



Certificate No.

IECRE.WE.TC.22.0115-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.
Avda. Ciudad de la innovación 9-11
31621 Sarriguren (Navarra)
Spain

for the wind turbine

SG 3.6-145 (LM 71.0 P2)

wind turbine class (class, standard, year

S, IEC 61400-1/A1, 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 (*covered in the design evaluation conformity statement)

IECRE.WE.CS.22.0150-R1
22.09.2022

Design evaluation conformity statement
Dated

IECRE.WE.CS.22.0150-R1
22.09.2022

Type test evaluation conformity statement
Dated

STC-220094-R2
27.09.2022

Manufacturing evaluation conformity statement
Dated

STC-220095-R3
04.11.2022

Final evaluation report
Dated

R13889596-12a-R3
04.11.2022

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.

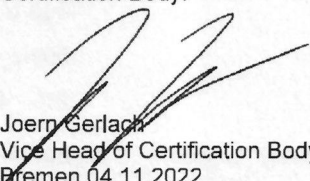
Changes in the system design or the manufacturer's quality system are to be approved by the Certification Body. Without approval, the certificate loses its validity.

This certificate is valid until:
01.12.2025

Approved for issue on behalf of the IECRE
Certification Body:

UL Renewables




Joern Gerlach
Vice Head of Certification Body
Bremen 04.11.2022

DEWI-OCC GmbH
Contrescarpe 45
28195 Bremen, Germany





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Annex I - Wind turbine characteristics

Machine parameters:

Power regulation:	Variable speed and pitch control
Rotor orientation:	upwind
Number of rotor blades:	3
Rotor tilt:	6°
Cone angle:	-4°
Rated power:	3.6 MW
Rated wind speed V_r :	10 m/s
Rotor diameter:	145 m
Hub height(s):	127.5 m
Hub height operating wind speed range $V_{in} - V_{out}$:	3 m/s - 20 m/s
Design life time:	20 years
Software version:	Control Architecture V2 or superior

Wind conditions:

Characteristic turbulence intensity I_{ref} at $V_{hub} = 15$ m/s:	15.25%
Annual average wind speed at hub height V_{ave} :	7.0 m/s
Reference wind speed V_{ref} :	37.4 m/s
Mean flow inclination:	8 degrees
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:	50Hz \pm 6%
Voltage imbalance:	2% - 4%
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: 0°C to +35°C Extreme: 0°C to +50°C
Relative humidity of the air:	Up to 95%
Air density:	1.12 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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Annex II - Major components:

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

Blade:

Manufacturer:	LM Wind Power LM Wind Power (Qinhuangdao) Co. Ltd. LM Wind Power Blades (India) Pvt. Ltd.
Type:	LM 71.0 P2
Material:	Glass fiber reinforced polyester
Blade length:	71 m
Number of blades:	3

Blade bearing:

Type:	Four point contact double row
Manufacturer:	Laulagun Laulagun Bearings India Private. Ltd
Drawing / Data sheet / Part No.:	F3132M00DST0125QVV

Blade bearing:

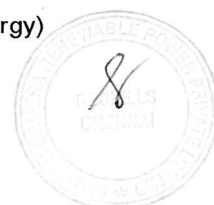
Type:	Four point contact double row
Manufacturer:	Wafangdian Bearing Group Wind Power Bearing Co. Ltd.
Drawing / Data sheet / Part No.:	FL-HSB2889DX1K-C4 FL-HSB2889DX1K-C5

Pitch system:

Motor / Actuator Type:	Double acting hydraulic cylinder
Pitch Controller Type:	Hydraulic
Manufacturer:	SGRE (Siemens Gamesa Renewable Energy)

Main shaft:

Type:	Steel shaft
Manufacturer (Designer):	SGRE (Siemens Gamesa Renewable Energy)
Material:	Forged steel
Drawing / Data sheet / Part No.:	GP501561 (GP501560)





