



Certificate. No.

IECRE.WE.TC.18.0007-R2

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

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

Design evaluation conformity statement
Dated

44 220 18245100-D-IEC
Rev. 0, 2019-02-04

Type test conformity statement
Dated

44 220 18245100-T-IEC
Rev. 0, 2019-02-04

Manufacturing conformity statement
Dated

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

Component certificate Converter PT0100
Dated

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

Component certificate Rotor Blade SB59S2

44 220 19482776-CC-IEC
Rev. 0, 2019-01-23, valid until 2024-01-22

Final evaluation report
Dated

8116 608 191-20 E
Rev. 0, 2019-02-04

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:
2024-02-03

Approved for issue on behalf of the IECRE
Certification Body:

Dipl. Technomath. K. Götz
Deputy Specialist Manager Wind Energy
Essen, 2019-02-07



TÜV NORD CERT GmbH
Langemarckstraße 20
45141 Essen



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The wind turbine can be operated additionally in an enhanced performance mode. Some values differ for this mode. Power output during running in enhanced performance mode is 2250 kW at rated wind speed.

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 heights: | 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: | 14% |
| Annual average wind speed at hub height V_{ave} : | 7.25 m/s |
| Reference wind speed V_{ref} : | 36.5 m/s |
| Mean flow inclination: | 8° |
| Hub height 50-year extreme wind speed V_{e50} : | 51.1 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: | 1.16 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 | Tower Type |
|----------|------------|----------------------|
| 1 | 105 m | Tubular Steel (TT) |
| 2 | 140 m | Hybrid lattice (HLT) |



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Major components:

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

Blade SB59S2 :

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

Pitch System:

Motor / Actuator Type: E-Motor
Motor / Actuator Manufacturer: Bonfiglioli Transmissions (PVT) Ltd.
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)



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Main shaft:

Type: Forged
Manufacturer: Suzlon Energy Ltd. (Design)
Zhongyuan Special Steel Co. Ltd., Jiyuan
City, China
Tongyu Heavy Industry Co., Ltd.,
Shandong, China
Shandong Laiwu Jinlei Wind Power Tech.
Co. Ltd., Shandong, China
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) (Design)
Schaeffler Romania S.R.L., Brasov,
Romania
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) (Design)
Schaeffler Romania S.R.L., Brasov,
Romania
Drawing / Data sheet / Part No.: Designation: F-623425.PRL-M15BK-C2H
Drawing No.: EDD F-623425.PRL 000

alternative:

Type: Spherical roller bearing
Manufacturer: SKF Group (Design)
SKF Technologies India Pvt. Ltd.,
Ahmedabad, Gujarat, India
Drawing / Data sheet / Part No.: Designation: 240/710 BC/C2H
Drawing No.: 240/710 BC/C2H, Rev.1

alternative:

Type: Spherical roller bearing



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Manufacturer: SKF Group (Design)
SKF Technologies India Pvt. Ltd.,
Ahmedabad, Gujarat, India
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 (Design)
309/2, "A" Block 100, Chettipattu Village,
Thandalam Post. Sriperumbudur Taluk,
Kancheepuram Dist., 602105 India
Drawing / Data sheet / Part No.: Designation: Winergy PEAB 4450
Drawing No.: A5E35769398A, Rev. AK
(011)

Yaw System:

Type: Active, friction bearing with gear rim, 6 active yaw drives and
motor brake

Drive Type: E-motor with motor brake
Manufacturer: Bonfiglioli Transmissions (PVT) Ltd.
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
Gear Type: 5-stage planetary gearbox



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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
Max. speed: 1300 rpm
Rated Current: 1580 A (Stator)
540 A (Rotor)
Insulation Class: H
Degree of Protection: IP 54

Converter:

Type:
Manufacturer: Ingeteam (Design)
Suzlon Energy Ltd., Combatore, India
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. (Design)
Emerson Network Power Co. Ltd.
(VERTIV), Mianyang, China
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, HH 105m

Manufacturer:

Suzlon Energy Ltd. (Design)
Suzlon Energy Ltd., Chopadava, Kutch,
India
Tool fab Engineering Industries (P) Ltd.,
Trichy, Tamilnadu, India
Barakath Engineering Industries Pvt. Ltd.,
Trichy, Tamilnadu, India
Jay Engineering Industries, Trichy,
Tamilnadu, India
Altec Fabricators, Trichy, Tamilnadu,
India
Cu-Built Engineers Pvt. Ltd., Khandala,
India
Metal Engineers, Trichy, Tamilnadu, India
Likhita Energy Systems Pvt. Ltd., Ongole,
Prakasham, India

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, HH 140m

Manufacturer:

Suzlon Energy Ltd. (Design)

Steel part:
Suzlon Energy Ltd., Chopadava, Kutch,
India
Tool fab Engineering Industries (P) Ltd.,
Trichy, Tamilnadu, India
Barakath Engineering Industries Pvt. Ltd.,
Trichy, Tamilnadu, India
Jay Engineering Industries, Trichy,
Tamilnadu, India
Altec Fabricators, Trichy, Tamilnadu,
India
Cu-Built Engineers Pvt. Ltd., Khandala,
India
Metal Engineers, Trichy, Tamilnadu, India



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Likhita Energy Systems Pvt. Ltd., Ongole,
Prakasham, India

Lattice part:
Valmont Structures Pvt. Ltd., Survey No.
189 to 193, Village: Chandrapur – 389
350, Taluka: Halol, District: Panchmahal,
Gujarat, India
Associated Power Structure Pvt. Ltd.,
Block No. 35, Near Mordern Petrofiles,
N.H. 8, Village: Bamangam Tal.: Karjan
Dist.: Vadodara – 391240, Gujarat, India
Sanvijay Infrastructures Pvt. Ltd., A-1-1
A-1/P/1/A/2, MIDC Butibori Area, Khairy
Khurd-440108, Tal.-Hingna, Dist-Nagpur,
Maharashtra, India

Sections:

Length:

Drawing / Data sheet / Part No.:

138.015 m

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

Manuals:

Operation & maintenance manual:

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

Transport manual, Installation &
commissioning. manual:

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