



Certificate No.

**IECRE.WE.TC.22.0108-R2**

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

for the wind turbine

wind turbine class(es) (class, standard, year)

ENERCON GmbH  
Dreekamp 5  
Aurich, 26605  
Germany

ENERCON E-138 EP3 E3  
E-138 EP3 E3, class S, IEC 61400-1:2019

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:

44 220 19142915-TDB-IEC, Rev.4  
2023-03-01

Design evaluation conformity statement

Dated:

IECRE.WE.CS.22.0118-R2  
2023-03-15

Type test conformity statement

Dated:

44 220 22224863-PT-IECRE, Rev.1 (provisional)  
2023-03-15

Manufacturing conformity statement

Dated:

44 220 19142915-M-IEC, Rev.10  
2023-03-15

Final evaluation report

Dated:

8119 224 863-20 E, Rev.2  
2023-03-15

The conformity evaluation was carried out in accordance with the rules and procedures of the IECRE System  
[www.iecre.org](http://www.iecre.org)

The wind turbine type specification begins on page 2 of this certificate. Outstanding issues are listed in the last page(s) 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:  
2024-03-15

Approved for issue on behalf of the  
IECRE Certification Body:

Broschart, Michael  
Deputy Specialist Manager Wind Energy  
Essen 2023-03-15

# **TÜVNORD**

TÜV NORD CERT GmbH  
Am TÜV 1  
Essen 45307  
Germany



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

## PROVISIONAL TYPE CERTIFICATE Wind Turbine

### Machine parameters:

Power regulation:	Independent electromechanical pitch system for each blade.
Rotor orientation:	Upwind
Number of rotor blades:	3
Rotor tilt:	7.0°
Cone angle:	2.5°
Rated power:	4260 kW
Rated wind speed $V_r$ :	12.1 m/s
Rotor diameter:	138.59 m (prebend and coned: 138.25 m)
Hub height(s):	111 m / 131 m
Hub height operating wind speed range $V_{in} - V_{out}$ :	2.5 – 28.0 m/s (with storm control at 22 m/s)
Design life time:	25 years (The components of the safety equipment shall be exchanged or proof-tested after 20 years.)
Software version:	PI-CS-EP3-01 (controller software version)

### Wind conditions:

Characteristic turbulence intensity $I_{ref}$ at $V_{hub} = 15$ m/s:	16 %
Annual average wind speed at hub height $V_{ave}$ :	7.8 m/s
Reference wind speed $V_{ref}$ :	37.5 m/s
Mean flow inclination:	8 deg.
Hub height 50-year extreme wind speed $V_{e50}$ :	52.5 m/s

### Electrical network conditions:

Normal supply voltage and range:	24 kV and 36 kV (no range defined)
Normal supply frequency and range:	50/60 Hz (no range defined)
Voltage imbalance:	Not defined
Maximum duration of electrical power network outages:	Not defined
Number of electrical network outages:	20 per year



Certificate No.

**IECRE.WE.TC.22.0108-R2**

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

## **PROVISIONAL TYPE CERTIFICATE Wind Turbine**

### **Other environmental conditions (where taken into account):**

Design conditions in case of offshore WT:	N/A
Normal and extreme temperature ranges:	-10 °C - +40 °C (operating) -20 °C - +50 °C (survival)
Relative humidity of the air:	Up to 95 %
Air density:	1.225 kg/m <sup>3</sup>
Solar radiation:	1000 W/m <sup>2</sup>
Lightning protection system (standard and protection class):	LPC 1
Earthquake model and parameters (standard and key parameters e.g. spectrum, model, seismic zone, soil class, etc.):	See note at tower component where applicable.
Other design conditions:	No ice on rotor blades considered. Installation altitude of 1000 m considered for electrical components.



Certificate No.

**IECRE.WE.TC.22.0108-R2**

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

## **PROVISIONAL TYPE CERTIFICATE Wind Turbine**

### **Major components:**

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

#### **Blade:**

Type:	E-138 EP3-RB-02
Material:	E-glass fibre reinforced epoxy
Blade length:	67.5 m
Number of blades:	3
Manufacturer:	(1) TPI Kompozit Kanat 2 (2) ENEOP 3 – Desenvolvimento De Projecto Industrial, S.A.
Drawing / Data sheet / Part No.:	R1382.110.10000, Rev. 02

#### **Blade bearing:**

Type:	Triple-row roller slewing ring
Manufacturer:	Liebherr Components Biberach GmbH
Drawing / Data sheet / Part No.:	ROD02994-032DJ18-002-000, Rev. 05.1

#### **Pitch system:**

Motor / Actuator Type:	AC rotary drives
Motor / Actuator Manufacturer:	Wilo; alternative: Bonfiglioli
Motor / Actuator Designation:	Wilo M112BM1-4F40Y1-PZ55 alternative: Bonfiglioli JB00023142
Pitch Controller Type:	Frequency converter
Manufacturer:	KEBA Industrial Automation Germany GmbH
Gear Type:	3-stage planetary gearbox
Manufacturer:	Bonfiglioli Trasmital
Drawing / Data sheet / Part No.:	I7070T003600, Rev. F (alternative: I7070T04700, Rev. F)
Gear Type:	3-stage planetary gearbox
Manufacturer:	Liebherr Components Biberach GmbH
Drawing / Data sheet / Part No.:	3684572000990, Rev. 03.3 (alternative: 3684572000992, Rev. 01.3)





