



Certificate No.

IECRE.WE.TC.19.0033-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

Lagerwey Wind BV
Nijverheidsplein 21
3771 Barneveld
The Netherlands

for the wind turbine

L100-2.5MW, LM 49.1P, 50 Hz

wind turbine class (class, standard, year)

IIIA and IIB, IEC 61400-1 Ed. 3:2005-08 incl. Amendment 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

Integrated in design evaluation conformity statement

Design evaluation conformity statement
Dated

44 220 14463967-D-IEC, Rev. 6
2017-07-13

Design evaluation conformity statement
Dated

DE-159/125483098/2019, Rev. 1
2019-03-28

Type test conformity statement
Dated

44 220 17242410-T-IEC
Rev. 1, 2017-07-13

Manufacturing conformity statement
Dated

44 220 17242410-M-IEC
Rev. 3, 2019-03-19

Component certificate Rotor Blade LM 49.1P
Dated

09.02.18.12.03
Rev. 0, 2018-06-11, valid until 2023-06-12

Final evaluation report
Dated

8114 242 410-20 E
Rev. 2, 2019-03-29

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:
2024-03-28

Approved for issue on behalf of the IECRE
Certification Body:

Dipl.-Ing./M.Sc. M. Lange
Deputy of Specialist Manager Wind Energy
Essen, 2019-03-29



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:	6°
Cone angle:	2°
Rated power:	2500 kW
Rated wind speed V_r :	11.7 m/s
Rotor diameter:	100 m
Hub height(s):	75 m, 98 m, 135 m
Hub height operating wind speed range $V_{in} - V_{out}$:	Conf. 1-3: 2.75 – 21 m/s Conf. 4,5: 2.0 – 22 m/s
Design life time:	20 years
Software version:	Conf. 1: L100 P2500 T75 BLM AW7.5 TI16.0 v3.34.5 Conf. 2: L100 P2500 T98 BLM AW7.5 TI16.0 v3.34.0 Conf. 3: L100 P2500 T135 BLM AW7.5 TI16.0 v3.34.1 Conf. 4,5: L100 P2500 T98M BLM AW7.5 TI16.0 180203LW0 v3.38.8.0

Wind conditions:

Characteristic turbulence intensity I_{ref} at $V_{hub} = 15$ m/s:	IIIA: 0.16 IIB: 0.14
Annual average wind speed at hub height V_{ave} :	IIIA: 7.5 m/s IIB: 8.5 m/s
Reference wind speed V_{ref} :	IIIA: 37.5 m/s IIB: 42.5 m/s
Mean flow inclination:	8°
Hub height 50-year extreme wind speed V_{e50} :	IIIA: 52.5 m/s IIB: 59.5 m/s



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Electrical network conditions:

Normal supply voltage and range:	690 V ± 10%
Normal supply frequency and range:	50 Hz ± 2 Hz
Voltage imbalance:	Config 1-3: No information Config 4,5: max. 2%
Maximum duration of electrical power network outages:	No information
Number of electrical network outages	Config 1-3: No information Config 4,5: 375

Other environmental conditions (where taken into account):

Normal and extreme temperature ranges:	-10 °C - +40 °C (operational) -20 °C - +50 °C (survival)
Relative humidity of the air:	Up to 95 %
Air density:	1.225 kg/m ³
Solar radiation:	1000 W/m ²
Lightning protection system (standard and protection class):	IEC 61400-24, LPL I
Earthquake model and parameters (standard and key parameters e.g. spectrum, model, seismic zone, soil class, etc.):	N/A
Other design conditions :	N/A

Configurations:

No.	Hub heights [m]	Rotor Blade	Associated load evaluation report	Associated configuration in machinery evaluation report	Associated tower evaluation report
1	75	LM 49.1P	8113 605 552-1 E I	6	8113 605 552-6 E
2	98	LM 49.1P	8112 220 248-1 E I	3	8110 463 967-6 E I
3	135	LM 49.1P	8112 220 248-1 E II	4	8110 463 967-6 E II
4	98 MST	LM49.1P	125483098-3.4-1 (IIB)	-	125483098-3.6-2
5	98 MST	LM49.1P	125483098-3.4-2 (IIIA)	-	125483098-3.6-2



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Major components:

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

Blade LM 49.1P

Type: vacuum infusion
Material: glass fibre reinforced polyester
Blade length: 49.1 m
Number of blades: 3
Manufacturer: LM Wind Power
Drawing / Data sheet / Part No.: Drawing No.: DR-06261/A3
Specification: BS-00368/A2 Rev.A2

Blade bearing:

Type: ball bearing slewing ring
Manufacturer: Galperti Engineering & Flow Control
S.p.A
Drawing / Data sheet / Part No.: Designation: V82-2390-004-24-45-2210
Drawing No.: V82-2390-004-COMM,
Rev.-

Pitch System:

