

Deutsche Akkreditierungsstelle GmbH

Annex to the Accreditation Certificate D-PL-11140-21-00 according to DIN EN ISO/IEC 17025:2005

Period of validity: 05.10.2018 to 01.03.2021

Date of issue: 05.11.2018

Holder of certificate:

Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e. V.
Hansastraße 27c, 80686 München

at the location

Fraunhofer-Institut für Windenergiesysteme (IWES)
Am Seedeich 45, 27572 Bremerhaven

Tests in the fields:

**determination of physical properties of fiber reinforced plastics and composite materials
using mechanical and thermal tests;**
measurement of mechanical loads on wind turbines;
power performance measurements of wind turbines

Abbreviations used: see last page

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.

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1 Plastics - Tensile testing

DIN EN ISO 527-4 1997-07	Plastics - Determination of tensile properties - Part 4: Test conditions for isotropic and anisotropic fibre-reinforced plastic compo-sites
DIN EN ISO 527-5 2010-01	Plastics - Determination of tensile properties - Part 5: Test conditions for unidirectional fibre-reinforced plastic composites
ASTM D 3039/D 3039M 2017	Standard Test Method for Tensile Properties of Polymer Matrix Composite Materials
ASTM D 3479/D 3479M 2012	Standard Test Method for Tension-Tension Fatigue of Polymer Matrix Composite Materials
ISO 13003 2003-12	Fibre-reinforced plastics - Determination of fatigue properties under cyclic loading conditions
DIN EN ISO 14129 1998-02	Fibre-reinforced plastic composites - Determination of the in-plane shear stress/shear strain response, including the in-plane shear modulus and strength, by $\pm 45^\circ$ tension test method
ASTM D 7078/D 7078M 2012	Standard Test Method for Shear Properties of Composite Materials by V-Notched Rail Shear Method

2 Plastics - Compression testing

DIN EN ISO 14126 2000-12	Fibre-reinforced plastic composites - Determination of compressive properties in the in-plane direction
ASTM D 6641/D 6641M 2016	Standard Test Method for Compressive Properties of Polymer Matrix Composite Materials Using a Combined Loading Compression (CLC) Test Fixture

3 Plastics - Shear strength/ Bending strength

DIN EN ISO 14130 1998-02	Fibre reinforced plastic composites - Determination of apparent interlaminar shear strength by short beam-method
ASTM D 2344/D 2344M 2016	Standard Test Method for Short-Beam Strength of Polymer Matrix Composite Materials and Their Laminates

4 Plastics - Thermal material testing

DIN EN ISO 11357-2
2014-07 Plastics - Differential scanning calorimetry (DSC) - Part 2: Determination of glass transition temperature and glass transition step height

DIN EN 2331
1993-04 Aerospace series - Textile glass fibre preimpregnates - Test method for the determination of the resin and fibre content and mass of fibre per unit area
(here: *only 9.1 Ashing procedure*)

5 Power performance measurements of wind turbines

DIN EN 61400-13
2017-06 Wind turbines - Part 13: Measurement of mechanical loads
IEC 61400-13
2015

IEC 61400-12-1
2017-03 Wind energy generation systems - Part 12-1: Power performance measurements of electricity producing wind turbines

6 Full-scale testing of rotor blades

DIN EN 61400-23
2014-12 Wind turbines - Part 23: Full-scale structural testing of rotor blades
IEC 61400-23
2014

abbreviations used:

ASTM	American Society for Testing and Materials
DIN	German Institute for Standardization
EN	European Standard
ISO	International Organization for Standardization
IEC	International Electrotechnical Commission