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Main bearing:

Type: Double-row spherical roller bearing
Manufacturer: Timken
Drawing / Data sheet / Part No.: C949521 (230/800 YMDWEW886C)
C952045 (WE-1478-A)

Main bearing:

Type: Double-row spherical roller bearing
Manufacturer: Koyo / JTEKT Corporation
Drawing / Data sheet / Part No.: DSA306671 (230/800RHAW33TS1)
DSA309921 (231/630RHAW33TS1)

Main bearing:

Type: Double-row spherical roller bearing
Manufacturer: ZKL
Drawing / Data sheet / Part No.: 230/800EW33MH TPF 11517-15_NV
231/630EW33MH TPF 11519-15_NV

Gearbox:

Type: Three stages (two planetary gear stages plus one helical gear stage)
Gear Ratio: 1:106.4 (50 Hz)
Manufacturer: SGRE (Siemens Gamesa Renewable Energy)
Drawing / Data sheet / Part No.: gBOX3.65

Gearbox:

Type: Three stages (two planetary gear stages plus one helical gear stage)
Gear Ratio: 1:106.444 (50 Hz)
Manufacturer: ZF Wind Power
ZF Wind Power Coimbatore Pvt. Ltd.
ZF Wind Power Tianjin Ltd.
Drawing / Data sheet / Part No.: 097-EH0951A001





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Yaw Ring:

Manufacturer:

Dalian Tracy Slewing Bearing Manufacturing
Company Ltd.
Dalian United Wind Power Generation Bearing Co.
Ltd.

Drawing / Data sheet / Part No.:

GP499535

Yaw System:

Drive Type:

Sliding bearing, activated by yaw drives

Manufacturer:

SGRE (Siemens Gamesa Renewable Energy)

Drawing / Data sheet / Part No.:

GD268640

Bearing Type:

Slide bearing provided by axial and radial PETP
bearing pads

Manufacturer:

SGRE (Siemens Gamesa Renewable Energy)

Drawing / Data sheet / Part No.:

GD268640

Gear Type:

Geared by yaw drives

Manufacturer:

Bonfiglioli

Drawing / Data sheet / Part No.:

56265331 (710T4)

Manufacturer:

Comer

Drawing / Data sheet / Part No.:

5718.050.0508 / N06771_00 (PG 2504DSP)

Manufacturer:

NGC

Drawing / Data sheet / Part No.:

FDX204S

Manufacturer:

Bonfiglioli

Drawing / Data sheet / Part No.:

I7090T004704 (709T4)

Brake Type:

Yaw claws with active and passive brake pads

Manufacturer:

IRUNA INDIAN BRAKES PVT. LTD.

Drawing / Data sheet / Part No.:

GP345273 (Lower claw 4 act - 2 pas)
GP345274 (Lower claw 2 act - 4 pas)
GP345275 (Upper part)





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Generator:

Type:	Asynchronous doubly-fed machine
Manufacturer (Designer):	SGRE (Siemens Gamesa Renewable Energy)
Drawing / Data sheet / Part No.:	CR33-6P
Rated Power:	3450 / 3585 kW
Rated Frequency:	50 Hz
Rated Speed:	1120 rpm
Rated Voltage:	690 V
Rated Current (stator / rotor):	2610-2712 A (range) / 961-1007 A (range)
Insulation Class:	F / F
Degree of Protection:	IP54 / IP23

Converter:

Type:	DAC 3.3 MW
Manufacturer (Designer):	SGRE (Siemens Gamesa Renewable Energy)
Drawing / Data sheet / Part No:	GP306944 / GP317306
Rated Voltage (grid side):	0 - 690 / 690 ($\pm 10\%$) V
Rated Current (grid side):	1250 / 660 A
Degree of Protection:	IP54

Converter:

