

# Deutsche Akkreditierungsstelle

## Annex to the Partial Accreditation Certificate D-PL-11134-01-01 according to DIN EN ISO/IEC 17025:2018

**Valid from:** 13.05.2024

**Date of issue:** 13.05.2024

This annex is a part of the accreditation certificate D-PL-11134-01-00.

Holder of partial accreditation certificate:

**DNV Energy Systems Germany GmbH  
Brooktorkai 18, 20457 Hamburg**

with the locations

**Sommerdeich 14 b, 25709 Kaiser-Wilhelm-Koog  
Brooktorkai 18, 20457 Hamburg**

The testing laboratory meets the requirements of DIN EN ISO/IEC 17025:2018 to carry out the conformity assessment activities listed in this annex. The testing laboratory meets additional legal and normative requirements, if applicable, including those in relevant sectoral schemes, provided that these are explicitly confirmed below.

The management system requirements of DIN EN ISO/IEC 17025 are written in the language relevant to the operations of testing laboratories and they conform to the principles of DIN EN ISO 9001.

Tests in the fields:

- 1. Wind measurements with meteorological masts and remote sensing devices (LiDAR) as well as verification and classification of remote sensing devices (LiDAR)**
- 2. Determination and evaluation of site-specific wind conditions and energy production**
- 3. Load Measurements on wind turbines; Safety, function and behaviour tests on wind turbines**
- 4. Power Performance Measurements**
- 5. Measurement of electrical characteristics of power generating system**
- 6. Shadow impact assessments**

*This certificate annex is only valid together with the written accreditation certificate and reflects the status as indicated by the date of issue. The current status of any given scope of accreditation can be found in the directory of accredited bodies maintained by Deutsche Akkreditierungsstelle GmbH at <https://www.dakks.de>.*

**Annex to the Partial Accreditation Certificate D-PL-11134-01-01**

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 within the flexible scope of accreditation.

The test methods are identified by the following symbols of the sites where they are carried out:

KWK = Kaiser-Wilhelm-Koog

HAM = Hamburg

**1 Wind measurements with meteorological masts and remote sensing devices (LiDAR) as well as verification and classification of remote sensing devices (LiDAR) / (KWK)**

<b>Guideline or standard Date of issue</b>	<b>Title of the guideline or standard</b>
IEC 61400-12-1, Ed. 2.0 * 2017-03	Wind turbines - Part 12-1: Power performance measurements of electricity producing wind turbines, Annex L
FGW TR 6, Rev. 11 * 2020-09	Determination of wind potential and energy yields
ISI-RA-MEA-4200-A551 2021-12	Wind Ressource Measurement
ISI-RA-MEA-4200-A552 2021-12	Ground Based LiDAR Verification
IEC 61400-50-3 Ed. 1.0 * PRVC 2020-11-14	Wind energy generation systems - Part 50-3: Use of nacelle mounted lidars for wind measurements <i>excluding chapters (8, 10, 11, 12)</i>

**2 Determination and evaluation of site-specific wind conditions and energy production (HAM)**

<b>Guideline or standard Date of issue</b>	<b>Title of the guideline or standard</b>
FGW TR 5, Rev. 8 * 2020-03	Determination and application of the reference yields
FGW TR 6, Rev. 11 * 2020-09	Determination of wind potential and energy yields
FGW TR 10, Rev. 2 * 2021-03-31	Determination of Site Quality after Commissioning
MEASNET Site-Specific Wind Conditions, Version 2 2016-04	MEASNET Evaluation of Site-Specific Wind Conditions
ISI-RA-MEA-4900-A560 2022-01	Determination and evaluation of site-specific wind conditions and energy production

**Annex to the Partial Accreditation Certificate D-PL-11134-01-01**

<b>Guideline or standard Date of issue</b>	<b>Title of the guideline or standard</b>
ISI-RA-MEA-4900-A560 2022-01	Determination and evaluation of site-specific wind conditions and energy production
ISI-RA-MEA-4900-A550 2022-01	Wind Resource and Energy Yield Modelling - Without On Site Measurement
ISI-RA-MEA-4900-A552 2022-01	EEG Relating Service with reference to: <i>EEG 2017-01</i> <i>Gesetz für den Ausbau erneuerbarer Energien (Erneuerbare-Energien-Gesetz – EEG)</i>

