

Accreditation



The Deutsche Akkreditierungsstelle attests with this **Accreditation Certificate** that the testing laboratory

**Fraunhofer Gesellschaft zur Förderung der angewandten Forschung
eingetragener Verein
Hansastraße 27c, 80686 München**

meets the requirements according to DIN EN ISO/IEC 17025:2018 for the conformity assessment activities listed in the annex to this certificate. This includes additional existing legal and normative requirements for the testing laboratory, including those in relevant sectoral schemes, provided they are explicitly confirmed in the annex to this certificate.

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

This accreditation was issued in accordance with Art. 5 Para. 1 Sentence 2 of Regulation (EC) 765/2008, after an accreditation procedure was carried out in compliance with the minimum requirements of DIN EN ISO/IEC 17011 and on the basis of a review and decision of the appointed accreditation committees.

This accreditation certificate only applies in connection with the notices of 31.05.2024 with accreditation number D-PL-11140-15.


It consists of this cover sheet, the reverse side of the cover sheet and the following annex with a total of 7 pages.

Registration number of the accreditation certificate: **D-PL-11140-15-00**

Berlin, 31.05.2024

Dr.-Ing. Tobias Poeste
Head of Technical Unit

Translation issued:
31.05.2024


Dr.-Ing. Tobias Poeste
Head of Technical Unit

The certificate together with the annex 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 (www.dakks.de).

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

See notes overleaf

Deutsche Akkreditierungsstelle GmbH

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Spittelmarkt 10
10117 Berlin

Office Frankfurt am Main
Europa-Allee 52
60327 Frankfurt am Main

Office Braunschweig
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38116 Braunschweig

The Deutsche Akkreditierungsstelle GmbH (DAkKS) is the entrusted national accreditation body of the Federal Republic of Germany according to § 8 section 1 AkkStelleG in conjunction with § 1 section 1 AkkStelleGBV. DAkKS is designated as the national accreditation authority by Germany according to Art. 4 Para. 4 of Regulation (EC) 765/2008 and clause 4.7 of DIN EN ISO/IEC 17000.

Pursuant to Art. 11 section 2 of Regulation (EC) 765/2008, the accreditation certificate shall be recognised as equivalent by the national authorities within the scope of this Regulation as well as by the WTO member states that have committed themselves in bilateral or multilateral mutual agreements to recognise the certificates of accreditation bodies that are members of ILAC or IAF as equivalent.

DAkKS is a signatory to the multilateral agreements for mutual recognition of the European co-operation for Accreditation (EA), International Accreditation Forum (IAF) and International Laboratory Accreditation Co-operation (ILAC).

The up-to-date state of membership can be retrieved from the following websites:

EA: www.european-accreditation.org

ILAC: www.ilac.org

IAF: www.iaf.nu

Deutsche Akkreditierungsstelle

Annex to the Accreditation Certificate D-PL-11140-15-00 according to DIN EN ISO/IEC 17025:2018

Valid from: 31.05.2024

Date of issue: 31.05.2024

Holder of accreditation certificate:

**Fraunhofer Gesellschaft zur Förderung der angewandten Forschung
eingetragener Verein
Hansastraße 27c, 80686 München**

with the locations

**Fraunhofer Gesellschaft zur Förderung der angewandten Forschung
eingetragener Verein
Fraunhofer-Institut für Keramische Technologien und Systeme (IKTS)
Labor für Thermische Analyse/Thermophysik und
Labor für Partikel- und Suspensionscharakterisierung
Winterbergstraße 28, 01277 Dresden**

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 they conform to the principles of DIN EN ISO 9001.

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

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Tests in the fields:

determination of thermal, dispersion and electrokinetic characteristics of gases, fluids and solids

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. The testing laboratory maintains a current list of all testing methods within the flexible scope of accreditation.

