



Certificate No.

**IECRE.WE.TC.19.0038-R1**

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 SL  
Avda. Ciudad de la Innovación 9-11  
31621 Sarriguren (Navarra)  
Spain

for the wind turbine

SG 3.4-132 50/60Hz Rated Power 3.3 - 3.65MW

wind turbine class (class, standard, year)

WT class IIA / S, 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 – 181004 Rev. 1  
19.03.2019

Design evaluation conformity statement  
Dated

STC – 181004 Rev. 1  
19.03.2019

Type test conformity statement  
Dated

STC – 181006 Rev. 1  
19.03.2019

Manufacturing conformity statement  
Dated

STC – 181005 Rev. 1  
19.03.2019

Final evaluation report  
Dated

R12766984-12 Rev. 0  
20.03.2019

The conformity evaluation was carried out in accordance with the rules and procedures of the IECRE System  
[www.iecre.org](http://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:  
2023-12-19

Approved for issue on behalf of the IECRE  
Certification Body:

UL Renewables



Jörn Gerlach  
Vice Head of Certification Body  
Cuxhaven 2019-07-16

DEWI-OCC GmbH  
Am Seedeich 9  
27472 Cuxhaven, Germany



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#### Machine parameters:

Power regulation:	Variable speed and pitch regulation
Rotor orientation:	Upwind
Number of rotor blades:	3
Rotor tilt:	6°
Cone angle:	-4°
Rated power:	3300 / 3465 / 3550 / 3650kW
Rated wind speed $V_r$ :	See Annex I
Rotor diameter:	132m
Hub height(s):	84 / 97 / 101.5 / 114 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 V1 or superior

#### Wind conditions:

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

#### Electrical network conditions:

Normal supply voltage and range:	690V +/- 10%
Normal supply frequency and range:	50/60Hz +/- 6%
Voltage imbalance:	2%
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:	See Annex I
Solar radiation:	1000 W/m <sup>2</sup>
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: B132 Infused blade, structural shells and adhesive joints  
Material: Glass fiber reinforced epoxy resin  
Blade length: 64.5 m  
Number of blades: 3  
Manufacturer: Siemens Gamesa  
Drawing / Data sheet / Part No.: G132i 3.3MW

#### Blade:

Type: B132 Infused blades, structural shells and adhesive joints  
Material: Glass fiber reinforced epoxy resin  
Blade length: 64.5 m  
Number of blades: 3  
Manufacturer: Siemens Gamesa / TPI Mexico / TPI Turkey  
Drawing / Data sheet / Part No.: G132 3.3MW T-Bolts

#### Blade:

Type: B132 Infused blades, structural shells and adhesive joints  
Material: Glass fiber reinforced epoxy resin  
Blade length: 64.5 m  
Number of blades: 3  
Manufacturer: Siemens Gamesa  
Drawing / Data sheet / Part No.: G132FL 3.3MW TB

#### Blade bearing:

Type: Four point contact double row  
Manufacturer: Laulagun  
Drawing / Data sheet / Part No.: M00DST0125XZ  
M00DST0125PN



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### **Wind Turbine**

#### **Blade bearing:**

Type: Four point contact double row  
Manufacturer: Rollix  
Drawing / Data sheet / Part No.: 13-2892-AB  
13-2892-01  
13-2892-03

#### **Blade bearing:**

Type: Four point contact double row  
Manufacturer: SKF  
Drawing / Data sheet / Part No.: 18536001  
18536A01

#### **Blade bearing:**

Type: Four point contact double row  
Manufacturer: Renogear SL  
Drawing / Data sheet / Part No.: 200.0/60.2890.000 (98-106)  
200.0/60.2890.000 (76-106)  
200.0/60.2890.000 (94-106)

#### **Pitch System:**

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

#### **Main shaft:**

Type: Steel shaft  
Manufacturer: Siemens Gamesa  
Material: 42CrMo4+QT /  
Forged 34CrNiMo6 + QT  
Drawing / Data sheet / Part No.: GP360398 & GP404059 /  
GP334823



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#### **Main bearing:**

Type: Spherical Roller Bearing  
Manufacturer: Timken  
Drawing / Data sheet / Part No.: YMDWEW886F / WE-1478-A

