

Deutsche Akkreditierungsstelle GmbH

Annex to the Accreditation Certificate D-PL-18020-01-00 according to DIN EN ISO/IEC 17025:2018

Valid from: 18.07.2022

Date of issue: 18.07.2022

Holder of certificate:

**Deutsche WindGuard Consulting GmbH
Oldenburger Straße 65, 26316**

Tests in the fields:

Determination of Wind Turbine Power Curves; Execution and Evaluation of Wind Measurements by Anemometer and Remote Sensing; Determination of Site Quality; Determination of Wind Potential and Energy Yields; Determination of Turbulence Intensity by Means of Measurement and Calculation; Determination of Noise Emissions of Wind Turbines; Determination of Shadow Flicker Immission by Calculation; Noise Immission in the neighbourhood; Load Measurement on Wind Turbine; Module Immission Control

Within the scope of accreditation marked with *, the testing laboratory is permitted, without being required to inform and obtain prior approval from DAkkS, to use standards or equivalent testing methods listed here with different issue dates.

The testing laboratory maintains a current list of all testing methods within the flexible scope of accreditation.

This document is a translation. The definitive version is the original German annex to the accreditation certificate.

Abbreviations used: see last page

*The certificate together with its annex reflects the status at the time of the date of issue. The current status of the scope of accreditation can be found in the database of accredited bodies of Deutsche Akkreditierungsstelle GmbH.
<https://www.dakks.de/en/content/accredited-bodies-dakks>*

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1. Determination of Wind Turbine Power Curves

DIN EN 61400-12-1* 2017-12	Power performance measurements of electricity producing wind turbines
DIN EN 61400-12-2* 2014-02	Power performance of electricity producing wind turbines based on nacelle anemometry
FGW TG5, Rev. 8* 2020-03	Determination and application of the reference yields
FGW TG2, Rev. 17* 2018-03	Determination of power performance and standardized energy yields
MEASNET, Version 5 2009-12	MEASNET „Power Performance measurement procedure“
IEC 61400-12 Ed. 1 CDV* 2021-08	Wind energy generation systems - Part 12: Power performance measurements of electricity producing wind turbines - Overview
IEC 61400-12-1 Ed. 3 CDV* 2021-08	Wind turbines - Part 12-1: Power performance measurements of electricity producing wind turbines
IEC 61400-12-2 Ed. 2 CDV* 2021-08	Wind turbines - Part 12-2: Power performance measurements of electricity producing wind turbines based on nacelle anemometry
IEC 61400-12-3 Ed. 1 CDV* 2021-08	Wind energy generation systems – Part 12-3: Power Performance – Measurement based site calibration
IEC 61400-12-5 Ed. 1 CDV* 2021-08	Wind energy generation systems – Part 12-5: Power performance – Assessment of obstacles and terrain
IEC 61400-12-6 Ed. 1 CDV* 2021-08	Wind energy generation systems – Part 12-6: Measurement based nacelle transfer function of electricity producing wind turbines
IEC 61400-50 Ed. 1 CDV* 2021-08	Wind energy generation systems - Part 50: Wind measurements - Overview
IEC 61400-50-1 Ed. 1 CDV* 2021-08	Wind energy generation systems – Part 50-1: Wind measurements Application of meteorological mast, nacelle and spinner mounted instruments
IEC 61400-50-2 Ed. 1 CDV* 2021-08	Wind energy generation systems – Part 50-2: Wind Measurement – Application of ground mounted remote sensing technology

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3. Determination of Site Quality; Determination of Wind Potential and Energy Yields

FGW TR 6, Rev. 11* 2020-09	Determination of wind potential and energy yields
MEASNET, Version 2 2016-04	Evaluation of Site Specific Wind Conditions
D5871, Rev. 10 2018-11	Standard Operating Procedure VA EE-Energy Yield Evaluation
FGW TG10 Rev. 2* 2021-03	Determination of site quality following commissioning

4. Determination of Noise Emissions of Wind Turbines

IEC 61400-11, Ed. 3* 2012 + Amendment 1 2018	Wind turbines - Part 11: Acoustic noise measurement techniques
DIN EN 61400-11* 2019-05	Wind turbines - Part 11: Acoustic noise measurement techniques
FGW TG 1, Rev. 18* 2008-02	Determination of noise emission
FGW TG 1, Rev. 19* 2021-03	Determination of noise emission
IEC 61400 -14* 2005	Wind turbine generator systems - Part 14: Declaration of sound power level and tonality values of wind turbines
MEASNET, V.3 2011	Acoustic Noise Measurement Procedure

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5. Determination of Shadow Flicker Immission by Calculation

