

Deutsche Akkreditierungsstelle GmbH

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

Valid from: 20.06.2019

Date of issue: 20.06.2019

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; Noise Emission and Noise Immission Measurements; Noise Immission Determination by Calculation; Determination of Shadow Flicker Immission by Calculation; Load Measurement on Wind Turbine; Module Immission Control

Abbreviations used: see last page

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>*

1 Determination of Wind Turbine Power Curves

IEC 61400-12-1, Ed. 2* 2017	Wind turbines - Part 12-1: Power performance measurements of electricity producing wind turbines
IEC 61400-12-2, Ed. 1* 2013	Wind turbines - Part 12-2: Power performance measurements of electricity producing wind turbines based on nacelle anemometry
DIN EN 61400-12-1* 2017-08	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 TR5, Rev. 7* 2017-01	Determination and application of the reference yields
FGW TR 2, Rev. 16* 2010-01	Determination of power performance and standardized energy yields
MEASNET, Version 5 2009-12	MEASNET „Power Performance measurement procedure“

2 Execution and Evaluation of Wind Measurements by Anemometer and Remote Sensing

IEC 61400-12-1, Ed. 2* 2017	Wind turbines - Part 12-1: Power performance measurements of electricity producing wind turbines
DIN EN 61400-12-1* 2017-08	Wind turbines - part 12-1: Power performance measurements of electricity producing wind turbines
FGW TR 6, Rev. 10 * 2017-10	Determination of wind potential and energy yields
MEASNET, Version 2 2016-04	Evaluation of Site Specific Wind Conditions

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

FGW TR 6, Rev. 10* 2017-10	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

4 Noise Emission and Noise Immission Measurements

IEC 61400 -14, Ed. 1* 2005	Wind turbine generator systems - Part 14: Declaration of sound power level and tonality values of wind turbines
IEC 61400-11, Ed. 3* 2012	Wind turbines - Part 11: Acoustic noise measurement techniques
DIN EN 61400-11* 2013-09	Wind turbines - Part 11: Acoustic noise measurement techniques
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
DIN ISO 9613-2* 1999-10	Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation
FGW TR 1, Rev. 18* 2008-02	Determination of noise emission
MEASNET, V.3 2011	Acoustic Noise Measurement Procedure

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TA Lärm 1998-08	Sixth general administrative regulation of the Federal Immission Control Act – Technical instruction for the protection against noise - TA noise including the standards and guidelines listed in it
LAI 2005-03	Notes on noise immission protection at wind turbines (German federal committee for immission protection)
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

5 Noise Immission Determination by Calculation

DIN ISO 9613-2 1999-10	Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation
DIN Interimsverfahren 2015-05.1	Documentation of sound propagation: interim procedure for prediction of noise immission of wind turbines
TA Lärm 1998-08	Sixth general administrative regulation of the Federal Immission Control Act -Technical instruction for the protection against noise - TA Noise
LAI 2005-03	Notes on noise immission protection at wind turbines (German federal committee for immission protection)

6 Determination of Shadow Flicker Immission by Calculation

DIN 5034-2* 1985-02	Daylight in interiors; principles
D5885, Rev. 3 2017-11	Standard Operating Procedure VA PS-Forecast of Shadow Flicker
LAI 2002-03	Notes on determination and assessment of optical immissions of wind turbines (German federal committee for immission protection)

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VDI 3789 Blatt 2 1994-10	Environmental meteorology - Interactions between atmosphere and surfaces - Calculation of spectral short-wave and long-wave radiation
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7 Determination of Turbulence Intensity by Means of Measurement and Calculation

IEC 61400-1 Ed. 3 2010	Wind turbines - Part 1: Design Requirements Chapters 6, 11 Annex B, D - F
DIN EN 61400-1 2011-08	Wind turbines - Part 1: Design requirements Chapters 6, 11, Annex B, D - F
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. 4 2018-12	Standard Operating Procedure VA Site Suitability Studies

8 Load Measurement on Wind Turbine

D5877, Rev. 4 2017-11	Standard Operating Procedure VA Load Measurement
IEC 61400-13 Ed.1 * 2015-12	Wind turbines - Part 13: Measurement of mechanical loads

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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

DNVGL-ST-0437
2016-11

Loads and site conditions for wind turbines
Section 5. Measurements

DNVGL-ST-0438
2016-04

Control and protection systems for wind turbines
Section 6. Test of the wind turbine behavior
Appendix C Test of turbine behavior, specification

9 Determination of Noise Immission

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 working in the neighborhood
including the standards and guidelines listed in
it*

TA Lärm
1998-08

Sixth general administrative regulation of the Federal Immission Control Act - Technical instruction for the protection against noise - TA Noise including the standards and guidelines listed in it

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10 Module Immission Control

Group V: Determination of Noise Immission		
Standard / Guideline / Technical Rule		QM-Document
Titel	Description	
TA Lärm 1998-08	Sixth general administrative regulation of the Federal Immission Control Act - Technical instruction for the protection against noise - TA Noise including the standards and guidelines listed in it	D5878, PA Emission Control 16.02.2017 D5878, PA Immission Control. 16.02.2017
FGW TR 1 Rev. 18* 2008-02	Technical guidelines for Wind turbines - Part 1: Determination of noise emission	D5878, PA Emission Control 16.02.2017
IEC 61400-11 Ed. 3* 2012-11	Wind turbines - Part 11: Acoustic noise measurement techniques	D5879, PA Emission Control 16.02.2017
DIN EN 61400-11* 2013-09	Wind turbines - Part 11: Acoustic noise measurement techniques	D5879, PA Emission Control 16.02.2017

The named procedures correspond to the requirements of the "special proof of competence in the area of Immission control" ("Module Immission Control") in the version of 15th September, 2011.

Competence is confirmed in the legally regulated technical fields of activity

Group V

Determination is limited to wind turbines.

Technical in charge: Stefan Kieselhorst
Deputy technical in charge: Markus Meyer zu Himmern

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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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