Data sheet / Part no.	29110524, Rev. 3
Pitch system	TPS no.	0023-3088, Rev. 5
	Type	Hydraulic power unit
	Manufacturer	LJM/HINE/Liebherr/Hengli
	Hydraulic Cylinder (140/90x922)	29111326, Rev. 1
Main shaft	Type	Pitch Actuation Module
	Manufacturer	Vestas Wind Systems A/S
	Drawing / Data sheet / Part no.	29111583, Rev. 1
	Type	Cast iron
Main bearing	Material	EN-GJS-500-14
	Drawing / Data sheet / Part no.	29085300, Rev. 4
	Type	Spherical Roller Bearing
	Manufacturer	FAG
Gearbox	Drawing / Data sheet / Part no.	F-582562.PRL-WPO 000
	Type	2 stage planetary and helical stage gearbox
	Manufacturer	ZF (EH1052A)
	Gear ratio	1:143.37
Yaw system	Drawing / Data sheet / Part no.	096-EH1052A001, Rev. A
	Type	2 stage planetary and helical stage gearbox
	Manufacturer	Winergy (PZAB 3580)
	Gear ratio	1:142.76
Yaw system	Drawing / Data sheet / Part no.	A5E45622888A, rev.2
	Drive type	8 x 2.7 kW, 400 V, 50 Hz asynchronous motors
	Drive manufacturer	Lafert
	Drawing / Data sheet / Part no.	MZ10/A4A-55337
Yaw system	Drive type	8 x 3.2 kW, 400 V, 60 Hz asynchronous motors
	Drive manufacturer	Lafert

CONFORMITY STATEMENT – ANNEX 1

Statement No.: DE-DNVGL-SE-0074-04352-2

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	Drawing / Data sheet / Part no.	MZ10/A4A-55338
	Drive type	8 x 2.7 kW, 400 V, 50 Hz asynchronous motors
	Drive manufacturer	ABB
	Drawing / Data sheet / Part no.	3GZF500810-23 A 14 AA 100 A
	Drive type	8 x 3.2 kW, 400 V, 60 Hz asynchronous motors
	Drive manufacturer	ABB
	Drawing / Data sheet / Part no.	3GZF500810-23 A 14 AA 100 A
	Drive type	8 x 2.7 kW, 400 V, 50 Hz asynchronous motors
	Drive manufacturer	Bonfiglioli
	Drawing / Data sheet / Part no.	CD00006614-02
	Drive type	8 x 3.2 kW, 400 V, 60 Hz asynchronous motors
	Drive manufacturer	Bonfiglioli
	Drawing / Data sheet / Part no.	CD00007013-01
	Gear type	Bevel stage and three planetary stages, i = 952.3
	Gear manufacturer	Bonfiglioli
	Drawing / Data sheet / Part no.	I7090T010300
	Gear type	Bevel stage and three planetary stages, i = 935
	Gear manufacturer	Comer
	Drawing / Data sheet / Part no.	N07297_01
	Bearing type	Preloaded sliding bearing, PETP pads
	Bearing manufacturer	Vestas Wind Systems A/S
	Drawing / Data sheet / Part no.	29104726, Rev. 0
Generator	Type	DASG 560/6M, Induction generator
	Manufacturer	Vestas Nacelles Deutschland (VND)
	Rated power	4450 kW
	Rated frequency	74 Hz
	Rated speed	1485 rpm
	Rated voltage	800 V
	Rated current	3650 A
	Insulation class	H
	Degree of protection	IP54

CONFORMITY STATEMENT – ANNEX 1

Statement No.: DE-DNVGL-SE-0074-04352-2

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Converter	Type	Full quadrant IGBT
	Manufacturer	Vestas Wind Systems A/S
	Rated voltage machine/grid	720 Vrms / 800 Vrms
	Rated current	3200 A
	Degree of protection	IP54
Transformer	Drawing / Data sheet / Part no.	0069-2805, Rev. 0
	Type	Cast-Resin transformer
	Manufacturer	4GY6781-1EY
	Rated voltage	Siemens
	Degree of protection	33 / 0.72 V
Tower	Drawing / Data sheet / Part no.	IP00
	Type	0073-7914, Rev. 0
	Manufacturer	Cast-Resin transformer
	Rated voltage	DTTH1N 4000/30
	Degree of protection	SGB
Manuals	Drawing / Data sheet / Part no.	33 / 0.72 V
	Type	IP00
	Number of sections	0073-7915, Rev. 0
	Length	Conical steel tower
	Drawing / Data sheet / Part no.	4
Manuals	O&M manual	102.6 m (105 m)
	Transport manual	0074-7302 Rev. 0
	Installation / Commissioning manual	0040-6996, Rev. 14
Manuals	O&M manual	0040-6996, Rev. 14
	Transport manual	0040-6996, Rev. 14
	Installation / Commissioning manual	0040-6996, Rev. 14



Certificate No.

