



Certificate No.

IECRE.WE.TC.18.0007-R0

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

PROVISIONAL TYPE CERTIFICATE

Wind Turbine

This certificate is issued to

Suzlon Energy Ltd.
One Earth
Opp. Magarpatta City
Pune, 411028
India

for the wind turbine

Suzlon S120 DFIG 2.1MW (50 Hz)

wind turbine class (class, standard, year)

S, IEC 61400-1 Ed.3:2005-08 incl. Amendment 1: 2010-10

This certificate is transferred from IEC 61400-22 to IECRE (according to WE-OMC/316/DV and WE-OMC/321/RV) 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

44 220 18245100-TDB-IEC
Rev. 0, 2018-10-15

Prov. Design evaluation conformity statement
Dated

44 220 18245100-PD-IEC
Rev. 2, 2018-12-20

Prov. Type test conformity statement
Dated

44 220 18245100-PT-IEC
Rev. 1, 2018-12-20

Manufacturing conformity statement
Dated

44 220 18245100-M-IEC
Rev. 1, 2018-12-20

Component certificate PT0100
Dated

44 220 17257731-CC-IEC
Rev.0, 2017-09-25, valid until 2022-09-20

Final evaluation report
Dated

8115 245 100-20 E
Rev. 1, 2018-12-20

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 the TÜV NORD CERT GmbH.
Without approval, the certificate loses its validity.

This certificate is valid until:
2019-10-29

Approved for issue on behalf of the IECRE
Certification Body:

Dipl.-Ing. C. Hering
Specialist Manager Wind Energy
Essen, 2018-12-20



TÜV NORD CERT GmbH
Langemarckstraße 20
45141 Essen



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Machine parameters:

Power regulation:	Independent electromechanical pitch system for each blade
Rotor orientation:	Upwind
Number of rotor blades:	3
Rotor tilt:	5°
Cone angle:	3.5°
Rated power:	2100 kW
Rated wind speed V_r :	9.5 m/s
Rotor diameter:	120 m
Hub height(s):	105 m, 140 m
Hub height operating wind speed range $V_{in} - V_{out}$:	3 – 18 m/s
Design life time:	20 years
Software version:	18.20.4.2

Wind conditions:

Characteristic turbulence intensity I_{ref} at $V_{hub} = 15$ m/s:	Conf. 1: 14% Conf. 2: 9.1% (wind distribution defined in DECS)
Annual average wind speed at hub height V_{ave} :	Conf. 1: 7.25 m/s Conf. 2: 7.39 m/s
Reference wind speed V_{ref} :	Conf. 1: 36.5 m/s Conf. 2: 22.1 m/s
Mean flow inclination:	Conf. 1: 8° Conf. 2: 0.8°
Hub height 50-year extreme wind speed V_{e50} :	Conf. 1: 51.1 m/s Conf. 2: 30.94 m/s

Electrical network conditions:

Normal supply voltage and range:	690 V -15% / +10%
Normal supply frequency and range:	50 Hz -6% / +5%
Number of electrical network outages	365/year



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Other environmental conditions (where taken into account):

Normal and extreme temperature ranges:	HTV Light 0°C - +45°C (operational) 0°C - +50°C (survival)
Relative humidity of the air:	Up to 95%
Air density:	Conf.1: 1.16 kg/m ³ Conf.2: 1.15 kg/m ³
Solar radiation:	1000 W/m ²
Lightning protection system (standard and protection class):	IEC 61400-24, LPL 1
Other design conditions :	Max. snow load on nacelle: 0kN/m ² Max. altitude above sea level for electrical components: 1000 m

Configurations:

Conf. No	Hub Height	IEC wind class	Climate conditions	Annual average air density
1	105 m	IEC S	HTV Light	1.16 kg/m ³
2	140 m (HLT)	IEC S	HTV Light	1.15 kg/m ³



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Major components:

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

Blade (Conf. 1):

