



Certificate No.

IECRE.WE.TC.18.0022-R0

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

Siemens Gamesa Renewable Energy Innovation & Technology
Avda. Ciudad de la Innovación 2
31621 Sarriguren (Navarra)
Spain

for the wind turbine

G114-2.1MW IEC IIIA

wind turbine class (class, standard, year)

WT class IIIA, IEC 61400-1/A1, 2010

This certificate is transferred from IEC 61400-22 to IECRE and 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 (*covered in the design evaluation conformity statement)

STC – 180104 Rev. 1
04.10.2018

Design evaluation conformity statement
Dated

STC – 180104 Rev. 1
04.10.2018

Type test conformity statement
Dated

STC – 180107 Rev. 1
04.10.2018

Manufacturing conformity statement
Dated

STC – 180106 Rev. 1
04.10.2018

Final evaluation report
Dated

R12658728-12 Rev. 0
20.12.2018

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 the Certification Body. Without approval, the certificate loses its validity.

This certificate is valid until:
2023-05-22

Approved for issue on behalf of the IECRE
Certification Body:

UL Renewables



Jörn Gerlach
Vice Head of Certification Body
Cuxhaven 2018-12-20

DEWI-OCC GmbH
Am Seedeich 9
27472 Cuxhaven, Germany



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Machine parameters:

Power regulation:	Pitch-controlled
Rotor orientation:	Upwind
Number of rotor blades:	3
Rotor tilt:	6°
Cone angle:	-3°
Rated power:	2100 kW
Rated wind speed V_r :	9.4 m/s
Rotor diameter:	114
Hub height(s):	80 / 93 / 125 m
Hub height operating wind speed range $V_{in} - V_{out}$:	3 – 25 m/s
Design life time:	20 years
Software version:	Control Architecture Version V3 or superior

Wind conditions:

Characteristic turbulence intensity I_{ref} at $V_{hub} = 15$ m/s:	0.16
Annual average wind speed at hub height V_{ave} :	7.5 m/s
Reference wind speed V_{ref} :	37.5 m/s
Mean flow inclination:	8°
Hub height 50-year extreme wind speed V_{e50} :	52.5 m/s

Electrical network conditions:

Normal supply voltage and range:	690V +/- 10%
Normal supply frequency and range:	50Hz +/- 3% 60Hz +/- 4%
Voltage imbalance:	5%
Maximum duration of electrical power network outages:	not dimensioning
Number of electrical network outages	52/yr.



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Other environmental conditions (where taken into account):

Design conditions in case of offshore WT :	NA
Normal and extreme temperature ranges:	Normal: -10°C to +40°C Extreme: -20°C to +50°C
Relative humidity of the air:	Up to 95%
Air density:	1.225 kg/m ³
Solar radiation:	1000 W/m ²
Lightning protection system (standard and protection class):	IEC 61400-24:2010, LPL I
Earthquake model and parameters (standard and key parameters e.g. spectrum, model, seismic zone, soil class, etc.):	NA
Other design conditions :	NA



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Major components:

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

Blade:

Type: G114 Infused blade, structural shells and adhesive joints
Material: Glass fiber reinforced resin
Blade length: 56m
Number of blades: 3
Manufacturer: LM Wind Power A/S
Drawing / Data sheet / Part No.: LM56.0P

Blade:

Type: B114 Infused blade, structural shells and adhesive joints
Material: Glass fiber reinforced resin
Blade length: 56m
Number of blades: 3
Manufacturer: Siemens Gamesa
Drawing / Data sheet / Part No.: G114 2.0 TB

Blade:

Type: B114 Infused blade, structural shells and adhesive joints
Material: Glass fiber reinforced resin
Blade length: 56m
Number of blades: 3
Manufacturer: Siemens Gamesa
Drawing / Data sheet / Part No.: G114 2.0 STD

Blade bearing:

Type: Four-point contact double row
Manufacturer: Laulagun
Drawing / Data sheet / Part No.: F2655M00DST0125



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Blade bearing:

Type: Four-point contact double row
Manufacturer: Rollix
Drawing / Data sheet / Part No.: 13-2418 / 13-2415

Blade bearing:

Type: Four-point contact double row
Manufacturer: IMO
Drawing / Data sheet / Part No.: 40-552418/0

Blade bearing:

Type: Four-point contact double row
Manufacturer: Tianma (Chengdu) Railway Bearing Co,
Ltd
Drawing / Data sheet / Part No.: B030.53.2418

Pitch System:

Motor / Actuator Type: Double acting hydraulic cylinder
Pitch Controller Type: Hydraulic
Manufacturer: Glual / HINE Cilindros / Hydratech
Industries

Main shaft:

Type: Steel shaft
Material: 42CrMo4 / 34CrNiMo6
Drawing / Data sheet / Part No.: GP309783

Main bearing:

Type: Spherical roller bearing
Manufacturer: JTEKT KOYO
Drawing / Data sheet / Part No.: RHA W33TS1
RHA W33TS1CS



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Main bearing:

Type: Spherical roller bearing
Manufacturer: SKF
Drawing / Data sheet / Part No.: CA-W33
ECA-W33

Main bearing:

Type: Spherical roller bearing
Manufacturer: ZKL Brno a.s.
Drawing / Data sheet / Part No.: EW33MH TPF

Main bearing:

Type: Spherical roller bearing
Manufacturer: Timken
Drawing / Data sheet / Part No.: YMDWEW886C
WE-A

Gearbox:

Type: Three stages gearbox (one planetary
stage and two helical gear stages)
Gear Ratio: 1:128.5 (50Hz)
1:102.5 (60Hz)
Manufacturer: Siemens Gamesa
Drawing / Data sheet / Part No.: GE2000PL