IECRE.WE.TC.19.0075-R2

IECRE - IEC System for Certification
to Standards Relating to Equipment
for Use in Renewable Energy
Applications

TYPE CERTIFICATE**Wind Turbine**

This certificate is issued to

Vestas Wind Systems A/S
Hedeager 42
8200 Aarhus N
Denmark

for the wind turbine

Vestas V150-4.0 MW / V150-4.2 MW

wind turbine class (class, standard, year)

Annex 1, IEC 61400-1: 2005+Amd1: 2010

This certificate attests compliance with IEC 61400 Series as specified in subsequent pages. It is based on the following reference documents:

Design basis evaluation conformity statement
Dated

DB-DNVGL-SE-0074-05341-2
2019-12-20

Design evaluation conformity statement
Dated

DE-DNVGL-SE-0074-04352-4
2019-12-20

Type test conformity statement
Dated

TT-DNVGL-SE-0074-05340-2
2019-12-20

Manufacturing evaluation conformity statement
Dated

ME-DNVGL-SE-0074-05339-2
2019-12-20

Final evaluation report
Dated

FER-TC-DNVGL-SE-0074-05338-2
2019-12-20

The conformity evaluation was carried out in accordance with the rules and procedures of the IECRE System
www.iecre.org

The wind turbine type specification begins on page 2 of this certificate.

Changes in the system design or the manufacturer's quality system are to be approved by DNV GL. Without approval, the certificate loses its validity.

This certificate is valid until:
2024-12-12

Approved for issue on behalf of the IECRE
Certification Body:

Nils Kreidelmeyer *Bente Vestergaard*
Nils Kreidelmeyer / Bente Vestergaard
Senior Project Manager / Service Line Leader, Type
Certification
Hamburg/Hellerup 2019-12-20

DNV GL

Renewables Certification
Brooktorkai 18
20457 Hamburg, Germany



IECRE - IEC System for Certification
to Standards Relating to Equipment
for Use in Renewable Energy
Applications

Certificate No.

IECRE.WE.TC.19.0075-R2

TYPE CERTIFICATE

Wind Turbine

Machine parameters:

Power regulation:	pitch-controlled
Rotor orientation:	Upwind
Number of rotor blades:	3
Rotor tilt:	6.0°
Cone angle:	-5.5°
Rated power:	4000 kW / 4200 kW
Rated wind speed V_r :	Annex 1
Rotor diameter:	150 m
Hub height(s):	Annex 1
Hub height operating wind speed range $V_{in} - V_{out}$:	3 m/s – 24.5 m/s (with the following HWO wind speeds: $V_{_HWO1} = 17.5$ m/s $V_{_HWO2} = 21.5$ m/s $V_{_HWO3} = 24.5$ m/s)
Design life time:	20 years
Software version:	2019.01

Wind conditions:

Characteristic turbulence intensity I_{ref} at $V_{hub} = 15$ m/s:	Annex 1
Annual average wind speed at hub height V_{ave} :	Annex 1
Reference wind speed V_{ref} :	Annex 1
Mean flow inclination:	8°

Electrical network conditions:

Normal supply voltage and range:	720 V
Normal supply frequency and range:	50 or 60 Hz $\pm$ 6 % Hz
Voltage imbalance:	IEC 61000-3-6 TR max 2 %
Maximum duration of electrical power network outages:	Two 3 months periods
Number of electrical network outages	Max 52 per year



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to Standards Relating to Equipment
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Applications

Certificate No.

IECRE.WE.TC.19.0075-R2

TYPE CERTIFICATE

Wind Turbine

Other environmental conditions (where taken into account):

Normal and extreme temperature ranges:
*de-rating strategy above +30°C for V150-4.0 MW
*de-rating strategy above +20°C for V150-4.2 MW

Normal: -20°C to +45°C*
Extreme: -40°C to +45°C

Relative humidity of the air:

100% (max 40% of time) and
90% (rest of life time)

Air density:

1.225 kg/m³ (for normal
operation)
1.273 kg/m³ (for low
temperature operation)

Solar radiation:

1000 W/m²

Lightning protection system (standard and protection
class):

Designed acc. to IEC 61400-24,
Protection Level 1 and IEC
61312-1



IECRE - IEC System for Certification
to Standards Relating to Equipment
for Use in Renewable Energy
Applications

Certificate No.
IECRE.WE.TC.19.0075-R2

TYPE CERTIFICATE

Wind Turbine

Major components:

**If not otherwise stated, the certificate holder is the manufacturer.

Blade:

Type:

Hybrid / Infused

Material:

Carbon fibre reinforced epoxy and glass
fibre reinforced epoxy

Blade length:

73.65 m

Number of blades:

3

Manufacturer:

Vestas Wind Systems A/S

Drawing / Data sheet / Part No.:

0069-0345, Rev. 3

Blade Aero Addons:

Type

STE's and RVG's

Manufacturer

Vestas Wind Systems A/S

Drawing / Data sheet / Part no.

