



Certificate No.

IECRE.WE.TC.18.0032-R3

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, S.L.
Ciudad de la Innovación n°2
31621 Sarriguren (Navarra)
Spain

for the wind turbine

SG 2.2-122

wind turbine class (class, standard, year)

S IEC 61400-1:2005 +Amd1:2010

This certificate is based on a transferred IEC 61400-22 type certificate to IECRE 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

Included in Design Evaluation Conformity Statement

Design evaluation conformity statement
Dated

023.09.2.03.19.06
28.06.2019

Type test conformity statement
Dated

023.09.2.04.19.06
28.06.2019

Manufacturing conformity statement
Dated

023.09.2.05.19.04
28.06.2019

Final evaluation report
Dated

2763946-32-e Rev. 9
28.06.2019

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:
24.05.2023

Approved for issue on behalf of the IECRE
Certification Body:



Add value.
Inspire trust.

TÜV SÜD Industrie Service GmbH
Westendstr. 199,
80686 Munich, Germany

Benjamin Bartels
Certification Body Wind Turbines
Munich, 28.06.2019



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Machine parameters:

Power regulation:	Three independent hydraulic pitch system
Rotor orientation:	Upwind
Number of rotor blades:	3
Rotor tilt:	6°
Cone angle:	-3.7°
Rated power:	2200 kW
Rated wind speed V_r :	9.0 m/s
Rotor diameter:	122 m
Hub height(s):	108 m / 127 m
Hub height operating wind speed range $V_{in} - V_{out}$:	3 – 20 m/s
Design life time:	20 y
Software version:	Control architecture Version V3 or superior

Wind conditions:

Characteristic turbulence intensity I_{ref} at $V_{hub} = 15$ m/s:	15.24
Annual average wind speed at hub height V_{ave} :	7.13 m/s
Reference wind speed V_{ref} :	37.4 m/s
Mean flow inclination:	8°
Hub height 50-year extreme wind speed V_{e50} :	52.4 m/s

Electrical network conditions:

Normal supply voltage and range:	690 V \pm 10 %
Normal supply frequency and range:	50 Hz \pm 6%
Voltage imbalance:	34.5 V (5%)
Maximum duration of electrical power network outages:	N/A
Number of electrical network outages	100 / year



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Other environmental conditions (where taken into account):

Design conditions in case of offshore WT :	N/A
Normal and extreme temperature ranges:	-10°C - +40°C -20°C - +50°C
Relative humidity of the air:	Up to 95%
Air density:	1.164 kg/m ³
Solar radiation:	1000 W/m ²
Lightning protection system (standard and protection class):	IEC 61400-24 / LPS1
Earthquake model and parameters (standard and key parameters e.g. spectrum, model, seismic zone, soil class, etc.):	N/A
Other design conditions :	N/A



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Major components:

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

Blade:

Type: B122
Material: Glass fiber reinforced, impregnated
Blade length: 60 m
Number of blades: 3
Manufacturer: SGRE
Drawing / Data sheet / Part No.: SG 122 V0

Blade:

Type: B122
Material: Glass fiber reinforced, impregnated
Blade length: 60 m
Number of blades: 3
Manufacturer: SGRE
Drawing / Data sheet / Part No.: SG 122 V1

Blade:

Type: G122
Material: Glass fiber reinforced, impregnated
Blade length: 60 m
Number of blades: 3
Manufacturer: LM
Drawing / Data sheet / Part No.: LM 60.0 P

Blade bearing:

Type: Four points contact double row
Manufacturer: Rollix / DEFONTAINE
Drawing / Data sheet / Part No.: 13-2418-XX



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TYPE CERTIFICATE

Wind Turbine

Blade bearing:

Type: Four points contact double row
Manufacturer: TMB
Drawing / Data sheet / Part No.: B030.53.2418Kx

Pitch System:

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

Pitch System:

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

Pitch System:

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

Pitch System:

Motor / Actuator Type: Double acting hydraulic cylinder
Pitch Controller Type: Hydraulic
Manufacturer: Fluitechnik / Wheels India