**3 Load Measurements on wind turbines,  
Safety, function and behaviour tests on wind turbines (KWK)**

<b>Guideline or standard Date of issue</b>	<b>Title of the guideline or standard</b>
IEC 61400-13 Ed. 1.0 * 2015-12	Wind turbines - Part 13: Measurement of mechanical loads
IEC 61400-2 Ed. 3.0 2013-12	Wind turbines - Part 2: Design requirements for small wind turbines Chapters: 7.6 Load Measurements 13. Testing Annex I Natural frequency analysis
IEC 61400-22 Ed. 1.0 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
DNV-ST-0437 Edition 2016-11 Amended 2021-11	Loads and site conditions for wind turbines Section 5. Measurements
DNV-ST-0438 Edition 2016-04 Amended 2021-11	Control and protection systems for wind turbines Section 6. Test of the wind turbine behaviour Appendix C Test of turbine behaviour, specification

**4 Power Performance Measurements (KWK)**

<b>Guideline or standard Date of issue</b>	<b>Title of the guideline or standard</b>
FGW TR 2 Rev. 17 * 2018-03	Determination of power curve and standardized energy yields
IEC 61400-12-1, Ed. 2.0 * 2017-03	Wind turbines - Part 12-1: Power performance measurements of electricity producing wind turbines”
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 61400-22 Ed. 1.0 2010-05	Wind turbines - Part 22: conformity testing and verification Chapters 8.4 Type testing 9.11 Project characteristics measurements
MEASNET Power Performance, Version 5 2009-12	MEASNET Power Performance Measurement Procedure

**5 Measurement of electrical characteristics of power generating systems (Power Quality) (KWK)**

<b>Guideline or standard Date of issue</b>	<b>Title of the guideline or standard</b>
ENA EREC G99 * Issue 1 Amendment 8 2021-09	Requirements for the connection of generation equipment in parallel with public distribution networks on or after 27 April 2019
DIN VDE V 0124-100 * 2020-06	Grid integration of generator plants - Low-voltage - Test requirements for generator units to be connected to and operated in parallel with low-voltage distribution networks
FGW TR 3, Rev. 25 * 2018-09	Determination of the Electrical Characteristics of Power Generating Units and Systems, Storage Systems as well for their Components in Medium-, High- and Extra-High Voltage Grids
IEC 61400-21-1, Ed. 1.0 * 2019-05	Wind energy generation systems - Part 21-1: Measurement and assessment of electrical characteristics - Wind turbines
IEEE 1453-2015 2015-09	IEEE Recommended Practice for the Analysis of Fluctuating Installations on Power Systems
IEEE 519-2014 2014-03	Recommended Practice and Requirements for Harmonic Control in Electrical Power Systems
MEASNET Electrical Characteristics	Procedure for Measurement of Electrical Characteristics

**Annex to the Partial Accreditation Certificate D-PL-11134-01-01**

<b>Guideline or standard Date of issue</b>	<b>Title of the guideline or standard</b>
Measurement Procedure, Version 1 2019-06	
NTS * Version 2.1 2021-07	Technical standard for monitoring the compliance of power generating modules according to EU Regulation 2016/631
NTS SENP * Version 1.1 2021-07	Technical standard for monitoring the compliance of power generating modules according to P.O. 12.2 SENP