STE Kit: 0072-2639, Rev. 0
RVG: 0073-5893, Rev. 0

Blade bearing:

Type:

Triple row cylinder bearing

Drawing / Data sheet / Part no.:

29110524, Rev. 3

TPS no.:

0023-3088, Rev. 5

Pitch System:

Type:

Hydraulic power unit

Manufacturer:

LJM/HINE/Liebherr/Hengli

Hydraulic Cylinder (140/90x922):

29111326, Rev. 1

Type

Pitch Actuation Module

Manufacturer

Vestas Wind Systems A/S

Drawing / Data sheet / Part no.

29111583, Rev. 1

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for Use in Renewable Energy
Applications

Certificate No.

IECRE.WE.TC.19.0075-R2

TYPE CERTIFICATE

Wind Turbine

Main shaft:

Type:

Cast iron

Material:

EN-GJS-500-14

Drawing / Data sheet / Part no.:

29085300, Rev. 4

Main bearing:

Type:

Spherical Roller Bearing

Manufacturer:

FAG

Drawing / Data sheet / Part no.:

F-582562.PRL-WPO 000

Main bearing:

Type:

Spherical Roller Bearing

Manufacturer:

SKF

Drawing / Data sheet / Part no.:

240/950 CA / C3LW33VQ113

Main bearing:

Type:

Spherical Roller Bearing

Manufacturer:

JTKET / KOYO

Drawing / Data sheet / Part no.:

240/950 RHAW33TS1CS

Gearbox:

Type:

2 stage planetary and 1 helical stage
gearbox

Manufacturer:

ZF (EH1052A)

Gear ratio:

1:143.37

Drawing / Data sheet / Part no.:

096-EH1052A001, Rev. A

Gearbox:

Type:

2 stage planetary and 1 helical stage
gearbox

Manufacturer:

Winergy (PZAB 3580)

Gear ratio:

1:142.76

Drawing / Data sheet / Part no.:

A5E45622888A, rev.2

Issued 2019-12-20

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IECRE - IEC System for Certification
to Standards Relating to Equipment
for Use in Renewable Energy
Applications

Certificate No.

IECRE.WE.TC.19.0075-R2

TYPE CERTIFICATE

Wind Turbine

Yaw System:

Drive type:

8 x 2.7 kW, 400 V, 50 Hz asynchronous
motors

Drive manufacturer:

Lafert

Drawing / Data sheet / Part no.:

MZ10/A4A-55337

Drive type:

8 x 3.2 kW, 400 V, 60 Hz asynchronous
motors

Drive manufacturer:

Lafert

Drawing / Data sheet / Part no.:

MZ10/A4A-55338

Drive type:

8 x 2.7 kW, 400 V, 50 Hz asynchronous
motors

Drive manufacturer:

ABB

Drawing / Data sheet / Part no.:

3GZF500810-23 A 14 AA 100 A

Drive type:

8 x 3.2 kW, 400 V, 60 Hz asynchronous
motors

Drive manufacturer:

ABB

Drawing / Data sheet / Part no.:

3GZF500810-23 A 14 AA 100 A

Drive type:

8 x 2.7 kW, 400 V, 50 Hz asynchronous
motors

Drive manufacturer:

Bonfiglioli

Drawing / Data sheet / Part no.:

CD00006614-02

Drive type:

8 x 3.2 kW, 400 V, 60 Hz asynchronous
motors

Drive manufacturer:

Bonfiglioli

Drawing / Data sheet / Part no.:

CD00007013-01

Gear type:

Bevel stage and three planetary stages, i
= 952.3

Gear manufacturer:

Bonfiglioli

Drawing / Data sheet / Part no.:

I7090T010300

Issued 2019-12-20

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IECRE - IEC System for Certification
to Standards Relating to Equipment
for Use in Renewable Energy
Applications

Certificate No.