Type:	DAC CONVERTER 3,4 MW PREMIUM
Manufacturer (Designer):	KK Wind Solutions India Pvt. Ltd. Gamesa Electric S.A. Unipersonal
Drawing / Data sheet / Part No:	GP443724 (GP451967) / GP443721
Rated Voltage (grid side):	0 - 690 / 690 ($\pm 10\%$) V
Rated Current (grid side):	1250 / 660 A
Degree of Protection:	IP54





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Converter:

Type:	DAC CONVERTER 3,4 MW PREMIUM
Manufacturer (Designer):	SGRE (Siemens Gamesa Renewable Energy)
Drawing / Data sheet / Part No.:	GP439687 / GP439692
Rated Voltage (grid side):	0 - 690 / 690 ($\pm 10\%$) V
Rated Current (grid side):	1250 / 660 A
Degree of Protection:	IP54

Transformer:

Type:	Three phase dry type
Manufacturer:	ABB
Drawing / Data sheet / Part No.:	DTE 3900/36
Rated Voltage:	33.6 / 0.69 kV 34.5 / 0.69 kV 33 / 0.69 kV 30 / 0.69 kV
Rated Power:	3900 KVA
Location (e.g. tower bottom):	Nacelle

Transformer:

Type:	Three phase dry type
Manufacturer:	ABB
Drawing / Data sheet / Part No.:	DTE 3900/24
Rated Voltage:	20 / 0.69 kV
Rated Power:	3900 KVA
Location (e.g. tower bottom):	Nacelle

Transformer:

Type:	Three phase dry type
Manufacturer:	SGB Starkstrom Geratebau GmbH
Drawing / Data sheet / Part No.:	DTTH1NG 3150/30
Rated Voltage:	33 / 0.69 kV
Rated Power:	3900 KVA
Location (e.g. tower bottom):	Nacelle





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Transformer:

Type: Three phase dry type
Manufacturer: ABB
Drawing / Data sheet / Part No.: DTE 3900/AF
Rated Voltage: 34.5 / 0.69 kV
Rated Power: 3900 KVA
Location (e.g. tower bottom): Nacelle

Transformer:

Type: Three phase dry type
Manufacturer: Hainan Jinpan Smart Technology Co., Ltd.
Drawing / Data sheet / Part No.: SCLB10-3900/35, 3900 kVA, 35 kV, 50Hz
Rated Voltage: 35 / 0.69 kV
Rated Power: 3900 KVA
Location (e.g. tower bottom): Nacelle

Cabinets:

Type: Stator cabinet
Manufacturer: KK Wind Solutions India Pvt. Ltd.
Gamesa Electric S.A. Unipersonal
Drawing / Data sheet / Part No.: GP539786 / GP542800

Type: Top cabinet
Manufacturer: KK Wind Solutions India Pvt. Ltd.
Gamesa Electric S.A. Unipersonal
Drawing / Data sheet / Part No.: GP556861 / GP570768

Type: Hub cabinet
Manufacturer: KK Wind Solutions India Pvt. Ltd.
Gamesa Electric S.A. Unipersonal
Drawing / Data sheet / Part No.: GP507552 / GP479691 / GP486862

Type: Tower base cabinet (Ground controller)
Manufacturer: Gamesa Electric S.A. Unipersonal
Drawing / Data sheet / Part No.: GP568162 / GP564579 / GP565243





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Tower:

Designer:	SGRE (Siemens Gamesa Renewable Energy)
Type:	Tubular steel tower
Sections:	5
Length:	127.5
Drawing / Data sheet / Part No.:	GD444587

Foundation:

Type:	N/A
Manufacturer:	N/A
Drawing / Data sheet / Part No:	N/A

Foundation Adaptor:

Type:	N/A
Manufacturer:	N/A
Drawing / Data sheet / Part No:	N/A

Manuals:

Operation & maintenance manual:	See applicable control and protection system evaluation report
Transport manual:	See applicable control and protection system evaluation report
Installation & commissioning. manual:	See applicable control and protection system evaluation report