Type: Vacuum infusion
Material: glass fibre reinforced epoxy
Blade length: 59 m
Number of blades: 3
Manufacturer: Suzlon Energy Ltd.
Drawing / Data sheet / Part No.:
Designation: SB59S1
Drawing No.: SB59XX-D-01-00001, Rev.
1
Specification: SB59S1-S-01-00001, Rev.
02

Blade (Conf. 2):

Type: Vacuum infusion
Material: glass fibre reinforced epoxy
Blade length: 59 m
Number of blades: 3
Manufacturer: Suzlon Energy Ltd.
Drawing / Data sheet / Part No.:
Designation: SB59S2
Drawing No.: SB59XX-D-01-00001, Rev.
0
Specification: SB59S2-S-01-00001,
Rev.00

Blade bearing:

Type: Double-row ball bearing slewing ring
Manufacturer: IMO GmbH & Co. KG
Drawing / Data sheet / Part No.:
Designation: 11900
Drawing No.: 42-552424/4-11900, Rev. -

alternative:

Type: Double-row ball bearing slewing ring
Manufacturer: Laulagun Bearings, S.L.
Drawing / Data sheet / Part No.:
Designation: F2634M16DTTI125FAB
Drawing No.: F2634M16DTTI125FAB, Rev. 0



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Pitch System:

Motor / Actuator Type:	E-Motor
Motor / Actuator Manufacturer:	Bonfiglioli Trasmital
Motor / Actuator Designation:	BN 132MA 4 230/400-50 IP55 CLF B5 FD100 270SD
Pitch Controller Type:	PLC
Manufacturer:	Bachmann
Gear Type:	3-stage planetary gearbox
Manufacturer:	Bonfiglioli Trasmital
Drawing / Data sheet / Part No.:	Main drawing no: 56120990, Rev. F Designation: 707T3F (Pitch drive MT707T033)

Main shaft:

Type:	Forged
Manufacturer:	Suzlon Energy Ltd. (Design) Zhongyuan Special Steel Co. Ltd. Tongyu Heavy Industry Co., Ltd. Shandong Laiwu Jinlei Wind Power Tech. Co. Ltd.
Material:	42CrMoS4/42CrMo4
Drawing / Data sheet / Part No.:	Drawing No.: M334.000985-04, Rev. 4

Main bearing:

Type:	Spherical roller bearing
Manufacturer:	Schaeffler Technologies AG & Co. KG (FAG)
Drawing / Data sheet / Part No.:	Designation: 240/710B.MB.R250.370.M15BK.M47 Drawing No.: 240/710B.MB.R250.370.M15BK.M47

alternative:

Type:	Spherical roller bearing
Manufacturer:	Schaeffler Technologies AG & Co. KG (FAG)
Drawing / Data sheet / Part No.:	Designation: F-623425.PRL-M15BK-C2H Drawing No.: EDD F-623425.PRL 000



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alternative:

Type: Spherical roller bearing
Manufacturer: SKF Group
Drawing / Data sheet / Part No.: Designation: 240/710 BC/C2H
Drawing No.: 240/710 BC/C2H, Rev.1

alternative:

Type: Spherical roller bearing
Manufacturer: SKF Group
Drawing / Data sheet / Part No.: Designation: 240/710 ECA/C2HW
33RE10
Drawing No.: 240/710 ECA/C2HW
33RE10, Rev.2

Gearbox:

Type: Planetary helical gearbox
Gear Ratio: 89.79
Manufacturer: ZF Wind Power Coimbatore Pvt. Ltd.
Drawing / Data sheet / Part No.: Designation: EH0828A-001
Drawing No.: 097-EH0828A001, Rev. B

alternative:

Type: Planetary helical gearbox
Gear Ratio: 89.775
Manufacturer: Siemens AG - Germany / Siemens Ltd. –
India
Drawing / Data sheet / Part No.: Designation: Winergy PEAB 4450
Drawing No.: A5E35769398A, Rev. AK
(011)