**Table 1:** Measurements according to NTS and NTS SENP Standards

Code for test location: KWK: Kaiser-Wilhelm-Koog; I: "in situ"/"on site" Tests

<b>Products tested</b>	<b>Type of test</b>	<b>Test procedure</b>	<b>Code</b>
PPMs (Power Park Modules) like: Solar inverter, wind turbine, fuel cells, battery storage systems, etc.  SPGMs (synchronous power generating modules) like: combined heat and power,	Test of control of power, frequency, voltage regulation and robustness against disturbances in the network and capability tests by testing according to chapters:  5.1: Limited frequency sensitive mode - overfrequency (LFSM-O) 5.2: Limited frequency sensitive mode - underfrequency (LFSM- U) 5.3: Frequency sensitive mode (FSM) 5.4 Power-frequency control capability 5.5: Active power control capability and range 5.7: Reactive power capability at maximum capacity and below maximum capacity 5.8: Reactive power control in PPM 5.11: Robustness requirements: Active power recovery after a fault, Fault ride through capability and fast fault current injection capability	Technical standard for monitoring the compliance of power generating modules according to EU Regulation 2016/631  Technical standard for monitoring the compliance of power generating modules according to P.O. 12.2 SENP	KWK, I

**Annex to the Partial Accreditation Certificate D-PL-11134-01-01**

<b>Products tested</b>	<b>Type of test</b>	<b>Test procedure</b>	<b>Code</b>
STATCOMS (Static Synchronous Compensators)	4.6.1: STATCOM  - Measurement of the reactive power capability exchanged by a STATCOM  - Measurement of the response dynamics of a STATCOM against a power/current setpoint change.	Technical standard for monitoring the compliance of power generating modules according to EU Regulation 2016/631  Technical standard for monitoring the compliance of power generating modules according to P.O. 12.2 SENP	KWK, I
PPC (Power Plant Controllers)	4.6.2: PPC  5.1: Limited frequency sensitive mode - overfrequency (LFSM-O) 5.2: Limited frequency sensitive mode - underfrequency (LFSM-U) 5.3: Frequency sensitive mode (FSM) 5.4 Power-frequency control capability 5.5: Active power control capability and range 5.7: Reactive power capability at maximum capacity and below maximum capacity 5.8: Reactive power control in PPM	Technical standard for monitoring the compliance of power generating modules according to EU Regulation 2016/631  Technical standard for monitoring the compliance of power generating modules according to P.O. 12.2 SENP	KWK, I
Synchronous Compensator	4.6.3 Synchronous Compensator  - Measurement of the reactive power capability exchanged by a synchronous compensator. - Measurement of the response dynamics of a synchronous compensator	Technical standard for monitoring the compliance of power generating modules according to EU Regulation 2016/631  Technical standard for monitoring the compliance of power generating modules according to P.O. 12.2 SENP	KWK, I
Battery Storage Systems	4.6.4: Battery Storage Systems  5.1: Limited frequency sensitive mode - overfrequency (LFSM-O)	Technical standard for monitoring the compliance of power generating	KWK, I

**Annex to the Partial Accreditation Certificate D-PL-11134-01-01**

Products tested	Type of test	Test procedure	Code
	5.2: Limited frequency sensitive mode - underfrequency (LFSM-U) 5.3: Frequency sensitive mode (FSM) 5.4 Power-frequency control capability 5.5: Active power control capability and range 5.7: Reactive power capability at maximum capacity and below maximum capacity 5.8: Reactive power control in PPM 5.11: Robustness requirements: Active power recovery after a fault, Fault ride through capability and fast fault current injection capability	modules according to EU Regulation 2016/631  Technical standard for monitoring the compliance of power generating modules according to P.O. 12.2 SENP	

**6 Shadow impact assessment (KWK)**

Guideline or standard Date of issue	Title of the guideline or standard
ISI-RA-MEA-4620 2021-12	Shadow Flicker Impact Assessment

**Annex to the Partial Accreditation Certificate D-PL-11134-01-01**

**Abbreviations used:**

BWEA	British Wind Energy Association
DIN	German Institute for Standardization
DNV	Det Norske Veritas
DNV GL	Det Norske Veritas Germanischer Lloyd
ENA EREC	Energy Networks Association Engineering Recommendation
FGW	Fördergesellschaft Windenergie und andere dezentrale Energien
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
ISI-RA-MEAxxx	In house method of the GL Garrad Hassan Deutschland GmbH
MEASNET	Measuring Network of Wind Energy Institutes
NTS	Norma técnica de supervisión
TA-Lärm	Technical Guidelines for noise reduction
VDE	Association for Electrical, Electronic and Information Technologies