DIN 5034-2* 1985-02	Daylight in interiors; principles
D5885, Rev. 3 2020-05	Standard Operating Procedure VA PS-Forecast of Shadow Flicker
LAI 2020-01	Notes on determination and assessment of optical immissions of wind turbines (German federal committee for immission protection)
VDI 3789 Blatt 2 1994-10	Environmental meteorology - Interactions between atmosphere and surfaces - Calculation of spectral short-wave and long-wave radiation

6. Determination of Turbulence Intensity by Means of Measurement and Calculation

IEC 61400-1 2019-02	Wind turbines - Part 1: Design Requirements
DIN EN 61400-1 2019-02	Wind turbines - Part 1: Design requirements
MEASNET Procedure Version 2 2016-04	Evaluation of Site Specific Wind Conditions
ESDU 87034 2012-03	World-wide extreme wind speeds. Part 1: origins and methods of analysis
ESDU 88037 2012-03	World-wide extreme wind speeds. Part 2: examples using various methods of analysis.
DIBt Richtlinie Für Windenergieanlagen 2012-10	Impacts on and proof of structural safety of tower and foundation
D5896, Rev. 5 2020-05	Standard Operating Procedure VA Site Suitability Studies

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7. Load Measurement on Wind Turbine

D5877, Rev. 4 2018-06	Standard Operating Procedure VA Load Measurement
IEC 61400-13 Ed.1 * 2015-12	Wind turbines - Part 13: Measurement of mechanical loads
IEC 61400-22 Ed. 1* 2010-05	Wind turbines - Part 22: conformity testing and verification Chapters: 8.4 Type testing 8.8 Type characteristics measurements 9.11 Project characteristics measurements Annex C Minimum requirements for load measurements Annex D Requirements for safety and function tests
DIN EN 61400-13 * 2017-06	Wind turbines - Part 13: Measurement of mechanical loads
DIN EN 61400-22* 2011-10	Wind turbines - Part 22: Conformity testing and certification Chapter: 8.4 Type testing 8.8 Type characteristics measurements 9.11 Project characteristics measurements Annex C Minimum requirements for load measurements Annex D Requirements for safety and function tests
DNV-ST-0437 2021-11	Loads and site conditions for wind turbines Section 5. Measurements
DNV-ST-0438 2021-11	Control and protection systems for wind turbines Section 6. Test of the wind turbine behavior Appendix C Test of turbine behavior, specification

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8. Determination of Noise Immission in the neighbourhood

8.1 Fields of activity regulated by immission control law

Specifications according to immission control module and DIN 45688:2014

Group V: Determination of Noise Immission (here: only Wind Turbines)		
Standard / Guideline / Technical Rule		QM-Document
Titel	Description	
TA Lärm 1998-08 (State 2017)	Sixth general administrative regulation of the Federal Immission Control Act - Technical instruction for the protection against noise - TA Noise	D5878, PA Emission Control 16.02.2017 D5878, PA Immission Control. 16.02.2017
TA Lärm 1968-07	General administrative regulation on installations requiring licensing according to the German Industrial Code - Technical instructions on protection against noise - TA Noise (in connection with: VDI 2058 Blatt 1:1985-09 "Assessment of work noise in the neighborhood")	

8.2 Determination of noise in the neighbourhood

DIN 45645-1* 1996-07	Determination of rating levels from measurement data - Part 1: Noise immission in the neighborhood
DIN 45680* 1997-03 + Supplement	Measurement and assessment of low-frequency noise immissions in the neighborhood
DIN 45681* 2005-03 + Correction 2 2006-08	Acoustics - Determination of tonal components of noise and determination of a tone adjustment for the assessment of noise immissions
IEA R&D Wind Recommended Practices 10, 1st Edition 1997-01	Recommended Practices for Wind Turbine Testing 10. Measurement of Noise Immission from Wind Turbines at Noise Receptor Locations

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The named procedures under 8.1 correspond to the requirements of the
"special proof of competence in the area of Immission control"
"LAI Module Immission Control" (Version updated by the L/W/V dated 30.01.2018)

Competence is confirmed in the legally regulated technical fields of activity

Group V

Abbreviations used:

BlmSchV	Bundes-Immissionsschutz-Verordnung
BWE	Bundesverband Wind Energie
FGW	Fördergesellschaft Windenergie
IEA	International Energy Agency
IEC	International Electrotechnical Commission
MEASNET	International Network for Harmonised and Recognised Measurements in Wind Energy
D...	In house procedure of WindGuard Consulting GmbH
ESDU	Engineering Sciences Data Unit
DNV GL	Det Norske Veritas-Germanischer Lloyd

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