

Deutsche Akkreditierungsstelle GmbH

Entrusted according to Section 8 subsection 1 AkkStelleG in connection with Section 1 subsection 1 AkkStelleGBV

Signatory to the Multilateral Agreements of
EA, ILAC and IAF for Mutual Recognition

Accreditation



The Deutsche Akkreditierungsstelle GmbH attests that the testing laboratory

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

at the location

Fraunhofer-Institut für Windenergie und Energiesystemtechnik (IWES)
Institutsteil Bremerhaven
mit den Laborbereichen Materiallabor, Windenergie-Feldmessungen und Rotorblatt
Am Seedeich 45, 27572 Bremerhaven

is competent under the terms of DIN EN ISO/IEC 17025:2005 to carry out tests in the following fields:

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

The accreditation certificate shall only apply in connection with the notice of accreditation of 25.08.2017 with the accreditation number D-PL-11140-21 and is valid until 01.03.2021. It comprises the cover sheet, the reverse side of the cover sheet and the following annex with a total of 3 pages.

Registration number of the certificate: **D-PL-11140-21-00**

Berlin,
04.12.2017

Dipl.-Ing. (FH) Ralf Egnér
Head of Division

Translation issued:
04.12.2017


Head of Division

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

See notes overleaf.

Deutsche Akkreditierungsstelle GmbH

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

Period of validity: 25.08.2017 to 01.03.2021

Date of issue: 04.12.2017

Holder of certificate:

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

at the location

**Fraunhofer-Institut für Windenergie und Energiesystemtechnik (IWES)
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Rotorblatt
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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**

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.

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 composites
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 2014	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 2014	Standard Test Method for Compressive Properties of Polymer Matrix Composite Materials Using a Combined Loading Compression (CLC) Test Fixture

3 Shear strength/ Bending strength

DIN EN ISO 14130 1998-02	Fibre reinforced plastic composites - Determination of apparent interlaminar shear strength by short beam-method
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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 Wind turbines - Field measurements

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

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