- 1 Thermal properties of plastic materials, metals, glasses, ceramics, carbides, cermets, basic materials, organic auxiliaries and powder-metallurgical materials**
- 1.1 Thermo-chemical and thermo-physical properties by Differential scanning calorimetry (DSC) (DSC) / Differential thermal analysis (DTA) ***

DIN EN 821-3 2005-04	Advanced technical ceramics – Monolithic ceramics – Thermophysical properties – Part 3: Determination of specific heat capacity
DIN EN 1159-3 2008-06	Advanced technical ceramics – Ceramic composites, thermophysical properties – Part 3: Determination of specific heat capacity
DIN EN ISO 11357-2 2020-08	Plastics – Differential scanning calorimetry (DSC) – Part 2: Determination of glass transition temperature and glass transition step height
DIN EN ISO 11357-3 2018-07	Plastics – Differential scanning calorimetry (DSC) – Part 3: Determination of temperature and enthalpy of melting and crystallization
DIN EN ISO 11357-4 2021-05	Plastics – Differential scanning calorimetry (DSC) – Part 4: Determination of specific heat capacity
DIN EN ISO 11357-5 2021-05	Plastics – Differential scanning calorimetry (DSC) – Part 5: Determination of characteristic reaction-curve temperatures and times, enthalpy of reaction and degree of conversion
DIN EN ISO 11357-6 2018-07	Plastics – Differential scanning calorimetry (DSC) – Part 6: Determination of oxidation induction time (isothermal OIT) and oxidation induction temperature (dynamic OIT)

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DIN EN ISO 11357-7 2022-06	Plastics – Differential scanning calorimetry (DSC) – Part 7: Determination of crystallization kinetics
DIN 51007 2019-04	Thermal analysis - Differential thermal analysis (DTA) and differential scanning calorimetry (DSC) - General Principles
DIN EN 1159-3 2008-06	Advanced technical ceramics – Ceramic composites, thermophysical properties – Part 3: Determination of specific heat capacity
ISO 19628 2021-06	Fine ceramics (advanced ceramics, advanced technical ceramics) – Thermophysical properties of ceramic composites - Determination of specific heat capacity
ASTM E 793 1995	Standard test method for enthalpies of fusion and crystallization by differential scanning calorimetry
ASTM E 1269 1995	Standard test method for determining specific heat capacity by differential scanning calorimetry
ASTM E 1356 1991	Standard test method for glass transition temperatures by differential scanning calorimetry or differential thermal analysis
ASTM D 3418 2021-09	Standard Test Method for Transition Temperatures of Polymers by Differential Scanning Calorimetry

1.2 Thermo-physical properties by Thermo-mechanical analysis (TMA) / Thermodilatometry (TDiL) *

DIN 51045-1 2005-08	Determination of the thermal expansion of solids – Part 1: Basic rules
DIN 51045-2 2009-04	Determination of linear thermal expansion of solids – Part 2: Testing of fired fine ceramic materials using the dilatometer method
DIN 51045-3 2009-04	Determination of linear thermal expansion of solids – Part 3: Testing of non-fired fine ceramic materials using the dilatometer method
DIN 51045-4 2007-01	Determination of linear change of solids by thermal effect using the dilatometer method – Part 4: Testing of fired heavy ceramic materials

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DIN 51045-5 2007-01	Determination of linear change of solids by thermal effect using the dilatometer method – Part 5: Testing of non-fired heavy ceramic materials
DIN EN 821-1 1995-04	Advanced technical ceramics - Monolithic ceramics – Thermophysical properties – Part 1: Determination of thermal expansion
DIN EN 1159-1 2007-11	Advanced technical ceramics – Ceramic composites – Thermophysical properties – Part 1: Determination of thermal expansion
DIN ISO 7991 1998-02	Glass – Determination of coefficient of mean linear thermal expansion
ISO 11359-1 2023-02	Plastics – Thermomechanical analysis (TMA) – Part 1: General principles
ISO 11359-2 2021-11	Plastics – Thermomechanical analysis (TMA) – Part 2: Determination of coefficient of linear thermal expansion and glass transition temperature
ISO 11359-3 2019-02	Plastics – Thermomechanical analysis (TMA) – Part 3: Determination of penetration temperature
DIN 51909 2009-05	Testing of carbonaceous materials - Determination of coefficient of linear thermal expansion - Solid materials
ISO 17139 2014-06	Fine ceramics (advanced ceramics, advanced technical ceramics) – Thermophysical properties of ceramic composites – Determination of thermal expansion
ASTM D 696-16 2016	Standard test method for coefficient of linear thermal expansion of plastics between -30 °C and 30 °C with a vitreous silica dilatometer
ASTM E 831-19 2019	Standard test method for linear thermal expansion of solid materials by thermomechanical analysis
ASTM D 3386 1994	Standard Test Method for Coefficient of Linear Thermal Expansion of Electrical Insulating Materials

