

Deutsche Akkreditierungsstelle GmbH

Annex to the Accreditation Certificate D-PL-11098-01-00 according to DIN EN ISO/IEC 17025:2005

Period of validity: 15.06.2018 to 22.10.2020

Date of issue: 15.06.2018

Holder of certificate:

WIND-consult

Ingenieurgesellschaft für umweltschonende Energiewandlung mbH

Reuterstraße 9, 18211 Admannshagen - Bargeshagen

Tests in the fields:

Power performance measurement of wind turbines (WT); Measurement of power quality characteristics of units and plants; Measurement of wind speed and wind direction for the determination of wind potential; Determination of wind potential and energy yield; Determination of the site quality for the initial operation according to the Renewable Energy Law (EEG 2017); Determination of noise emissions of WT; Noise in the neighbourhood of WT; Determination of shadow impact of WT on areas; Measurement of mechanical loads of WT; Measurement of the system behaviour of WT; Assessment of site suitability; Determination of noises (group V); 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 standards / equivalent testing procedures within the flexible scope of accreditation.

1 Power performance measurement of WT

IEC 61400-12* 1998-02	Wind Turbine Generator Systems - Part 12: Wind Turbines Power Performance Testing
IEC 61400-12-2* Ed. 1.0 2013-03	Wind turbines - Part 12-2: Power performance of electricity producing wind turbines based on nacelle anemometry
IEC 61400-12-1* Ed. 2 2017-03	Wind turbines - Part 12-1: Power performance measurement of electricity producing wind turbines
DIN EN 61400-12-1* 2017-12 VDE 0127-12-1 2017-12	Wind Turbines - Part 12-1: Power performance measurements of electricity producing wind turbines
DIN EN 61400-12* 1999-07 VDE 0127 Teil 12 1999-07	Wind turbine generator systems - Part 12: Wind turbines power performance testing
FGW TR 2, Rev. 16* 2010-01	Determination of power curve and standardized energy yields
FGW TR 5, Rev. 7* 2017-01	Determination and application of the reference yields
MEASNET 2009-12	Power Performance Measurement Procedure Version 5

2 Measurement of power quality characteristics of units and plants

IEC 61400-21 Ed.2* 2008-08	Wind turbines – Part 21: Measurement and assessment of power quality characteristics of grid connected wind turbines
IEEE Std 519-2014* 2014-03	IEEE Recommended Practice and Requirements for Harmonic Control in Electric Power Systems
IEEE Std 1453-2015* 2015-09	IEEE Recommended Practice for the Analysis of Fluctuating Installations on Power Systems

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DIN EN 61400-21* 2009-06	Measurement and assessment of power quality characteristics of grid connected wind turbines
FGW TR 3, Rev. 24* 2016-03	Determination of the electrical characteristics of power generating units and systems in medium-, high- and extra-high voltage grids
MEASNET 2009-10	Power Quality Measurement Procedure, Version 4
CEI 0-16 Ed.4 2014	Reference Technical Rules for the Connection of Active and Passive Consumers to the HV and MV Electrical Networks of Distribution Company
AEE PVVC V 10 2012-01	PROCEDIMIENTOS DE VERIFICACIÓN; VALIDACIÓN Y CERTIFICACIÓN DE LOS REQUISITOS DEL PO 12:3 SOBRE LA RESPUESTA DA LAS INSTALACIONES EÓLICAS ANTE HUECOS DE TENSIÓN; Versión 10
IEC 61000-4-7 2002-08	Electromagnetic compatibility (EMC) Part 4-7: Testing and measurement techniques - General guide on harmonics and interharmonics measurements and instrumentation, for power supply systems and equipment connected thereto
DIN EN 61000-4-7 2009-12 VDE 0847- 4-7 2009-12	Testing and measurement techniques – General guide on harmonics and interharmonics measurements and instrumentation, for power supply systems and equipment connected thereto
IEC 61000-4-15 2010-08	Electromagnetic compatibility (EMC) - Part 4-15: Testing and measurement techniques - Flickermeter - Functional and design specification
DIN EN 61000-4-15 2011-10 VDE 0847- 4-15 2011-10	Part 4-15: Testing and measurement techniques - Flickermeter - Functional and design specifications

3 Measurement of wind speed and wind direction for the determination of wind potential

IEC 61400-12-1 Ed.2* 2017-03	Wind turbines - Part 12-1: Power performance measurement of electricity producing wind turbines
FGW TR 6, Rev. 10* 2017-10	Determination of wind potential and energy yields
MEASNET 2016-04	Evaluation of Site-Specific Wind Conditions. Version 2
WICO QMP 05 2018-03	Measurement of wind speed and wind direction for the determination of wind potential