Gearbox:

Type: Three stages gearbox (one planetary
stage and two helical gear stages)
Gear Ratio: 1:128.5 (50Hz)
1:102.5 (60Hz)
Manufacturer: ZF Wind Power
Drawing / Data sheet / Part No.: EH861A



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Wind Turbine

Gearbox:

Type: Three stages gearbox (one planetary stage and two helical gear stages)
Gear Ratio: 1:128.5 (50Hz)
1:102.5 (60Hz)
Manufacturer: NGC
Drawing / Data sheet / Part No.: GE2000PL

Yaw System:

Drive Type: Activated by yaw drives
Manufacturer: Siemens Gamesa
Drawing / Data sheet / Part No.: GD293701

Bearing Type: Friction Bearing
Manufacturer: Siemens Gamesa
Drawing / Data sheet / Part No.: GP222733

Gear Type: Planetary gear with motor and brake
Manufacturer: Bonfiglioli
Drawing / Data sheet / Part No.: 710T4U

Gear Type: Planetary gear with motor and brake
Manufacturer: Brevini Transmissions
Drawing / Data sheet / Part No.: ELS2814-
GE.L/9026922/1022/A.D.IEC100-112

Gear Type: Planetary gear with motor and brake
Manufacturer: Comer
Drawing / Data sheet / Part No.: PG 2504

Brake Type: Hybrid
Manufacturer: ANTEC
Drawing / Data sheet / Part No.: 20.101.562 / 20.101.563



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Brake Type: Hybrid
Manufacturer: Frenos Iruña
Drawing / Data sheet / Part No.: 1445062 / 6700066 / 6700067

Generator:

Type Doubly – fed induction machine
Manufacturer: Gamesa
Drawing / Data sheet / Part No.: CR2X
Rated Power: 2170 kW
Rated Frequency: 50Hz / 60Hz
Rated Speed: 2016 rpm / 1680 rpm / 1344 rpm
Max. speed: 1900 & 1545 rpm
Rated Voltage: 690 V
Rated Current: 1641 A
Insulation Class: F
Degree of Protection: IP54 / IP23

Generator:

Type Doubly – fed induction machine
Manufacturer: ABB
Drawing / Data sheet / Part No.: AMK500L4A
Rated Power: 2170 kW
Rated Frequency: 50Hz
Rated Speed: 1680 rpm
Max. speed: 1900 rpm
Rated Voltage: 690 V
Rated Current: 1634 A
Insulation Class: F
Degree of Protection: IP54



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Converter:

Type: Back to back DFIG converter
Manufacturer: Ingeteam / Gamesa / Valencia Power
Converters
Drawing / Data sheet / Part No: INGECON W
Rated Voltage (grid side): 690V
Rated Current (grid side): 250-300A
Degree of Protection: IP54

Transformer:

Type: Dry type vacuum cast resin transformer
Manufacturer: ABB Power Technology S.A.
Drawing / Data sheet / Part No.: DTE2350/24
Rated Voltage: 0.69 / 20 kV
Rated Power: 2350 kVA
Degree of Protection: IP00
Location (e.g. tower bottom): nacelle

Transformer:

Type: Dry type vacuum cast resin transformer
Manufacturer: Starkstrom Gerätebau GmbH
Drawing / Data sheet / Part No.: DTTH1NG 2500/30, 50Hz
Rated Voltage: 0.69 / 30 kV
Rated Power: 2350 kVA
Degree of Protection: IP00
Location (e.g. tower bottom): nacelle

Transformer:

Type: Dry type vacuum cast resin transformer
Manufacturer: Starkstrom Gerätebau GmbH
Drawing / Data sheet / Part No.: DTTH1NG 2500/30, 50Hz
Rated Voltage: 0.69 / 33 kV
Rated Power: 2350 kVA



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Degree of Protection: IP00
Location (e.g. tower bottom): nacelle

Transformer:

Type: Dry type vacuum cast resin transformer
Manufacturer: ABB Power Technology S.A.
Drawing / Data sheet / Part No.: 2350 / HiT33
Rated Voltage: 0.69 / 33 kV
Rated Power: 2350 kVA
Degree of Protection: IP00
Location (e.g. tower bottom): nacelle

Transformer:

Type: Dry type vacuum cast resin transformer
Manufacturer: ABB Power Technology S.A.
Drawing / Data sheet / Part No.: DTE 2350/36
Rated Voltage: 0.69 / 34.5 kV
Rated Power: 2350 kVA
Degree of Protection: IP00
Location (e.g. tower bottom): nacelle

Transformer:

Type: Dry type vacuum cast resin transformer
Manufacturer: ABB Power Technology S.A.
Drawing / Data sheet / Part No.: HiT-35 2220kVA 2500m
Rated Voltage: 0.69 / 35 kV
Rated Power: 2220 / 2350 kVA
Degree of Protection: IP00
Location (e.g. tower bottom): nacelle



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Tower:

Type: Tubular steel
Manufacturer: Siemens Gamesa
Sections: 3
Length: 80 m HH
Drawing / Data sheet / Part No.: GD357188

Tower:

Type: Tubular steel
Manufacturer: Siemens Gamesa
Sections: 4
Length: 93 m HH
Drawing / Data sheet / Part No.: GD328991 / GD323690 / GD382584

Tower:

Type: Tubular steel
Manufacturer: Siemens Gamesa
Sections: 5
Hub height: 125 m HH
Drawing / Data sheet / Part No.: GD361717

Manuals:

Operation & maintenance manual: A12-07-ECM049
Transport manual: A12-07-ECM036
Installation & commissioning. manual: A12-07-ECM036