



Certificate No.

IECRE.WE.TC.19.0041-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 turbine

ENERCON E-103 EP2 – 2.35MW

wind turbine class(class, standard, year)

III_A/S, 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
Dated

Included in Design Evaluation Conformity Statement

Design evaluation conformity statement
Dated

002.34.2.03.18.02
2018-08-23

Type test conformity statement
Dated

002.34.2.04.18.00
2018-09-06

Manufacturing conformity statement
Dated

002.34.2.05.18.00
2018-08-09

Final evaluation report
Dated

2631741-11-e Rev.1
2019-09-06

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:
2023-09-05

Approved for issue on behalf of the IECRE
Certification Body:

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



Add value.
Inspire trust.

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
Rated wind speed V_r :	11.7 m/s
Rotor diameter:	103 m
Hub height(s):	78 m / 85 m / 98 m / 108 m / 138 m
Hub height operating wind speed range $V_{in} - V_{out}$:	3 m/s – 34 m/s
Design life time:	25 y 20 y (control and protection system)
Software version:	CS82b

Wind conditions: (wind turbine class III_A – applicable for all hub heights and tower variants)

Characteristic turbulence intensity I_{ref} at $V_{hub} = 15$ m/s:	0.16
Annual average wind speed at hub height V_{ave} :	7.5
Reference wind speed V_{ref} :	37.5 m/s
Mean flow inclination:	8°
Hub height 50-year extreme wind speed V_{e50} :	52.5 m/s

Wind conditions: (wind turbine class S – additionally applicable for hub height 98 m with tubular steel tower)

Characteristic turbulence intensity I_{ref} at $V_{hub} = 15$ m/s:	0.1135
Annual average wind speed at hub height V_{ave} :	8.6
Reference wind speed V_{ref} :	38 m/s
Mean flow inclination:	8°
Hub height 50-year extreme wind speed V_{e50} :	53.2 m/s



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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

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 -20°C to +50°C
Relative humidity of the air:	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: E-103 EP2-RB-01 with optional
aerodynamic add-on parts (trailing edge
serrations)

Material: Fiber reinforced plastic

Blade length: 49.98 m

Number of blades: 3

Manufacturer: ENERCON

Drawing / Data sheet / Part No.: R1031.110.10001

Blade bearing:

Type: Double-row ball bearing slewing ring

Manufacturer: Liebherr Components Biberach GmbH

Drawing / Data sheet / Part No.: KUD02037-050WA18-001-900

Blade bearing:

Type: Double-row ball bearing slewing ring

Manufacturer: Hanse Drehverbindungen GmbH

Drawing / Data sheet / Part No.: 21502037000

Pitch System:

Motor / Actuator Type: Electro mechanical with DC-motors and
capacitor backups

Pitch Controller Type: Electromechanical

Manufacturer: Liebherr Components Biberach GmbH

Main shaft (Axle Pin):



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Type: Cast
Manufacturer: ENERCON
Material: EN-GJS-400-18-LT
Drawing / Data sheet / Part No.: EP2.01.034-4

Main bearing (fixed):

Type: Double row tapered roller bearing
Manufacturer: PSL a.s.
Drawing / Data sheet / Part No.: PSL612-408-PV

Main bearing (fixed):

Type: Double row tapered roller bearing
Manufacturer: Schaeffler Technologies AG & Co. KG
Drawing / Data sheet / Part No.: EDD F-624723.TR2 000 (FAG)

Main bearing (fixed):

Type: Double row tapered roller bearing
Manufacturer: SKF GmbH
Drawing / Data sheet / Part No.: SK-LE 16-81

Main bearing (floating):

Type: Cylindrical roller bearing
Manufacturer: PSL a.s.
Drawing / Data sheet / Part No.: PSL412-318-PV

Main bearing (floating):

Type: Cylindrical roller bearing
Manufacturer: Schaeffler Technologies AG & Co. KG
Drawing / Data sheet / Part No.: EDD F-624724.ZL 000 (FAG)

Main bearing (floating):



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Wind Turbine

Type: Cylindrical roller bearing
Manufacturer: SKF GmbH
Drawing / Data sheet / Part No.: SK-LE 16-82

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.: EP2.00.024-0

Bearing Type: Double-row ball bearing slewing ring
Manufacturer: Liebherr Components Biberach GmbH
Drawing / Data sheet / Part No.: KUD02194-060WA18-001-900

Gear Type: Multi stage planetary gear with motor
Manufacturer: Liebherr Components Biberach GmbH
Drawing / Data sheet / Part No.: DAT 450/3407-4000

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

Generator:



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Type	E-103 EP2-GE-01
Manufacturer:	ENERCON
Drawing / Data sheet / Part No.:	D0577461-0
Rated Power:	2550kW
Rated Frequency:	9.0 Hz
Rated Speed:	15 rpm
Max. speed:	29 rpm
Rated Voltage:	530 V
Rated Current:	1390 A
Insulation Class:	F
Degree of Protection:	IP23

Converter:

Type:	LS300kW (8 or 9 units)
Manufacturer:	ENERCON
Drawing / Data sheet / Part No:	D0127611
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
Rated Power:	N/A
Degree of Protection:	N/A
Location (e.g. tower bottom):	N/A

Tower:

Type:	E-103 EP2-ST-78-FB-C-01
Manufacturer:	ENERCON



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Sections: 5
Length: 76.76
Drawing / Data sheet / Part No.: EP2.00.039-1

Tower:

Type: E-103 EP2-ST-85-FB-C-01
Manufacturer: ENERCON
Sections: 5
Length: 82.93
Drawing / Data sheet / Part No.: EP2.00.018-1

Tower:

Type: E-103 EP2-ST-98-FB-C-01
Manufacturer: ENERCON
Sections: 5
Length: 96.37
Drawing / Data sheet / Part No.: D0531177-2

Tower:

Type: E-103 EP2-HT-98-ES-C-01
Manufacturer: ENERCON
Sections: 2 steel / 18 concrete
Length: 96.76
Drawing / Data sheet / Part No.: EP2.00.036-2

Tower:

Type: E-103 EP2-HT-108-IS-C-01
Manufacturer: ENERCON
Sections: 1 steel / 28 concrete
Length: 106.67
Drawing / Data sheet / Part No.: EP2.00.022-3



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Tower:

Type: E-103 EP2-HT-138-IS-C-01
Manufacturer: ENERCON
Sections: 3 steel / 22 concrete
Length: 136.67
Drawing / Data sheet / Part No.: EP2.00.007-2

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: D0538491-0 (operation)
D621214 0 (maintenance)
Transport manual: PLM-TES-DC008-VH_Straße_EP2-
Rev007-de-de.docx
Installation & commissioning. manual: D0564147-0 (installation)
D0569734-2_1 (commissioning)