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

## PROVISIONAL TYPE CERTIFICATE Wind Turbine

### Main shaft:

Type: Cast part ("axle pin")  
Manufacturer: Heger Guss GmbH, Heger Ferrit GmbH,  
GZO Gusszentrum Ostfriesland GmbH  
Material: EN-GJS-400-18-LT  
Drawing / Data sheet / Part No.: D02438823-3.0-de/en, Rev.-,  
dated 2022-09-13

### Main bearing:

Type: 2 tapered roller bearings in O-  
arrangement ("rotor bearing")  
Manufacturer: SKF GmbH  
Drawing / Data sheet / Part No.: BT1-8212 B/VK443, Rev. 3 (hub side)  
BT1-8212 AA/VK443, Rev. 1 (generator  
side)

### Main bearing:

Type: 2 tapered roller bearings in O-  
arrangement ("rotor bearing")  
Manufacturer: Thyssenkrupp rothe erde Slovakia, a.s.  
Drawing / Data sheet / Part No.: PSL612-415-1-PV, Rev. 1 (hub side)  
PSL612-416-1-PV, Rev. 2 (generator  
side)

### Main bearing:

Type: 2 tapered roller bearings in O-  
arrangement ("rotor bearing")  
Manufacturer: Liebherr-Components Biberach GmbH  
Drawing / Data sheet / Part No.: KED01915-090E018-001-000, Rev. 4  
(hub side)  
KED01920-075E018-001-000, Rev. 4  
(generator side)

### Main bearing:

Type: 2 tapered roller bearings in O-  
arrangement ("rotor bearing")  
Manufacturer: Schaeffler Technologies AG & Co.KG  
Drawing / Data sheet / Part No.: EDD F-627880.02.TR1-WPOS 000,  
Rev.AF (hub side)  
EDD F-627881.02.TR1-WPOS 000,  
Rev.AG (generator side)

### Main bearing:

Type: 2 tapered roller bearings in O-  
arrangement ("rotor bearing")  
Manufacturer: Thyssenkrupp rothe erde Slovakia, a.s.  
Drawing / Data sheet / Part No.: PSL612-415-2, Rev. 1 (hub side)  
PSL612-416-2, Rev. 1 (generator side)



Certificate No.

IECRE.WE.TC.22.0108-R2

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

## PROVISIONAL TYPE CERTIFICATE Wind Turbine

### Main bearing:

Type: 2 tapered roller bearings in O-  
arrangement ("rotor bearing")  
Manufacturer: TMB Tianma (Chengdu) Precision  
Machinery Co., Ltd.  
Drawing / Data sheet / Part No.: FD-3350422H889ST, Rev.2 (hub side)  
FD-3350418H889ST, Rev.2 (generator  
side)

### Gearbox:

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

### Yaw system:

Drive Type: A.C. braking motor  
Manufacturer: Bonfiglioli Trasmital  
Drawing / Data sheet / Part No.: JB00023132  
alternative: JB00025049 (soft brake)

Bearing Type: Double-row ball bearing slewing ring  
Manufacturer: TMB Tianma (Chengdu) Precision  
Machinery Co., Ltd.  
Drawing / Data sheet / Part No.: Y033.60.3993K2, Rev. 2

Bearing Type: Double-row ball bearing slewing ring  
Manufacturer: Thyssenkrupp rothe erde Germany  
GmbH  
Drawing / Data sheet / Part No.: 092.55.3996.010.48.150D, Rev. D

Gear Type: 4-stage planetary gearbox  
Manufacturer: Liebherr Components Biberach GmbH  
Drawing / Data sheet / Part No.: 13521946-99, Rev. 03.6

Gear Type: 4-stage planetary gearbox  
Manufacturer: Bonfiglioli Trasmital  
Drawing / Data sheet / Part No.: CD00019972, Rev.-, dated 2021-10-29

Gear Type: 4-stage planetary gearbox  
Manufacturer: Bonfiglioli Trasmital  
Drawing / Data sheet / Part No.: CD00024134, Rev.-, dated 2022-10-24