Main shaft:

Type: Steel shaft
Manufacturer: SGRE
Material: 42CrMo4
34CrNiMo6 (alternative)
Drawing / Data sheet / Part No.: GP360361

Main shaft:



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TYPE CERTIFICATE

Wind Turbine

Type: Steel shaft
Manufacturer: SGRE
Material: 42CrMo4
34CrNiMo6 (alternative)
Drawing / Data sheet / Part No.: GP460606

Main bearing:

Type: Two double row spherical roller bearing
Manufacturer: TIMKEN
Drawing / Data sheet / Part No.: C951246 (front)
C951247 (rear)

Main bearing:

Type: Two double row spherical roller bearing
Manufacturer: ZKL
Drawing / Data sheet / Part No.: 230/750 EW33MH TPF 11528-16 (front)
241/500 EW33MH TPF 11528-16 (rear)

Main bearing:

Type: Two double row spherical roller bearing
Manufacturer: KOYO
Drawing / Data sheet / Part No.: DSA310080 (front)
DSA310090 (rear)

Gearbox:

Type: Three stages gearbox (one planetary
stage and two helical gear stages)
Gear Ratio: 128.5
Manufacturer: ZF Wind Power
Drawing / Data sheet / Part No.: GE2000PL128.5-50Hz-CSA
GE2000PL128.5-50Hz-ENHB
GE2000PL128.5-50Hz-ENHC
GE2000PL128.5-50Hz-ENHB-XTR
GE2000PL128.5-50Hz-ENHC-XTR
GE2000PL-128.5-50Hz-CSA-XTR

Gearbox:

Type: Three stages gearbox (one planetary
stage and two helical gear stages)



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Wind Turbine

Gear Ratio:	128.5
Manufacturer:	SGRE
Drawing / Data sheet / Part No.:	GE2000PL128.5-50Hz-ENHB GE2000PL128.5-50Hz-ENHC GE2000PL128.5-50Hz-ENHB-XTR GE2000PL128.5-50Hz-ENHC-XTR
Gearbox:	
Type:	Three stages gearbox (one planetary stage and two helical gear stages)
Gear Ratio:	128.5
Manufacturer:	NGC
Drawing / Data sheet / Part No.:	GE2000PL128.5-50Hz-ENHB GE2000PL128.5-50Hz- ENHB-XTR
Gearbox:	
Type:	Three stages gearbox (one planetary stage and two helical gear stages)
Gear Ratio:	128.5
Manufacturer:	Siemens Limited
Drawing / Data sheet / Part No.:	GE2000PL128.5-50Hz-CSA GE2000PL128.5-50Hz-CSA-XTR
Gearbox:	
Type:	Three stages gearbox (one planetary stage and two helical gear stages)
Gear Ratio:	128.5
Manufacturer:	Siemens Limited (Winergy)
Drawing / Data sheet / Part No.:	GE2000PL128.5-50Hz-G122 MY20 OPTIMAFLEX
Gearbox:	
Type:	Three stages gearbox (one planetary stage and two helical gear stages)
Gear Ratio:	128.5
Manufacturer:	Siemens Gamesa
Drawing / Data sheet / Part No.:	GE2000PL128.5-50Hz-G122 MY20 OPTIMAFLEX
Gearbox:	



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TYPE CERTIFICATE

Wind Turbine

Type: Three stages gearbox (one planetary stage and two helical gear stages)
Gear Ratio: 128.5
Manufacturer: NGC
Drawing / Data sheet / Part No.: GE2000PL128.5-50Hz-G122 MY20 OPTIMAFLEX

Gearbox:

Type: Three stages gearbox (one planetary stage and two helical gear stages)
Gear Ratio: 128.5
Manufacturer: ZF
Drawing / Data sheet / Part No.: GE2000PL128.5-50Hz-G122 MY20 OPTIMAFLEX

Yaw System:

Drive Type: Active by yaw drives
Manufacturer: SGRE
Drawing / Data sheet / Part No.: GD254280 - Layout