4 Determination of wind potential and energy yield; Determination of the site quality for the initial operation according to the Renewable Energy Law (EEG2017)

FGW TR 6, Rev. 10* 2017-10	Determination of wind potential and energy yields
MEASNET 2016-04	Evaluation of Site-Specific Wind Conditions, Version 2
WICO QMP 10 2018-03	Determination of wind potential and energy yield

5 Determination of noise emissions of WT

IEC 61400-11: 2002 +A1:2006*	Wind turbine generator systems - Part 11: Acoustic noise measurement techniques (<i>withdraw Standard</i>)
IEC 61400-11* 2012	Wind turbines - Part 11: Acoustic noise measurement techniques
DIN EN 61400-11* 2007-03	Wind turbines - Part 11: Acoustic noise measurement techniques (<i>withdraw Standard</i>)
FGW TR 1, Rev. 18* 2008-02	Determination of noise emission

MEASNET 2011-11	Acoustic Noise Measurement Procedure Version 3
VDE 0127-11* 2007-03	Wind turbine generator systems - Part 11: Acoustic noise measurement techniques

6 Noise in the neighbourhood of WT

WICO QMP 02 2018-03	Measuring of noise emission of WT
WICO QMP 03 2018-03	Measuring of noise emission of WT
WICO QMP 11 2018-03	Calculation of noise immission
109. Sitzung LÄNDERAUSSCHUSS FÜR IMMISSIONSSCHUTZ (LAI) 2005-03	Hinweise zum Schallimmissionsschutz bei Windenergieanlagen.
134.Sitzung LÄNDERAUSSCHUSS FÜR IMMISSIONSSCHUTZ (LAI) 2017-09	Hinweise zum Schallimmissionsschutz bei Windkraftanlagen (WKA) überarbeiteter Entwurf vom 17.03.2016 mit Änderungen PhysE vom 23.06.2016 Stand 30.06.2016
NA 001-02-03-19 UA 2015-05	Dokumentation zur Schallausbreitung - Interimsverfahren zur Prognose der Geräuschimmissionen von Windkraftanlagen Fassung 2015-05.1

7 Determination of noises (group V) (limited to noise emissionen und immissionen of WT)

TA Lärm 1998-08	Sechste Allgemeine Verwaltungsvorschrift zum Bundes- Immissionsschutzgesetz; Technische Anleitung zum Schutz gegen Lärm - TA Lärm
DIN ISO 9613-2 1999-10	Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation

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DIN 45645-1 1996-07	Determination of rating levels from measurement data - Part 1: Noise immission in the neighbourhood
E DIN 45680 2013-09	Measurement and assessment of low-frequency noise immissions
E DIN 45680 B1 2013-09	Measurement and assessment of low-frequency noise immissions - Guidelines for the assessment - Technical equipment
DIN 45681 2005-03	Akustik - Bestimmung der Tonhaltigkeit von Geräuschen und Ermittlung eines Tonzuschlages für die Beurteilung von Geräuschimmissionen
DIN 45681 Berichtigung 2 2006-08	Acoustics - Determination of tonal components of noise and determination of a tone adjustment for the assessment of noise immissions, Corrigenda to DIN 45681:2005-03

8 Determination of shadow impact of WT on areas

WICO QMP 12 2018-03	Determination of shadow flicker
LÄNDERAUSSCHUSS FÜR IMMISSIONSSCHUTZ (LAI) 2002-03	Hinweise zur Ermittlung und Beurteilung der optischen Immission von Windenergieanlagen, WEA-Schattenwurf-Hinweise

9 Measurement of mechanical loads of WT

IEC TS 61400-13* 2001	Wind Turbine Generator Systems - Part 13: Measurement of mechanical loads
IEC 61400-13 Ed.1.0* 2015-12	Wind turbines - Part 13: Measurement of mechanical loads
Guideline Edition 2010 GERMANISCHER LLOYD 2010-07	Guideline for the Certification of Wind Turbines

Guideline Edition 2012 GERMANISCHER LLOYD 2012-12	Guideline for the Certification of Offshore Wind Turbines
IEC 61400-22 Ed.1.0 2010-05	Wind turbines Part 22: Conformity testing and certification
VDI 3834 Part 1 2015-08	Measurement and evaluation of the mechanical vibration of wind turbines and their components Wind turbines with gearbox
IEC/TS 61400-4 2012-12	Wind turbines - Part 4: Design requirements for wind turbine gearboxes, Chapter: 8. Design verification

