



Certificate No.

IECRE.WE.TC.19.0043-R0

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

ENERCON GmbH
Dreekamp 5
26605 Aurich
Germany

for the wind turbines

ENERCON E-82 E4 – 2.35MW
ENERCON E-82 E4 – 3.0MW

wind turbine class (class, standard, year)

IIA, IEC 61400-1:2005 + Amd1:2010

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

Included in Design Evaluation Conformity Statements

Design evaluation conformity statement (2.35MW)
Dated

002.28.2.03.16.00
2016-02-15

Design evaluation conformity statement (3.0MW)
Dated

002.26.2.03.16.01
2016-02-16

Type test conformity statement (2.35MW)
Dated

002.28.2.04.16.00
2016-02-22

Type test conformity statement (3.0MW)
Dated

002.26.2.04.16.00
2016-02-16

Manufacturing conformity statement (2.35MW and 3.0MW)
Dated

002.26.2.05.15.00
2015-12-14

Final evaluation report (2.35MW)
Dated

2476706-11-e
2016-02-23

Final evaluation report (3.0MW)
Dated

2476706-9-e
2016-02-22

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:
2021-02-21

Approved for issue on behalf of the IECRE
Certification Body:



Benjamin Bartels
Certification Body Wind Turbines
Munich, 2019-03-29

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



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Machine parameters:

Power regulation:	Three independent electromechanical pitch systems
Rotor orientation:	Upwind
Number of rotor blades:	3
Rotor tilt:	5°
Cone angle:	0°
Rated power:	2350 kW and 3000kW
Rated wind speed V_r (2350 kW):	13.9 m/s
Rated wind speed V_r (3000 kW)	16.0 m/s
Rotor diameter:	82.0 m
Hub height(s):	58.7 m / 68.7 m
Hub height operating wind speed range $V_{in} - V_{out}$:	3 m/s – 34 m/s
Design life time:	25 yrs 20 yrs control and protection system
Software version:	CS82a (Safety system)

Wind conditions:

Characteristic turbulence intensity I_{ref} at $V_{hub} = 15$ m/s:	0.16
Annual average wind speed at hub height V_{ave} :	8.5 m/s
Reference wind speed V_{ref} :	42.5 m/s
Mean flow inclination:	8°
Hub height 50-year extreme wind speed V_{e50} :	59.5 m/s

Electrical network conditions:

Normal supply voltage and range:	400 V +-20%
Normal supply frequency and range:	50/60 Hz (35...75 Hz)
Voltage imbalance:	N/A
Maximum duration of electrical power network outages:	6 hrs
Number of electrical network outages	20/yr



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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 to +40°C
Relative humidity of the air:	-20°C to +50°C 95% max
Air density:	1.225 kg/m ³
Solar radiation:	1000 W/m ²
Lightning protection system (standard and protection class):	IEC 61400-24-2010 protection class 1
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: E82-2 with optional aerodynamic add-on parts (trailing edge serrations)
Material: Fiber reinforced plastic
Blade length: 38.8 m
Number of blades: 3
Manufacturer: ENERCON
Drawing / Data sheet / Part No.: R822.110.006-2

Blade bearing:

Type: Double-row ball bearing slewing ring
Manufacturer: Liebherr Components Biberach GmbH
Drawing / Data sheet / Part No.: KUD458VA802-900

Blade bearing:

Type: Double-row ball bearing slewing ring
Manufacturer: Rothe Erde GmbH
Drawing / Data sheet / Part No.: 091.45.1900.003.44.1401

Blade bearing:

Type: Double-row ball bearing slewing ring
Manufacturer: Hanse Drehverbindungen GmbH
Drawing / Data sheet / Part No.: 21451900000

Pitch System:

Motor / Actuator Type: Electro mechanical with DC-motors and capacitor backups
Pitch Controller Type: Electromechanical
Manufacturer: Liebherr Components Biberach GmbH



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Pitch System:

Motor / Actuator Type:	Electro mechanical with DC-motors and capacitor backups
Pitch Controller Type:	Electromechanical
Manufacturer:	Zollern GmbH & Co. KG

Pitch System:

Motor / Actuator Type:	Electro mechanical with DC-motors and capacitor backups
Pitch Controller Type:	Electromechanical
Manufacturer:	ABM

Main shaft (Axle shaft):

Type:	Cast
Manufacturer:	ENERCON
Material:	EN-GJS-400-18U-LT
Drawing / Data sheet / Part No.:	82.01.055-0

Main bearing (fixed):

Type:	Tapered roller bearing
Manufacturer:	SKF GmbH
Drawing / Data sheet / Part No.:	BT2-8168/HA1VK443

Main bearing (fixed):

Type:	Tapered roller bearing
Manufacturer:	FAG
Drawing / Data sheet / Part No.:	F-809483.TR2

Main bearing (floating):

Type:	Cylindrical roller bearing
Manufacturer:	SKF GmbH
Drawing / Data sheet / Part No.:	BC1-8033/HB1VK443

Main bearing (floating):



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Wind Turbine(s)

Type: Cylindrical roller bearing
Manufacturer: FAG
Drawing / Data sheet / Part No.: F-804522.01.ZL-H113

Gearbox:

Type: N/A
Gear Ratio: N/A
Manufacturer: N/A
Drawing / Data sheet / Part No.: N/A

Yaw System:

Drive Type: 6 electro-mechanical drives with AC motors
Manufacturer: ENERCON
Drawing / Data sheet / Part No.: 82.03.124-0

Bearing Type: Double-row ball bearing slewing ring
Manufacturer: Liebherr Components Biberach GmbH
Drawing / Data sheet / Part No.: KUD718VA801-900

Bearing Type: Double-row ball bearing slewing ring
Manufacturer: Rothe Erde
Drawing / Data sheet / Part No.: 091.55.2190.000.48.1501

Gear Type: 4-stage planetary gear
Manufacturer: Liebherr Components Biberach GmbH
Drawing / Data sheet / Part No.: DAT 400/1439

Gear Type: 4-stage planetary gear
Manufacturer: Zollern GmbH & Co. KG
Drawing / Data sheet / Part No.: ZHP 3.25 -1089285 and
ZHP 3.25 -1089288

Gear Type: Cycloidal drive



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Manufacturer: Nabtesco Corporation
Drawing / Data sheet / Part No.: RGS35CW

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

Generator:

Type: G-82/30-G5
Manufacturer: ENERCON
Drawing / Data sheet / Part No.: D0222147-0
Rated Power: 3250 kW
Rated Frequency: 10.8 Hz
Rated Speed: 18 rpm
Max. speed: 35 rpm
Rated Voltage: 530 V
Rated Current: 1770 A
Insulation Class: F
Degree of Protection: IP23

Converter:

Type: LS300kW (9 or 12 units)
Manufacturer: ENERCON
Drawing / Data sheet / Part No: D0127611-1
Rated Voltage (grid side): 400 V
Rated Current (grid side): 4041 A
Degree of Protection: IP23

Transformer:

Type: N/A
Manufacturer: N/A
Drawing / Data sheet / Part No.: N/A
Rated Voltage: N/A



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Rated Power: N/A
Degree of Protection: N/A
Location (e.g. tower bottom): N/A

Tower:

Type: E-82 E4/S/57/4K/01
Manufacturer: ENERCON
Sections: 4
Length: 57.315 m
Drawing / Data sheet / Part No.: 82.00.354-0

Tower:

Type: E-82 E4/S/67/5K/01
Manufacturer: ENERCON
Sections: 5
Length: 67.315 m
Drawing / Data sheet / Part No.: 82.00.335-2

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: D0220644-1 (operation)
D0503019-1 / DC (maintenance 2.35MW)
TD-esc-08-ger-ger-13-007 Rev000
(maintenance 3MW)
TD-esc-08-ger-ger-10-037 Rev001
(maintenance 3MW)



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Transport manual:

TL-Tech-TSoo1-VH_See_e70_E82-
Rev003ger-ger

Installation & commissioning. manual:

TD-esc-08-ger-ger-13-017 Rev000
(installation)

TD-esc-08-ger-ger-12-032 Rev000
(CS82a)
(commissioning)