

Deutsche Akkreditierungsstelle GmbH

Annex to the Accreditation Certificate D-PL-20273-01-00 according to DIN EN ISO/IEC 17025:2018

Valid from: 05.08.2020

Date of issue: 05.08.2020

Holder of certificate:

SGL Carbon GmbH
Site Laboratory Services
Werner-von-Siemens-Straße 18, 86405 Meitingen

Tests in the fields:

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

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.

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

Abbreviations used: see last page

*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>*

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1 Thermoanalytical test methods ***

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| 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 |

2 Mechanical-technological tests ***

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|------------------------|---|
| 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 |

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| DIN EN 2563 1997-03 | Aerospace series - Carbon fibre reinforced plastics - Unidirectional laminates; determination of apparent interlaminar shear strength |
| DIN EN 2564 2019-08 | Aerospace series - Carbon fibre laminates - Determination of the fibre, resin and void contents |
| 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 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 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 |
| ISO 1889 2009-07 | Reinforcement yarns - Determination of linear density |
| ISO 10618 2004-08 | Carbon fibre - Determination of tensile properties of resin-impregnated yarn |

3 Chemical analysis

3.1 Standard tests ***

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|------------------------|---|
| DIN 51903 2012-11 | Testing of carbonaceous materials - Determination of ash value - Solid materials |
| DIN 51732 2014-07 | Testing of solid mineral fuels - Determination of total carbon, hydrogen and nitrogen - Instrumental methods (additionally: <i>Determination of the total sulfur content</i>) |
| DIN 51941-1 2008-01 | Testing of carbonaceous materials - Determination of chemical composition - Part 1: Sample preparation, solid materials, solid binders and impregnants |

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DIN EN ISO 21068-2
2008-12 Chemical analysis of silicon-carbide-containing raw materials and refractory products - Part 2: Determination of loss on ignition, total carbon, free carbon and silicon carbide, total and free silica and total and free silicon

ISO 14435
2005-07 Carbonaceous materials for the production of aluminium - Petroleum coke - Determination of trace metals by inductively coupled plasma atomic emission spectrometry
(additionally: *Determination of the elements Ag, Bi, Cd, Co, Cr, Cu, K, Mo, P, Pb, Sn, Sr, W und Zr*)

3.2 In-house methods

WS SBF 0306 MEI DE
Rev. 1
2020-04 Determination of the oxidation behaviour of graphite and carbon materials by thermogravimetric analysis (macro-TGA)

4 Test of physical properties

4.1 Standard tests ***

DIN 51911
1997-11 Testing of carbon materials - Determination of specific electrical resistance by the current-voltage method - Solid matters

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

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4.2 In-house method

WS SBF 0310 MEI DE Testing of fiber-reinforced Plastics - Fiber volume content by thermo-
Rev. 1 gravimetric analysis (macro-TGA)
2020-04

abbreviations used:

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|--------|--|
| DIN | German Institute for Standardization |
| EN | European Standard |
| ISO | International Organization for Standardization |
| WS SBF | In-house method of SGL Carbon GmbH, Site Laboratory Services |

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