IECRE.WE.TC.19.0075-R2

TYPE CERTIFICATE

Wind Turbine

Gear type:

Bevel stage and three planetary stages, i
= 935

Gear manufacturer:

Comer

Drawing / Data sheet / Part no.:

N07297_01

Bearing type:

Preloaded sliding bearing, PETP pads

Bearing manufacturer:

Vestas Wind Systems A/S

Drawing / Data sheet / Part no.:

29104726, Rev. 0

Generator:

Type:

DASG 560/6M, Induction generator

Manufacturer:

Vestas Nacelles Deutschland (VND)

Rated power:

4450 kW

Rated frequency:

74 Hz

Rated speed:

1485 rpm

Rated voltage:

800 V

Rated current:

3650 A

Insulation class:

H

Degree of protection:

IP54

Converter:

Type:

Full quadrant IGBT

Manufacturer:

Vestas Wind Systems A/S

Rated voltage machine/grid:

720 Vrms / 800 Vrms

Rated current:

3200 A

Degree of protection:

IP54

Drawing / Data sheet / Part no.:

0069-2805, Rev. 0

Transformer:

Type:

Cast-Resin transformer
4GY6781-1EY

Manufacturer:

Siemens

Rated voltage:

33 / 0.72 V

Issued 2019-12-20

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**IECRE - IEC System for Certification
to Standards Relating to Equipment
for Use in Renewable Energy
Applications**

Certificate No.

IECRE.WE.TC.19.0075-R2

TYPE CERTIFICATE

Wind Turbine

Degree of protection: IP00
Drawing / Data sheet / Part no.: 0073-7914, Rev. 0

Type: Cast-Resin transformer
DTTH1N 4000/30
Manufacturer: SGB
Rated voltage: 33 / 0.72 V
Degree of protection: IP00
Drawing / Data sheet / Part no.: 0073-7915, Rev. 0

Tower:
Type: Conical steel
Number of sections: 4
Length: 102.6 m (HH 105 m)
Drawing / Data sheet / Part no.: 0074-7302 Rev.0 (T966901)

Tower:
Type: Conical steel
Number of sections: 5
Length: 102.6 m (HH 105 m)
Drawing / Data sheet / Part no.: A005-4762, Rev.0 (T966906)

Tower:
Type: Conical steel
Number of sections: 5
Length: 102.6 m (HH 105 m)
Drawing / Data sheet / Part no.: 0068-6713, Rev.4 (T966900)

Tower:
Type: Conical steel
Number of sections: 6
Length: 152.6 m (HH 155 m)
Drawing / Data sheet / Part no.: 0078-9884 Rev.2 (T969B00)
Issued 2019-12-20 8/10



IECRE - IEC System for Certification
to Standards Relating to Equipment
for Use in Renewable Energy
Applications

Certificate No.
IECRE.WE.TC.19.0075-R2

TYPE CERTIFICATE Wind Turbine

Manuals:

Operating manual:	0079-9811, Rev. 1
Transportation and handling manual:	0079-9801, Rev. 2
Installation manual:	0079-9663, Rev. 2
Commissioning manual:	0079-9665, Rev. 0

Service lift:

Manufacturer:	Avanti
Type:	Avanti Shark / Avanti Dolphin / Avanti Beluga

Manufacturer:	Power climber
Type:	Sherpa-SD4

Crane:

Manufacturer:	Star 071/95 Liftket
Maximum lifting capacity:	max 800 kg



Certificate No.

IECRE.WE.TC.19.0075-R2

IECRE - IEC System for Certification
to Standards Relating to Equipment
for Use in Renewable Energy
Applications

TYPE CERTIFICATE
Wind Turbine

Annex 1

Configurations covered by this Type Certificate

ID*	Variants	Hub Height	IEC WT class	Turbulence Intensity Iref	Rated wind speed V_r	Mean wind speed V_{ave}
1.1	V150-4.0 MW	¹⁰⁵ (T966901)	IEC 3B	0.14	9.7 m/s	7.5 m/s
1.2	V150-4.2 MW	¹⁰⁵ (T966901)	S (based on IEC 3B)	0.14	9.9 m/s	7.0 m/s
1.3	V150-4.0MW	¹⁰⁵ (T966900)	IEC 3C	0.12	9.8 m/s	7.5 m/s
1.4	V150-4.2 MW	¹⁰⁵ (T966900)	S (based on IEC 3C)	0.12	10.1 m/s	7.0 m/s
1.5	V150-4.0MW	¹⁰⁵ (T966906)	IEC 3B	0.14	9.7 m/s	7.5 m/s
1.6	V150-4.2 MW	¹⁰⁵ (T966906)	S (based on IEC 3B)	0.14	9.9 m/s	7.0 m/s
2.1	V150-4.0MW	¹⁵⁵ (T969B00)	IEC 3B	0.14	9.7 m/s	7.5 m/s
2.2	V150-4.2 MW	¹⁵⁵ (T969B00)	S (based on IEC 3B)	0.14	9.9 m/s	7.0 m/s