Bearing Type: Friction Bearing
Manufacturer: SGRE
Drawing / Data sheet / Part No.: GP222733 – Yaw Ring

Gear Type: Planetary gear with motor and brake
Manufacturer: Bonfiglioli
Drawing / Data sheet / Part No.: 710T4

Gear Type: Planetary gear with motor and brake
Manufacturer: Comer
Drawing / Data sheet / Part No.: PG 2504DSP / 5718.050.0508

Gear Type: Planetary gear with motor and brake
Manufacturer: SEW
Drawing / Data sheet / Part No.: P4W034



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Wind Turbine

<i>Gear Type:</i>	Planetary gear with motor and brake
Manufacturer:	NGC
Drawing / Data sheet / Part No.:	FDX204S-01-00R1
<i>Gear Type:</i>	Planetary gear with motor and brake
Manufacturer:	Brevini
Drawing / Data sheet / Part No.:	SI0013423
<i>Brake Type:</i>	Hybrid (active hydraulically / passive loaded)
Manufacturer:	Antec
Drawing / Data sheet / Part No.:	20.101.562, 20.101.563 20.103.227 Rev. B, 20.103.230 Rev. A
Manufacturer:	Frenos Iruna
Drawing / Data sheet / Part No.:	1445062, 6700066, 6700067, 6700081
Manufacturer:	JIAOZUO
Drawing / Data sheet / Part No.:	GMS-G114-A-01, GMS-G114-A-02
Manufacturer:	ALTRA GKN
Drawing / Data sheet / Part No.:	390-30263, 390-30264, 390-00015, 390-00016



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Generator:

Type	Doubly-fed induction machine
Manufacturer:	Gamesa / Cantarey
Drawing / Data sheet / Part No.:	CR2x-4P
Rated Power:	2170 kW / 2040 kW
Rated Frequency:	50 Hz
Rated Speed:	1680 rpm
Max. speed:	1900 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 India Limited
Drawing / Data sheet / Part No.:	AMK 500L4A / AMK 500L4A BATY
Rated Power:	2170 kW
Rated Frequency:	50 Hz
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: PT0097, PT0103, PT0110, PEGE0044,
PEGE0114
Rated Voltage (grid side): 690 V
Rated Current (grid side): 250 - 300 A
Degree of Protection: IP54

Transformer:

Type: Dry type vacuum cast resin transformer
Manufacturer: ABB Power Technology S.A.
Drawing / Data sheet / Part No.: DTE 2350/24, DTE 2350/36
Rated Voltage: 690 V / 20000 V
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, 50 Hz
DTTH1NG 2500/20, 50 Hz
Rated Voltage: 690 V / 33000 V
Rated Power: 2350 kVA
Degree of Protection: IP00
Location (e.g. tower bottom): Nacelle



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Wind Turbine

Transformer:

Type: Dry type vacuum cast resin transformer
Manufacturer: ABB Power Technology S.A.
Drawing / Data sheet / Part No.: 2350 / HiT33
Rated Voltage: 690 V / 33000 V
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
Rated Voltage: 690 V / 35000 V
Rated Power: 2350 kVA
Degree of Protection: IP00
Location (e.g. tower bottom): Nacelle

Transformer:

Type: Dry type vacuum cast resin transformer
Manufacturer: RAYCHEM
Drawing / Data sheet / Part No.: ADA2716015
Rated Voltage: 690 V / 33000 V
Rated Power: 2350 kVA
Degree of Protection: IP00
Location (e.g. tower bottom): Nacelle



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Tower:

Type: Tubular steel tower
Sections: 4
Length: 108 m HH
Drawing / Data sheet / Part No.: GD405795

Tower:

Type: Tubular steel tower
Sections: 5
Length: 127 m HH
Drawing / Data sheet / Part No.: GD405029

Foundation:

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

Foundation Adaptor:

Type: Tubular steel tower
Manufacturer: NA
Drawing / Data sheet / Part No.: NA

Manuals:

Operation & maintenance manual: PM000882
Transport manual: GP199954
Installation & commissioning. manual: GP301951