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

## PROVISIONAL TYPE CERTIFICATE Wind Turbine

<i>Gear Type:</i>	Bonfiglioli Trasmital
Manufacturer:	CD00024134, Rev.-, dated 2022-10-24
Drawing / Data sheet / Part No.:	CD00024217, Rev.-, dated 2022-11-30
<i>Gear Type:</i>	4-stage planetary gearbox
Manufacturer:	Liebherr Components Biberach GmbH
Drawing / Data sheet / Part No.:	13856204-99, Rev. 00.2
<i>Brake Type:</i>	Motor brakes of yaw drives
Manufacturer:	Bonfiglioli Trasmital
Drawing / Data sheet / Part No.:	JB00023132 alternative: JB00025049 (soft brake)
<b>Generator:</b>	
Type	Synchronous, high-pole
Manufacturer:	(1) Windgeneratorfertigung Magdeburg GmbH (2) ATEŞ ÇELİK İNŞAAT TAAH. PROJE MÜHENDİSLİK SAN. VE TİC. A.Ş. (3) GPO Generator Produkcja Opole Sp.zo.o
Drawing / Data sheet / Part No.:	E-138 EP3 E3-GE-01
Rated Power:	4400 kVA
Rated Frequency:	10.5 Hz
Rated Speed:	11.1 rpm
Max. speed:	13.9 rpm
Rated Voltage:	4 x 2Y x 790 V (AC)
Rated Current:	530 A
Insulation Class:	F
Degree of Protection:	IP23
<b>Converter:</b>	
Type:	4-Q converter
Manufacturer:	Elektric Schaltanlagenfertigung GmbH
Drawing / Data sheet / Part No.:	Leistungsschrank B2B FL, article no. 778845 (778844)
Rated Voltage (grid side):	750 V (+20%, -15%)
Rated Current (grid side):	1000 A
Degree of Protection:	IP00 (IP20 installed)



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

## PROVISIONAL TYPE CERTIFICATE Wind Turbine

### Transformer:

Type:	Oil-filled
Manufacturer:	SGB-SMIT Group
Drawing / Data sheet / Part No.:	DST 5100 H/42 (VE621719)
Rated Voltage:	36 kV (HV-side), 750 V (LV-side)
Rated Power:	5100 kVA
Degree of Protection:	IP54
Location (e.g. tower bottom):	E-Nacelle (in machine house)

### Tower:

Type:	E-138 EP3 E3-HST-111-FB-C-01 (Hybrid Steel Tower)
Manufacturer:	Wegener Stahlservice KG (for modular sections), SAM Stahlturm- & Apparatebau Magdeburg GmbH (for tubular sections)
Sections:	6 (3 modular and 3 tubular steel sections connected by an adapter)
Length:	105.268 m
Drawing / Data sheet / Part No.:	D02437752, Rev. 6.0 ("Baseline Tower") D02498466, Rev. 3.0 ("Tower Variant") (foundation specification: D02378600, Rev. 2.2)
Standard:	IEC 61400-6:2020
Earthquake model and parameters:	Calculation of tower for seismic zone 3 and site types C-T acc. to DIN EN 1998-1/NA considered.

### Tower:

Type:	E-138 EP3 E3-HST-131-FB-C-01 (Hybrid Steel Tower)
Manufacturer:	Wegener Stahlservice KG (for modular sections), SAM Stahlturm- & Apparatebau Magdeburg GmbH (for tubular sections) Schönebeker Maschinenbau GmbH (for tubular steel sections 1&2)
Sections:	8 (5 modular and 3 tubular steel sections connected by an adapter)
Length:	125.863 m
Drawing / Data sheet / Part No.:	D02355298, Rev. 4.0 (foundation specification: D02292374, Rev. 2.1)
Standard:	IEC 61400-6:2020





Certificate No.

**IECRE.WE.TC.22.0108-R2**

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

## **PROVISIONAL TYPE CERTIFICATE Wind Turbine**

Earthquake model and parameters:

Calculation of tower for seismic zone 3  
and site types C-T acc. to DIN EN 1998-  
1/NA considered.

### **Foundation:**

Type: N/A

Manufacturer: N/A

Drawing / Data sheet / Part No.: N/A

### **Foundation adaptor:**

Type: Anchor cage

Manufacturer: SAM Stahlurm- & Apparatebau  
Magdeburg GmbH

Drawing / Data sheet / Part No.: D02434516, Rev. 0.0 (for HST111)  
D02348444, Rev. 2.0 (for HST131)

### **Manuals:**

Operation & maintenance manual: D02468862, Rev. 3.2 (operation);  
D02510835, Rev. 1 (maintenance)

Transport manual: PLM-TES-DC032-VH\_E-115E3\_E-  
126\_E-138E1E2\_EP3-Rev001de-de,  
Rev. 1

Installation & commissioning manual: TD-gccs-08-de-de-21-075, Rev. 1  
(installation RNA);  
TD-gccs-08-de-de-21-079, Rev.003  
(installation HST towers, for HST-131  
D02412584, Rev. 0 and for HST-111  
D02454031, Rev. 0 shall be used in  
addition);  
D02497612, Rev. 0.0 (commissioning)

### **Outstanding issues:**

#### Type Testing:

Non-safety related elements of type  
testing are pending (as detailed in the  
final evaluation report).

#### Manufacturing:

The suppliers for the alternative main  
bearings of TMB Tianma (Chengdu)  
Precision Machinery Co., Ltd. and  
Liebherr-Components Biberach GmbH  
need to be included to the MECS.