10 Measurement of the system behaviour of WT

IEC 61400-13 Ed. 1.0* 2015-12	INTERNATIONAL ELECTROTECHNICAL COMMISSION (IEC): Wind turbines - Part 13: Measurement of mechanical loads
IEC 61400-22 Ed.1.0* 2010-05	Wind turbines - Part 22 : Conformity testing and certification
Guideline Edition 2010 GERMANISCHER LLOYD 2010-07	Guideline for the Certification of Wind Turbines
Guideline Edition 2012 GERMANISCHER LLOYD 2012-12	Guideline for the Certification of Offshore Wind Turbines

11 Assessment of the site suitability of WT

DIBt Reihe B, Heft 8 2012-10 – korrigierte Fassung März 2015	Richtlinie für Windenergieanlagen: Einwirkungen und Standortsicherheitsnachweise für Turm und Gründung
FGW TR 6, Rev. 10* 2017-10	Determination of wind potential and energy yields
WICO QMP 13 2018-03	Assessment of the site suitability of WT

12 Module Immission Control

Group V: Determination of noises (limited to noises of wind turbines)			
Standard / Guideline / Technical rule		QM- Document	Note Location
Titel	Description		
TA Lärm 1998-08	Sechste Allgemeine Verwaltungsvorschrift zum Bundes- Immissionsschutzgesetz - Technische Anleitung zum Schutz gegen Lärm - TA Lärm einschließlich der darin benannten Normen und Richtlinien.	WICO QMP 02 WICO QMP 03 WICO QMP 11	Admannshagen - Bargeshagen
IEC 61400-11: 2002 + A1 2006	Wind turbines - Part 11: Acoustic noise measurement techniques		
IEC 61400-11 2013-09	Wind turbines - Part 11: Acoustic noise measurement techniques		
DIN EN 61400-11 + A1-2007-03	Wind turbines - Part 11: Acoustic noise measurement techniques		
VDE 0127-11 2013-09	Wind turbines - Part 11: Acoustic noise measurement techniques		
TR Teil 1, Rev. 18 2008-02	Determination of noise emission		
IEA No. 4 3. Edition 1994	Recommended Practices for Wind Turbine-Testing and Evaluation: 4 Acoustics -Measurement of Noise Emission from Wind Turbines		

Group V: Determination of noises (limited to noises of wind turbines)			
Standard / Guideline / Technical rule		QM- Document	Note Location
Titel	Description		
TR-No. 304 ENVIRONMENT MINISTRY OF 1991-05	On Noise from Windmills	WICO QMP 02 WICO QMP 03 WICO QMP 11	Admannshagen - Bargeshagen
MEASNET 2011-11	Acoustic Noise Measurement Procedure Version 2		
109. Sitzung LÄNDERAUS-SCHUSS FÜR IMMISSIONS- SCHUTZ (LAI) 2005-03	Hinweise zum Schallimmissionsschutz bei Windenergieanlagen		
134.Sitzung LÄNDERAUSSCHUSS FÜR IMMISSIONS- SCHUTZ (LAI) 2017-09	Hinweise zum Schallimmissionsschutz bei Windkraftanlagen (WKA) überarbeiteter Entwurf vom 17.03.2016 mit Änderungen PhysE vom 23.06.2016 Stand 30.06.2016		
ARBEITSKREIS "GERÄUSCHE VON WIND- KRAFTANLAGEN" 1999-10	Schallimmissionsschutz im Genehmigungsverfahren von Windenergieanlagen		

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.

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Abbreviations used:

BGBI	Bundesgesetzblatt
DIBt	German Institute for Structural Engineering
DIN	German Institute for Standardization
EN	European Standard
IEA	International Energy Agency
IEC	International Energy Committee
IEEE	Institute of Electrical and Electronics Engineers
ISO	International Standardisation Organisation
PVVC	Procedure for Verification, Validation and Certification
TR	Technical guideline
VDE	Association for Electrical, Electronic and Information Technologies
VDI	Verein Deutscher Ingenieure
WT	Wind turbine
WICO QMP	In house method of the WIND-consult Ingenieurgesellschaft für umweltschonende Energiewandlung mbH
MEASNET	Measuring Network of Wind Energy Institutes