#### **Main bearing:**

Type: Spherical Roller Bearing  
Manufacturer: Koyo  
Drawing / Data sheet / Part No.: RHAW33TS1CS

#### **Main bearing:**

Type: Spherical Roller Bearing  
Manufacturer: Schaeffler  
Drawing / Data sheet / Part No.: 623409.PRL  
623394.PRL

#### **Main bearing:**

Type: Spherical Roller Bearing  
Manufacturer: ZKL  
Drawing / Data sheet / Part No.: EW33MH TPF 11519-15  
EW33MH TPF 11519-15

#### **Gearbox:**

Type: Three stages gearbox (two planetary stages and one helical gear stage)  
Gear Ratio:  $i=1:106.404$  (50Hz)  
 $i=1:127.286$  (60Hz)  
Manufacturer: Gamesa Energy Transmission, SAU  
Drawing / Data sheet / Part No.: gBOX 3.3

#### **Yaw System:**

Drive Type: Activated by Yaw drives  
Manufacturer: Bonfiglioli  
Drawing / Data sheet / Part No.: GD268640



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### Wind Turbine

*Drive Type:* Activated by Yaw drives  
*Manufacturer:* Comer  
*Drawing / Data sheet / Part No.:* PG 2504DSP

*Drive Type:* Activated by Yaw drives  
*Manufacturer:* NGC  
*Drawing / Data sheet / Part No.:* FDX204S

*Bearing Type:* Friction Bearing  
*Manufacturer:* Siemens Gamesa  
*Drawing / Data sheet / Part No.:* GD268640

*Gear Type:* Yaw Ring G132 3.3MW  
*Manufacturer:* Siemens Gamesa  
*Drawing / Data sheet / Part No.:* GP300882

*Brake Type:* Integrated in yaw bearing claws with active  
and passive brakes  
*Manufacturer:* Siemens Gamesa  
*Drawing / Data sheet / Part No.:* GD268640

#### **Generator:**

*Type:* Asynchronous doubly-fed machine  
*Manufacturer:* Gamesa Electric  
*Drawing / Data sheet / Part No.:* CR33-6P  
*Rated Power:* 3615 kW  
*Rated Frequency:* 50/60Hz  
*Rated Speed:* 1120/1344 rpm  
*Max. speed:* 1713/2055.6 rpm  
*Rated Voltage:* 690 V  
*Rated Current:* 3000 / 1198A (Stator/Rotor)  
*Insulation Class:* F  
*Degree of Protection:* IP54



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#### Generator (valid only for 3.3/3.465MW variants):

Type	Asynchronous doubly-fed machine
Manufacturer:	Siemens
Drawing / Data sheet / Part No.:	JFWA-630MR
Rated Power:	3585 kW
Rated Frequency:	50/60Hz
Rated Speed:	1120/1344 rpm
Max. speed:	1332 / 1599 rpm
Rated Voltage:	690 V
Rated Current:	2829 / 1125 A (Stator/Rotor)
Insulation Class:	F
Degree of Protection:	IP54 / IP23

#### Converter:

Type:	4 Quadrant DFIG Converter
Manufacturer:	Gamesa Electric
Drawing / Data sheet / Part No:	DAC 3.3 MW
Rated Voltage (grid side):	690V
Rated Current (grid side):	1250/660 A (MSC/LSC)
Degree of Protection:	IP54

#### Transformer:

Type:	Three Phase Dry Type
Manufacturer:	ABB
Drawing / Data sheet / Part No.:	DTE 3900/36
Rated Voltage:	0,69 / 33.6 kV & 0,69 / 34.5 kV
Rated Power:	3900 KVA
Degree of Protection:	IP00
Location (e.g. tower bottom):	Nacelle





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### Wind Turbine

#### Transformer:

Type:	Three Phase Dry Type
Manufacturer:	ABB
Drawing / Data sheet / Part No.:	DTE 3900/24
Rated Voltage:	0,69 / 20 kV
Rated Power:	3900 KVA
Degree of Protection:	IP00
Location (e.g. tower bottom):	Nacelle

