

Deutsche Akkreditierungsstelle

Annex to the Partial Accreditation Certificate D-PL-20273-01-01 according to DIN EN ISO/IEC 17025:2018

Valid from: 04.04.2023

Date of issue: 04.04.2023

This annex is a part of the accreditation certificate D-PL-20273-01-00.

Holder of partial accreditation certificate:

SGL CARBON GmbH

with its testing laboratory

**Central Laboratory Services CLS
Werner-von-Siemens-Straße 18, 86405 Meitingen**

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 confirm generally with the principles of DIN EN ISO 9001.

Tests in the fields of:

physical-mechanical and chemical material investigations of solid fuels, carbon materials, carbon fibers, laminates, fiber composites, polymers and polymer fibers

Within the given testing field marked with *, the testing laboratory is permitted, without being required to inform and obtain prior approval from DAkkS, the following: the free choice of standard or equivalent testing methods. The listed testing methods are exemplary. The testing laboratory maintains a current list of all testing methods within the flexible scope of accreditation.

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>.

Abbreviations used: see last page

Page 1 of 6

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

Annex to the Partial Accreditation Certificate D-PL-20273-01-01

1 Thermoanalytical test methods *

DIN 51908 2006-05	Testing of carbon materials - Determination of thermal conductivity at room temperature by means of a comparative method - Solid material
DIN 51909 2009-05	Testing of carbonaceous materials - Determination of coefficient of linear thermal expansion - Solid materials
DIN 51936 2016-08	Testing of carbonaceous materials - Determination of thermal diffusivity at high temperatures by the laser pulse method - Solid materials
DIN 65583 1999-04	Aerospace - Fibre reinforced materials - Determination of glass transition of fibre composites under dynamic load
DIN EN ISO 11358-1 2014-10	Plastics - Thermogravimetry (TG) of polymers - Part 1: General principles
ISO 11357-2 2020-03	Plastics - Differential scanning calorimetry (DSC) - Part 2: Determination of glass transition temperature and step height
ISO 11357-3 2018-03	Plastics - Differential scanning calorimetry (DSC) - Part 3: Determination of temperature and enthalpy of melting and crystallization

Valid from: 04.04.2023

Date of issue: 04.04.2023

Page 2 of 6

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

Test item	Type of testing	Test parameters	Characteristic test method
fiber-reinforced plastics and fiber composites	Thermal stress	Temperature Mass Time Length Path	ISO 11357-2 ISO 11357-3 DIN EN ISO 11358-1 DIN 65583
graphite and carbon materials	Thermal conductivity	Temperature Time Length	DIN 51936
	Thermal conductivity	Temperature Voltage Length	DIN 51908
	Expansion	Temperature Path	DIN 51909

2 Mechanical-technological tests *

DIN 51902 2009-05	Testing of carbonaceous materials - Determination of flexural strength by three point method - Solid materials
DIN 51915 2015-09	Testing of carbonaceous materials - Determination of dynamic modulus of elasticity by the resonance method - Solid materials
DIN 51944 2009-05	Testing of carbonaceous materials - Determination of flexural strength by four point method - Solid materials
DIN EN 2377 1989-10	Aerospace series; glass fibre reinforced plastics; test method; determination of apparent interlaminar shear strength
DIN EN 2561 1995-11	Aerospace series - Carbon fibre reinforced plastics - Unidirectional laminates - Tensile test parallel to the fibre direction
DIN EN 2562 1997-05	Aerospace series - Carbon fibre reinforced plastics - Unidirectional laminates; flexural test parallel to the fibre direction
DIN EN 2563 1997-03	Aerospace series - Carbon fibre reinforced plastics - Unidirectional laminates; determination of apparent interlaminar shear strength

Valid from: 04.04.2023

Date of issue: 04.04.2023

Annex to the Partial Accreditation Certificate D-PL-20273-01-01

DIN EN 2597 1998-08	Aerospace series - Carbon fibre reinforced plastics; unidirectional laminates - Tensile test perpendicular to the fibre direction
DIN EN ISO 527-4 1997-07	Plastics - Determination of tensile properties - Part 4: Test conditions for isotropic and orthotropic 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 14125 2011-05	Fibre-reinforced plastic composites - Determination of flexural properties
DIN EN ISO 14126 2000-12	Fibre-reinforced plastic composites - Determination of compressive properties in the in-plane direction
DIN EN ISO 14130 1998-02	Fibre reinforced plastic composites - Determination of apparent interlaminar shear strength by short beam-method

Test item	Type of testing	Test parameters	Characteristic test method
fiber-reinforced plastics and fiber composites	Tensile test	Force Path Elongation Length	DIN EN ISO 527-4 DIN EN ISO 527-5 DIN EN 2561 DIN EN 2597
	Examination of the shear and flexural strength	Force Path Elongation Length	DIN EN ISO 14130 DIN EN 2377 DIN EN 2562 DIN EN 2563 DIN EN ISO 14125
graphite and carbon materials	Bend test	Force Path Elongation Length	DIN 51902 DIN 51944
	Dynamic e-modulus	Frequency Length	DIN 51191

Annex to the Partial Accreditation Certificate D-PL-20273-01-01

3 Testing of physical properties

3.1 Standard procedures *

DIN 51911 1997-11	Testing of carbonaceous materials - Determination of specific electrical resistance by the current-voltage method - Solid materials
DIN 51913 2013-05	Testing of carbonaceous materials - Determination of density by gas pycnometer (volumetric) using helium as the measuring gas - Solid materials
DIN 51918 2018-07	Testing of carbonaceous materials - Determination of bulk density and the open porosity
ISO 12985-1 2018-05	Carbonaceous materials used in the production of aluminium - Baked anodes and cathode blocks - Part 1: Determination of apparent density using a dimensions method

Test item	Type of testing	Test parameters	Characteristic test method
graphite and carbon materials	bulk density	Length Mass	DIN 51918 ISO 12985-1
	electrical resistance	Voltage Current	DIN 51911
	He-density (pycnometer)	Pressure Mass	DIN 51913

3.2 In-house procedures (outside the flexible scope)

WS SBF 0310 MEI DE Rev. 1 2020-04	Testing of fiber reinforced plastics - fiber volume content using Macro TGA
---	---

Valid from: 04.04.2023
Date of issue: 04.04.2023

Annex to the Partial Accreditation Certificate D-PL-20273-01-01

Abbreviations used:

DIN	German institute for standardization
EN	European Standard
IEC	International Electrotechnical Commission
ISO	International Organization for Standardisation
WS SBF	In house method of the SGL Carbon GmbH, Site Laboratory Services
TGA	Thermogravimetric analysis

Valid from: 04.04.2023

Date of issue: 04.04.2023

Page 6 of 6

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