* The ID follows the hub height with its first digit, the second digit is only consecutive to identify the different configurations within one hub height

Design Evaluation Conformity Statement

STC – 151113, Rev. 2

This conformity statement is issued to

Gamesa Innovation and Technology, S.L.U.
GIT Sarriguren Oficinas (I+D)
Avda. Ciudad de la Innovación 2
31621 Sarriguren (Navarra)
Spain

for the wind turbines

G114 2.5 MW / 2.625 MW IEC-IIA HH 68 m, 80 m, 93 m and 125 m, 50/60 Hz
G114 2.5 MW IEC-S HH 88 m 50 Hz

This conformity statement attests compliance with

IEC 61400-1

"Wind turbines - Part 1: Design requirements", Edition 3.0, 2005-08
- Wind Turbine Class IIA / S

concerning the design. It is based on the evaluation reports listed on page 2 of this statement.

The conformity evaluation was carried out according to IEC 61400-22, "Wind turbines - Part 22: Conformity testing and certification", Edition 1.0, 2010-05.

The main wind turbine characteristics are specified in the annex II of this conformity statement.

Any change in the design is to be approved by DEWI-OCC. Without approval, this statement loses its validity.

Cuxhaven, 2016-10-24

A handwritten signature in blue ink, reading "Kai Grigutsch".

Kai Grigutsch, M.Sc.
Head of DEWI-OCC

Certification Body for Wind Turbines

Annex I - Design Evaluation Conformity Statement

This conformity statement STC – 151113, Rev. 2 is based on the following reference documents:

1. G114 2.5 MW IEC-IIA HH 68 m, 80 m, 93 m and 125 m, 50/60 Hz:

R101196-0	Design Basis Evaluation Report	DEWI-OCC, Rev. 0, 2014-04-22
R101196-1c	Load Assumptions G114LM HH 80 m	DEWI-OCC, Rev. 0, 2014-09-26
R101196-1d	Load Assumptions G114Gam HH 80 m	DEWI-OCC, Rev. 0, 2014-09-26
R101196-1a	Load Assumptions G114LM HH 93 m	DEWI-OCC, Rev. 0, 2014-05-16
R101196-1b	Load Assumptions G114Gam HH 93 m	DEWI-OCC, Rev. 0, 2014-06-02
R101196-1e	Load Assumptions G114LM HH 125 m	DEWI-OCC, Rev. 0, 2014-09-19
R101196-1f	Load Assumptions G114Gam HH 125 m	DEWI-OCC, Rev. 1, 2015-11-27
R101196-1g	Load Assumptions G114G 68 m HH	DEWI-OCC, Rev. 0, 2016-09-21
R101196-1h	Load Assumptions G114LM 68 m HH	DEWI-OCC, Rev. 0, 2016-09-21
R101196-2	Safety Systems and Manuals	DEWI-OCC, Rev. 2, 2016-07-06
R101196-3	Rotor Blade LM - HH 80 m and 125 m	DEWI-OCC, Rev. 0, 2015-08-26
R11204776-3d	Rotor Blade LM - HH 68 m	DEWI-OCC, Rev. 0, 2016-09-22
009.05.3.03.14.00(STC)	Rotor Blade LM - HH 93 m	TÜV SÜD, Rev. 0, 2014-09-19
ER-DE-DNV-DSS-904-00246-0	Rotor Blade Gam – HH 80 m, 93 m and 125 m	DNV-GL, Rev. 0, 2015-05-07
R101196-3c	Rotor Blade Gam – HH 68 m	DEWI-OCC, Rev. 0, 2016-09-21
R101196-3b	Rotor Blade Gam – T-Bolts	DEWI-OCC, Rev. 0, 2016-08-25
R101196-4	Machinery Components	DEWI-OCC, Rev. 4, 2016-09-21
R101196-5b	Tower HH 80 m	DEWI-OCC, Rev. 0, 2014-10-01
R101196-5a	Tower HH 93 m	DEWI-OCC, Rev. 1, 2015-11-30
R101196-5c	Tower HH 125 m	DEWI-OCC, Rev. 2, 2015-11-30
R101196-5d	Tower HH 68 m	DEWI-OCC, Rev. 1, 2016-09-22
R101196-6	Electrical System	DEWI-OCC, Rev. 3, 2016-07-29