#### Transformer (only for 3.3MW):

Type:	Three Phase Dry Type
Manufacturer:	Schneider Electric
Drawing / Data sheet / Part No.:	GP321808
Rated Voltage:	0,69 / 20 kV
Rated Power:	3668 KVA
Degree of Protection:	IP00
Location (e.g. tower bottom):	Nacelle

#### Tower:

Type:	Tubular Steel
Manufacturer:	Siemens Gamesa
Sections:	4
Length:	84 m HH
Drawing / Data sheet / Part No.:	GD289760

#### Tower:

Type:	Tubular Steel
Manufacturer:	Siemens Gamesa
Sections:	4
Length:	97 m HH
Drawing / Data sheet / Part No.:	GD339547



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### Wind Turbine

#### **Tower:**

Type: Tubular Steel  
Manufacturer: Siemens Gamesa  
Sections: 4  
Length: 101.5 m HH  
Drawing / Data sheet / Part No.: GD340275

#### **Tower:**

Type: Tubular Steel  
Manufacturer: Siemens Gamesa  
Sections: 5  
Length: 114 m HH  
Drawing / Data sheet / Part No.: GD275737

#### **Foundation:**

Type: NA  
Manufacturer: NA  
Drawing / Data sheet / Part No.: NA

#### **Foundation Adaptor:**

Type: NA  
Manufacturer: NA  
Drawing / Data sheet / Part No.: NA

#### **Manuals:**

Operation & maintenance manual: See R11268035-2-R6  
Transport manual: See R11268035-2-R6  
Installation & commissioning. manual: See R11268035-2-R6



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#### Annex I – Wind conditions

<i>Wind conditions</i>	<i>SG3.4-132 3.3/3.465MW</i>	<i>SG3.4-132 3.55MW</i>	<i>SG3.4-132 3.65MW</i>
50-year reference wind speed ( $V_{ref}$ )	42.5 m/s	41 m/s	39 m/s
50-year extreme wind speed ( $V_{e50}$ )	59.5 m/s	57.4 m/s	54.6 m/s
Annual average wind speed ( $V_{ave}$ )	8.5 m/s	8.2 m/s	7.8 m/s
Characteristic turbulence intensity $I_{ref}$ at $v_{hub} = 15\text{m/s}$	0.16	0.153	0.147
Air density	1.225 kg/m <sup>3</sup>	1.20 kg/m <sup>3</sup>	1.18 kg/m <sup>3</sup>
Cut-in wind speed	3 m/s	3 m/s	3 m/s
Rated wind speed	9.6 m/s (3.3MW) 10.3 m/s (3.465 MW)	10.6 m/s	11 m/s
Cut-out wind speed (10 min mean)	25 m/s	25 m/s	25 m/s



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#### Annex II - Turbine variants

ID	ID (Type Variant)	IEC WT Class	Power	Derating Temperature	Hub Height	Blade manufacturer
1	AM-1	cIIA	3.3MW	40.5°C	84 m	Siemens Gamesa
2	AM-1	cIIA	3.3MW	40.5°C	97 m	Siemens Gamesa
3	AM-1	cIIA	3.3MW	40.5°C	101.5 m	Siemens Gamesa
4	AM-1	cIIA	3.3MW	40.5°C	114 m	Siemens Gamesa
5	AM 0	cIIA	3.465MW	40°C	84 m	Siemens Gamesa
6	AM 0	cIIA	3.465MW	40°C	97 m	Siemens Gamesa
7	AM 0	cIIA	3.465MW	40°C	101.5 m	Siemens Gamesa
8	AM 0	cIIA	3.465MW	40°C	114 m	Siemens Gamesa
9	AM+1	S	3.55MW	25°C	84 m	Siemens Gamesa
10	AM+1	S	3.55MW	25°C	97 m	Siemens Gamesa
11	AM+1	S	3.55MW	25°C	101.5 m	Siemens Gamesa
12	AM+1	S	3.55MW	25°C	114 m	Siemens Gamesa
13	AM+2	S	3.65MW	20°C	84 m	Siemens Gamesa
14	AM+2	S	3.65MW	20°C	97 m	Siemens Gamesa
15	AM+2	S	3.65MW	20°C	101.5 m	Siemens Gamesa
16	AM+2	S	3.65MW	20°C	114 m	Siemens Gamesa