

Deutsche Akkreditierungsstelle GmbH

Annex to the Accreditation Certificate D-PL-11140-21-00 according to DIN EN ISO/IEC 17025:2018

Valid from: **01.03.2021**

Date of issue: 01.03.2021

Holder of certificate:

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

at 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; power performance measurements of wind turbines; measurement of mechanical loads on wind turbines

Within the given testing field marked with *, the testing laboratory is permitted, without being required to inform and obtain prior approval from DAkkS, the free choice of standard or equivalent testing methods. The listed testing methods are exemplary.

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 procedures within the flexible scope of accreditation.

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

*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 physical properties of fiber reinforced plastics and composite materials using mechanical and thermal tests

1.1 Tensile testing of fiber reinforced plastics and composite materials *

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
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
ISO 13003 2003-12	Fibre-reinforced plastics - Determination of fatigue properties under cyclic loading conditions
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
ASTM D 7078/D 7078M 2012	Standard Test Method for Shear Properties of Composite Materials by V-Notched Rail Shear Method

1.2 Compressive testing of fiber reinforced plastics and composite materials *

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

1.3 Determination of shear and flexural strength on fiber reinforced plastics and composite materials *

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

1.4 Determination of properties of fiber reinforced plastics and composite materials by thermal stress *

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*)

test item	type of testing	test parameter	characteristic test method
fiber reinforced plastics and composite materials	tensile testing	force	DIN EN ISO 527-4
		travel	
		strain	
	compressive testing	force	DIN EN ISO 14126
		travel	
		strain	
	Determination of shear and flexural strength	force	DIN EN ISO 14130
		travel	
		strain	
	thermal stress		temperature
weight			

2 power performance measurements of wind turbines **

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

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

3 measurement of mechanical loads on wind turbines **

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