2. G114 2.625 MW IEC-IIA HH 68 m, 80 m, 93 m and 125 m, 50/60 Hz:

R101196-0	Design Basis Evaluation Report	DEWI-OCC, Rev. 0, 2014-04-22
R101196-1c	Load Assumptions G114LM HH 80 m	DEWI-OCC, Rev. 0, 2014-09-26
R101196-1d	Load Assumptions G114Gam HH 80 m	DEWI-OCC, Rev. 0, 2014-09-26
R101196-1a	Load Assumptions G114LM HH 93 m	DEWI-OCC, Rev. 0, 2014-05-16
R101196-1b	Load Assumptions G114Gam HH 93 m	DEWI-OCC, Rev. 0, 2014-06-02
R101196-1e	Load Assumptions G114LM HH 125 m	DEWI-OCC, Rev. 0, 2014-09-19
R101196-1f	Load Assumptions G114Gam HH 125 m	DEWI-OCC, Rev. 1, 2015-11-27
R101196-1g	Load Assumptions G114G 68 m HH	DEWI-OCC, Rev. 0, 2016-09-21
R101196-1h	Load Assumptions G114LM 68 m HH	DEWI-OCC, Rev. 0, 2016-09-21
R101196-1i	Load Comparison G114-2.625MW IEC IIA	DEWI-OCC, Rev. 0, 2016-09-22
R101196-2	Safety Systems and Manuals	DEWI-OCC, Rev. 2, 2016-07-06
R101196-3	Rotor Blade LM - HH 80 m and 125 m	DEWI-OCC, Rev. 0, 2015-08-26
009.05.3.03.14.00 (STC)	Rotor Blade LM - HH 93 m	TÜV SÜD, Rev. 0, 2014-09-19
ER-DE-DNV-DSS-904-00246-0	Rotor Blade Gam – HH 80 m, 93 m and 125 m	DNV-GL, Rev. 0, 2015-05-07
R101196-3c	Rotor Blade Gam – HH 68 m	DEWI-OCC, Rev. 0, 2016-09-21
R101196-4	Machinery Components	DEWI-OCC, Rev. 4, 2016-09-21

R101196-5b	Tower HH 80 m	DEWI-OCC, Rev. 0, 2014-10-01
R101196-5a	Tower HH 93 m	DEWI-OCC, Rev. 1, 2015-11-30
R101196-5c	Tower HH 125 m	DEWI-OCC, Rev. 2, 2015-11-30
R101196-5d	Tower HH 68 m	DEWI-OCC, Rev. 1, 2016-09-22
R101196-6	Electrical System	DEWI-OCC, Rev. 3, 2016-07-29
S101196-12	Statement Design Evaluation	DEWI-OCC, Rev. 0, 2015-12-10

3. G114 2.5 MW IEC-S HH 88 m 50 Hz:

R101344-0	Site Conditions Evaluation	DEWI-OCC, Rev. 0, 2015-02-03
R101344-1a	Load Assumptions G114G 2.5MW 88 m HH	DEWI-OCC, Rev. 0, 2015-10-26
R101344-1b	Load Assumptions G114LM It2 2.5MW 88 m HH	DEWI-OCC, Rev. 0, 2015-10-26
R101196-2	Safety Systems and Manuals	DEWI-OCC, Rev. 2, 2016-07-06
R101344-3	Rotor Blade G114G 2.5MW 88 m HH	DEWI-OCC, Rev. 0, 2015-11-19
009.05.3.03.14.00 (STC)	Rotor Blade LM - HH 93 m	TÜV SÜD, Rev. 0, 2014-09-19
R101344-4	Machinery Components 88 m HH	DEWI-OCC, Rev. 2, 2016-02-02
R101344-5	Tubular Steel Tower 88 m HH	DEWI-OCC, Rev. 1, 2015-12-15
R101196-6	Electrical System	DEWI-OCC, Rev. 3, 2016-07-29

The following configurations are covered by this conformity statement:

Type Designation	Rated Power	IEC Class	Frequency	Rotor Blade	Hub Height
G114-2.5MW Class IIA	2.5 MW	IIA	50 Hz / 60 Hz	G114 2.5	68 m
					80 m
					93 m
					125 m
				LM56.0 P2	68 m
					80 m
					93 m
					125 m
G114-2.5MW Class S	2.5 MW	S	50 Hz	G114 2.5	88 m
			50 Hz	LM56.0 P2	88 m
G114-2.625MW Class IIA	2.625 MW	IIA	50 Hz / 60 Hz	G114 2.5	68 m
					80 m
					93 m
					125 m
				LM56.0 P2	80 m
					93 m
					125 m