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1.3 Thermo-physical properties by laser flash analysis (LFA) and comparing *

DIN EN 821-2 1997-08	Advanced technical ceramics – Monolithic ceramics, thermophysical properties – Part 2: Determination of thermal diffusivity by the laser flash (or heat pulse) method
DIN EN 1159-2 2003-12	Advanced technical ceramics – Ceramic composites – Thermophysical properties – Part 2: Determination of thermal diffusivity
DIN 51908 2006-05	Testing of carbon materials – Determination of thermal conductivity at room temperature by means of a comparative method - Solid material
DIN 51936 2016-08	Testing of carbonaceous materials – Determination of thermal diffusivity at high temperatures by the laser pulse method – Solid materials
ISO 18755 2005-03	Fine ceramics (advanced ceramics, advanced technical ceramics) – Determination of thermal diffusivity of monolithic ceramics by laser flash method
ASTM E 1461 2013	Standard test method for thermal diffusivity of solids by the flash method

1.4 Thermo-chemical properties by thermal gravimetric analysis (TGA) *

ISO 9924-1 2016-08	Rubber and rubber products – Determination of the composition of vulcanizates and uncured compounds by thermogravimetry – Part 1: Butadiene, ethylene-propylene copolymer and terpolymer, isobutene-isoprene, isoprene and styrene-butadiene rubbers
DIN EN ISO 11358-1 2022-07	Plastics – Thermogravimetry (TG) of polymers – Part 1: General principles
DIN 51006 2005-07	Thermal analysis (TA) - Thermogravimetry (TG) - Principles
ASTM E 794 1995	Standard test method for melting and crystallization temperatures by thermal analysis
ASTM E 914 1983	Standard Practice for Evaluating Temperature Scale for Thermogravimetry

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ASTM E 1641 1999	Standard Test Method for Decomposition Kinetics by Thermogravimetry
ASTM D 2766 1995	Standard Test Method for Specific Heat of Liquid and Solid
ASTM D 3850 1994	Standard Test Method for Rapid Thermal Degradation of Solid Electrical Insulating Materials by Thermogravimetric Method

2 Characterization of powders and suspensions

2.1 Properties of dispersion *

ISO 13320 2020-01	Particle size analysis – Laser diffraction methods
DIN ISO 22412 2018-09	Particle size analysis – Dynamic light scattering (DLS)
DIN EN 725-5 2007-04	Advanced technical ceramics – Methods of test for ceramic powders – Part 5: Determination of the particle size distribution
ISO 13318-2 2007-09	Determination of particle size distribution by centrifugal liquid sedimentation methods – Part 2: Photocentrifuge method

2.2 Electrokinetics measurement *

SO 13099-1 2012-06	Colloidal systems – Methods for zeta-potential determination – Part 1: Electroacoustic and electrokinetic phenomena
ISO 13099-2 2012-06	Colloidal systems – Methods for zeta-potential determination – Part 2: Optical methods
ISO 13099-3 2014-07	Colloidal systems – Methods for zeta-potential determination – Part 3: Acoustic methods

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3 General physical properties *

DIN 19268 2021-10	pH-measurement – pH-measurement of aqueous solutions with pH measuring chains with pH glass electrodes and evaluation of measurement uncertainty
DIN EN 27888 1993-11	Water quality – Determination of electrical conductivity
DIN 66137-2 2019-03	Determination of solid state density – Part 2: Gaspycnometry
DIN EN ISO 18753 2018-01	Fine ceramics (advanced ceramics, advanced technical ceramics) – Determination of absolute density of ceramic powders by pycnometer
DIN EN ISO 3369 2010-08	Impermeable sintered metal materials and hardmetals – Determination of density
DIN 51918 2018-07	Testing of carbonaceous materials – Determination of bulk density and the open porosity
DIN EN 993-1 2019-03	Methods of test for dense shaped refractory products – Part 1: Determination of bulk density, apparent porosity and true porosity
DIN EN 993-2 1995-04	Methods of test for dense shaped refractory products – Part 2: Determination of true density
DIN EN 1389 2004-03	Advanced technical ceramics – Ceramic composites – Physical properties – Determination of density and apparent porosity

Abbreviations used:

ASTM	American Society for Testing and Materials
DIN	German institute for standardization
EN	European Standard
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
StAA-XX	In-house method of the Fraunhofer Gesellschaft zur Förderung der angewandten Forschung eingetragener Verein

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