Yaw System:

Drive Type: E-motor with motor brake
Manufacturer: Bonfiglioli
Drawing / Data sheet / Part No.: Designation: BN100LB4 400/690-50

Bearing Type: Slide block system with friction pads
Manufacturer: Suzlon Energy Ltd.
Drawing / Data sheet / Part No.: Drawing No.: M310.000107-00, Rev. 0



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Gear Type: 5-stage planetary gearbox
Manufacturer: Bonfiglioli Trasmital
Drawing / Data sheet / Part No.: Designation: 712T5F (MT712T086 / MT712T092)
Drawing no. (MT712T086): I7120T014000, Rev. D
Drawing no. (MT712T092): I7120T016500, Rev. A

Brake Type: See drive and bearing

Generator:

Type: Doubly-fed induction generator (DFIG)
Manufacturer: Suzlon Energy Ltd
Drawing / Data sheet / Part No.: Designation: MRL-063Z06
Rated Power: 2170 kW
Rated Frequency: 50 Hz
Rated Speed: 1166 rpm
Rated Voltage: 690 V
Rated Current: 1580 A (Stator)
540 A (Rotor)
Insulation Class: H
Degree of Protection: IP 54

Converter:

Type:
Manufacturer: Ingeteam (Design)
Suzlon Energy Ltd.
Drawing / Data sheet / Part No.: Designation: PT0100
Rated Voltage (grid side): 690 V
Rated Current (grid side): 600 A
Degree of Protection: IP 54

alternative:

Manufacturer: Vertiv Tech Co. Ltd.
Drawing / Data sheet / Part No.: Designation: WF1000-06L0210-CPN-A
Rated Voltage (grid side): 690 V
Rated Current (grid side): 600 A
Degree of Protection: IP54



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Transformer:

Out of scope (outside tower)

Tower (Conf. 1):

Type:

Tubular Steel Tower

Manufacturer:

Suzlon Energy Ltd.
Tool fab Engineering Industries (P) Ltd.
Barakath Engineering Industries Pvt. Ltd.
Jay Engineering Industries
Altec Fabricators
Cu-Built Engineers Pvt. Ltd.
Metal Engineers
Likhita Energy Systems Pvt. Ltd.

Sections:

5

Length:

101.895 m

Drawing / Data sheet / Part No.:

Drawing No.: M200.000272-02, Rev. B
Foundation specification: TGDE-RE-
003172, Rev.03

Tower (Conf.2)

Type:

Hybrid Lattice Tower

Manufacturer:

Suzlon Energy Ltd.
Tool fab Engineering Industries (P) Ltd.
Barakath Engineering Industries Pvt. Ltd.
Jay Engineering Industries
Altec Fabricators
Cu-Built Engineers Pvt. Ltd.
Metal Engineers
Likhita Energy Systems Pvt. Ltd.
Derit Infrastructure Private Limited
Associated Power Structure Pvt. Ltd.
Sanvijay Infrastructures Pvt. Ltd.

Sections:

Length:

138.015 m

Drawing / Data sheet / Part No.:

Drawing No.: M200.000276-01, Rev. 01
Tubular part: M201.000672-01, Rev. 01
Lattice part: M801.000030-01, Rev. 01
Foundation specification: M111.300006-
00, Rev. 01



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Manuals:

Operation & maintenance manual:

TGPM-MA-006850-S120-OMS, Rev. 04

Transport manual, Installation &
commissioning. manual:

TGPM-MA-006850-S120-A, Rev. 04

Outstanding issues:

1. Design evaluation of fatigue loads for Conf. 2
2. Design evaluation of the blade fatigue test specification, post fatigue test specification, fatigue test evaluation, post fatigue test evaluation as well as evaluation of the manuals and manufacturing documentation for the blades
3. Design evaluation of internals for Conf. 2
4. Completion of evaluation of test report for load validation