Annex II - Wind Turbine Characteristics

I. General

Manufacturer	Gamesa Innovation and Technology, S.L.U. GIT Sarriguren Oficinas (I+D) Avda. Ciudad de la Innovación 2 31621 Sarriguren (Navarra) Spain
Wind turbine type designation	G114 2.5 MW / 2.625 MW IEC-IIA/IEC-S HH 68 m, 80 m, 88 m, 93 m and 125 m, 50/60 Hz
Type	Horizontal axis wind turbine with variable rotor speed
Wind turbine (generator system) class	Wind Turbine Class IIA for 68 m, 80 m, 93 m and 125m Wind Turbine Class S for 88 m
Design lifetime	20 years
Rated power	2.5 MW / 2.625 MW
Rotor diameter	114 m
Number of blades	3
Power regulation	Variable speed and pitch regulation
Rated rotational speed	50Hz: 1680 rpm 60Hz: 1344 rpm
Operating range rotational speed	50Hz: 1050-1900 rpm 60Hz: 840-1520 rpm
Hub height	68 m, 80 m, 88 m, 93 m and 125 m
Rotor type	Upwind, 3 blades and fixed hub
Rotating direction	Clockwise
Cone angle	-2°
Tilt angle	6°
<i>Electrical network conditions</i>	
Normal supply voltage and range	690 ± 10%
Normal supply voltage frequency and range	50Hz ± 6% 60Hz ± 6%
<i>Wind conditions</i>	
50-year reference wind speed (Vref)	42.5 m/s for G114-2.5 MW / 2.625 MW class IIA Stated in R101344-1a Rev.0 for G114-2.5 MW class S
50-year extreme wind speed (Ve50)	59.5 m/s for G114-2.5 MW / 2.625 MW class IIA Stated in R101344-1a Rev.0 for G114-2.5 MW class S
Annual average wind speed (Vave)	8.5 m/s for G114-2.5 MW / 2.625 MW class IIA Stated in R101344-1a Rev.0 for G114-2.5 MW class S
Characteristic turbulence intensity Iref at vhub = 15 m/s	16% for G114-2.5 MW / 2.625 MW class IIA 14.9% for G114-2.5 MW class S

Cut-in wind speed	3.0 m/s
Rated wind speed	11.0 m/s
Cut-out wind speed (10 min mean)	25.0 m/s

II. Main Components

Type Designation		G114-2.5MW Class IIA	G114- 2.625MW Class IIA	G114- 2.5MW Class S
<i>Rotor blade</i>				
Supplier	LM	√	√	√
Type	LM 56.0 P2			
Blade Length	56 m			
Material	Fiberglass reinforced plastic			
<i>Rotor blade (alternative)</i>				
Supplier	Gamesa	√	√	√
Type	G114 2.5			
Blade Length	56 m			
Material	Fiberglass reinforced plastic			
<i>Pitch system</i>				
<i>Pitch cylinder</i>				
Supplier	Glual	√	√	√
Type	Double acting hydraulic cylinder			
Drawing-No.	FGE001546, Rev. A			
<i>Pitch bearings</i>				
Supplier	Rollix Defontaine	√	√	√
Drawing-No.	13-2418-00 13-2425-01			
<i>Pitch bearings (alternative)</i>				
Supplier	Laulagun Bearing S.A.	√	√	-
Drawing-No.	F2670M0-0DST0125XD, Rev. 4 F2670M0-0DST0125XP, Rev. 4			
<i>Pitch bearings (alternative)</i>				
Supplier	Kaydon Bearings Division	√	√	-
Drawing-No.	18190001 Rev. B			
<i>Pitch bearings (alternative)</i>				
Supplier	Tianma Railway Bearing Co., Ltd.	√	√	-
Drawing-No.	B030.53.2418K B030.53.2418K2			

Pitch bearings (alternative)				
Supplier	ThyssenKrupp Rothe Erde	√	√	-
Drawing-No.	090.55.2418.000.49.1422 Rev. B 090.55.2418.001.49.1422 Rev. B 090.55.2418.010.49.1422 Rev. B			
Hub				
Drawing-No.	GP301051 Rev. 0	√	√	√
Material	EN-GJS-400-18U-LT			
Hub (alternative)				
Drawing-No.	GP264868 Rev. 0	√	√	-
Material	EN-GJS-400-18U-LT			
Hub (alternative)				
Drawing-No.	GP307464 Rev. 1	-	-	√
Material	EN-GJS-400-18U-LT			
Rotor shaft				
Drawing-No.	GP280230 Rev. 2	√	√	√
Material	34CrNiMo6 / 42CrMo4			
Main bearings				
Supplier	Koyo	√	√	√
Type (front)	230/800RHAW33TS1			
Drawing-No. (front)	DSA302861			
Type (rear)	241/530RHAW33TS1			
Drawing-No. (rear)	DSA302851			
Main bearings (alternative)				
Supplier	SKF	√	√	√
Type (front)	230/800 CA/W 33VR646			
Type (rear)	241/530 ECA/W 33VR646			
Main bearings (alternative)				
Supplier	ZKL Brno, a.s.	√	√	-
Type (front)	230_800EW33MH_TPF_11517-15_NV			
Type (rear)	241_530EW33MH_TPF_11517-15_NV			
Main bearing housings				
Drawing-No.	GP294767, Rev. 0 (Front) GP225163, Rev. 2 (Rear)	√	√	√
Material	EN-GJS-400-18U-LT			
Gearbox				
Supplier	Gamesa Innovation and Technology, S.L.U.	√	√	√
Type	Gearbox gBOX2.5			