Motor / Actuator Type: Electromechanical/hydraulic
Motor / Actuator Manufacturer: Bonfiglioli Riduttori, Italy
Motor / Actuator Designation: BN 132MB 4 230/400-50 IP55 CLF B5
FD60 24 50 (AC)
Alpatek A 166PMSW4
Gear Type: 1-stage worm gear combined with 2-
stage planetary gearbox
Manufacturer: Bonfiglioli Trasmital
Drawing / Data sheet / Part No.: Designation: W110 and 707T2N
Drawing No.: 56111763, Rev. A



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Main bearing:

Type: single row tapered roller bearing
Manufacturer: PSL, a.s.
Drawing / Data sheet / Part No.: Designation: PSL 612-395
Drawing No.: PSL 612-395-PV, Rev.-

alternative Conf. 4,5:
Designation: PSL 612-395-3
Drawing No.: PSL 612-395-3-PV, Rev.-

Yaw System:

Drive Type: 4 stage planetary gearbox
Manufacturer: Bonfiglioli Trasmital
Drawing / Data sheet / Part No.: Designation: 711T4N
Drawing No.: 56300451, Rev.-
Designation Motor: BN 100LB 6 230/400-
50 IP55 CLF B5 FD 40 R NB 230
Bearing Type: ball bearing slewing ring
Manufacturer: Galperti Engineering & Flow Control
S.p.A
Drawing / Data sheet / Part No.: Designation: V81-2516-004-24-40-2230
Drawing No.: V81-2516-004-COMM,
Rev.1

Brake Type: active hydraulic with 3 units
Manufacturer: ANTEC S.A.
Drawing / Data sheet / Part No.: Designation: HE-3-120
Drawing No.: 175425, Rev.J



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Generator:

Type	Synchronous machine
Manufacturer:	Lagerwey Wind BV
Drawing / Data sheet / Part No.:	Designation: LW 4300-1750
Rated Power:	2500 kW
Rated Frequency:	50 Hz
Rated Speed:	15.2 rpm
Rated Voltage:	676 V
Rated Current:	2794 A
Insulation Class:	F
Degree of Protection:	IP 54

Converter:

Type:	ACS800-77LC-4065/3345-7
Manufacturer:	ABB
Drawing / Data sheet / Part No:	Designation: ACS800-77LC-4065/3345-7
Rated Voltage (grid side):	690 V \pm 10%
Rated Current (grid side):	2794 A
Degree of Protection:	IP 54

Tower HH 75 m (Config. 1 – 3):

Type:	Tubular steel tower
Manufacturer:	Lagerwey Wind BV (Design) SIAG, Germany Ambau, Germany
Sections:	4
Length:	72.840 m
Drawing / Data sheet / Part No.:	Drawing No.: M01-C5-20-011500-A Rev.A Foundation Specification: M08-C5-30- 10424-R0 Rev.0



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Tower HH 98 m (Config. 1 – 3):

Type:	Tubular steel tower
Manufacturer:	Lagerwey Wind BV (Design) SIAG, Germany Ambau, Germany
Sections:	5
Length:	96.70 m
Drawing / Data sheet / Part No.:	Drawing No.: M01-C5-20-010438-F M01-C5-20-010439-D M01-C5-20-010440-C M01-C5-20-010444-D M01-C5-20-010445-D M01-C5-20-010449-D M01-C5-20-010450-C M01-C5-20-010454-D M01-C5-20-010455-C M01-C5-20-010461-E M01-C5-20-010462-C M01-C5-20-010465-B M01-C5-20-010466-B Foundation specification: M08-C2-30-10147-R3

Tower HH 135 m (Config. 1 – 3):

Type:	Modular steel tower
Manufacturer:	Lagerwey Wind BV (Design) Wilhelm Severt Maschinenbau, Germany
Sections:	12
Length:	133.744 m
Drawing / Data sheet / Part No.:	Drawing No.: M01-C5-20-010575-D Foundation specification: M08-C2-30-10302-R4



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Tower HH 98 m (Config. 4,5):

Type:	Modular Steel Tower
Manufacturer:	Lagerwey Wind BV (Design) Wilhelm Severt Maschinenbau, Germany Ferro Umformtechnik, Germany
Sections:	8
Length:	96.497 m
Drawing / Data sheet / Part No.:	Drawing No.: 20-011193, Rev. A Foundation specification: Config. 4: M08-C2-30-10616-R0 Config. 5: M08-C2-30-10512-R1

Manuals:

Operation & maintenance manual:	M00-C5-30-10326-R11. Rev. 11 Config. 1 – 3: M00-C2-40-050022-R8. Rev. 08 Config. 4,5: M00-05-30-10293-R7. Rev. 07 M00-C2-30-10429-R1. Rev. 01
Transport manual:	M00-C2-30-10429-R1. Rev. 01
Installation & commissioning. manual:	Config. 1 – 3: M00-C5-30-10290-R5.1. Rev. 5.1 M00-C2-30-050135-R3. Rev. 03 Config. 4,5: M00-C5-30-10290-R6. Rev. 6 M00-C2-30-050135-R4. Rev. 04