Ratio	129.68 (50Hz) 103.99 (60Hz)			
<i>Gearbox supports</i>				
Drawing-No.	GP252765 (Upper), Rev. 0 GP252766 (Lower), Rev. 0	√	√	√
Material	EN-GJS-400-18U-LT			
<i>Elastomer bearings</i>				
Supplier	Macla	√	√	√
Drawing-No.	GP252769, Rev. 0			
<i>Main frame</i>				
Drawing-No.	GP251595, Rev. 3	√	√	√
Material	EN-GJS-400-18U-LT			
<i>Generator frame</i>				
Drawing-No.	GD233298, Rev. 2	√	√	√
Material	S355			
<i>Mechanical brakes and locking devices</i>				
<i>Mechanical brake</i>				
Supplier	Gamesa Innovation and Technology, S.L.U.	√	√	√
Document-No.	GD199400, Rev.1			
<i>Rotor lock</i>				
Drawing-No.	GD188169, Rev. 1	√	√	√
Material	42CrMo4			
<i>Rotor lock (alternative for 88 m)</i>				
Drawing-No.	GD282536 Rev. 3	-	-	√
Material	S355 J2			
<i>Rotor lock (alternative for 88 m)</i>				
Drawing-No.	GD309385, Rev. 1	-	-	√
Material	S460 NL			
<i>Couplings</i>				
<i>LSS shrink disc</i>				
Supplier	Tollok	√	√	√
Type	TLK 681 - 620x980			
<i>HSS elastic coupling (50 Hz)</i>				
Supplier	KTR	√	√	√
Type	RADEX-N 165 spez.4-link-50Hz NANA 4 spez.			
Drawing-No.	592840, Rev. 2			
<i>HSS elastic coupling (60 Hz)</i>				
Supplier	KTR	√	√	-

Type Drawing-No.	RADEX-N 165 spez.4-link-60Hz NANA 4 spez. 592678, Rev. 1			
<i>Yaw system</i>				
<i>Yaw gearbox</i>				
Supplier Type	Bonfiglioli 710T4U	√	√	√
<i>Yaw gearbox (alternative)</i>				
Supplier Type	Comer PG 2504DSP R=1031.2/1 IEC100/112	√	√	-
<i>Yaw gearbox (alternative)</i>				
Supplier Type	Brevini Transmissions ELS2814-GE.L/9026922/1022/A.D. IEC100-112(PP2264)	√	√	-
<i>Yaw gearbox (alternative)</i>				
Supplier Type	Comer 5718.050.0505	-	-	√
<i>Tower top flange</i>				
Drawing-No. Material	GP262561, Rev. 0 S355 NL Z35	√	√	√
<i>Towers – 68 m, 80 m, 93 m and 125 m</i>				
Supplier Type Drawing-No.	Gamesa Innovation and Technology, S.L.U. Tubular Steel GD222883 Rev. 0 (HH80m) GD212018 Rev. 3 (HH93m) GD233243-en, Rev. 1 (HH125m) GD286712, Rev. 0 (HH68m)	√	√	-
<i>Tower – 88 m</i>				
Supplier Type Drawing-No.	Gamesa Innovation and Technology, S.L.U. Tubular Steel GD267878, Rev. 0 (HH88m)	-	-	√
<i>Generator (50 Hz)</i>				
Supplier Type	Gamesa Cantarey CR25 50Hz 4p	√	√	√
<i>Generator (60 Hz)</i>				
Supplier Type	ABB Asea Brown Boveri, S.A. AML 560M6A BAFT	√	√	-

<i>Converter</i>				
Supplier	Enertron Gamesa	√	√	√
Type	DAC 2.5MW			
<i>Lightning protection system</i>				
Protection Level	LPL I	√	√	√