

Deutsche Akkreditierungsstelle GmbH

Annex to the Accreditation Certificate D-PL-18634-01-00 according to DIN EN ISO/IEC 17025:2005

Period of validity: 26.06.2018 to 25.06.2023 Date of issue: 04.11.2019

Holder of certificate:

**Forschungsinstitut für Anorganische Werkstoffe - Glas/Keramik - GmbH
Heinrich-Meister-Straße 2, 56203 Höhr-Grenzhausen**

Tests in the fields:

**mechanical-technological, thermal, physical and chemical testing on selected inorganic nonmetallic products and raw materials;
physical, physico-chemical and chemical testing on water, aqueous solutions and eluates**

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 Testing on ceramic products and raw materials

1.1 Mechanical-technological tests

DIN EN ISO 10545-2 2019-01	Ceramic tiles - Part 2: Determination of dimensions and surface quality
DIN EN ISO 10545-6 2012-05	Ceramic tiles - Part 6: Determination of resistance to deep abrasion for unglazed tiles
DIN EN ISO 10545-7 1999-03	Ceramic tiles - Part 7: Determination of resistance to surface abrasion for glazed tiles

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DIN EN ISO 10545-11 1996-09	Ceramic tiles - Part 11: Determination of crazing resistance for glazed tiles
DIN EN ISO 13383-1 2016-11	Fine ceramics (advanced ceramics, advanced technical ceramics) - Microstructural characterization - Part 1: Determination of grain size and size distribution
DIN EN 843-1 2008-08	Advanced technical ceramics - Mechanical properties of monolithic ceramics at room temperature - Part 1: Determination of flexural strength
DIN EN 843-2 2007-03	Advanced technical ceramics - Mechanical properties of monolithic ceramics at room temperature - Part 2: Determination of Young's modulus, shear modulus and Poisson's ratio (here only: <i>determination of Young's modulus according to method A.1</i>)
DIN EN 843-4 2005-08	Advanced technical ceramics - Mechanical properties of monolithic ceramics at room temperature - Part 4: Vickers, Knoop and Rockwell superficial hardness (here only: <i>Vickers superficial hardness</i>)
DIN EN 12875-1 2005-08	Mechanical dishwashing resistance of utensils - Part 1: Reference test method for domestic articles
DIN EN 12875-2 2002-03	Mechanical dishwashing resistance of utensils - Part 2: Inspection of non-metallic articles
DIN EN 12875-4 2006-06	Mechanical dishwashing resistance of utensils - Part 4: Rapid test for domestic ceramic articles
DIN EN 12875-5 2006-06	Mechanical dishwashing resistance of utensils - Part 5: Rapid test for ceramic catering articles
DIN EN 13310 2019-02	Kitchen sinks - Functional requirements and test methods (here only: <i>Chapter 5.6 Resistance to scratching, Chapter 5.7 Resistance to abrasion</i>)
DIN EN 14231 2003-07	Natural stone test methods - Determination of the slip resistance by means of the pendulum tester
DIN EN 15771 2010-07	Vitreous and porcelain enamels - Determination of surface scratch hardness according to the Mohs scale

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DIN CEN/TS 16165 DIN SPEC 51132 2016-12	Determination of slip resistance of pedestrian surfaces - Methods of evaluation
BS 7976-2 2002-08-20 + A1:2013	Pendulum testers. Part 2: Method of operation
BS 7976-3 2002-08-20 + A1:2013	Pendulum testers. Part 3: Method of calibration
DIN 51097 1992-11	Testing of floor coverings - Determination of the anti-slip properties - Wet-loaded barefoot areas - Walking method - Ramp test
DIN 51130 2014-02	Testing of floor coverings - Determination of the anti-slip property - Workrooms and fields of activities with slip danger - Walking method - Ramp test
DIN 51131 2014-02	Testing of floor coverings - Determination of the anti-slip property - Method for measurement of the sliding friction coefficient
FGK-AV-TBF 2006-05	Determination of dry bending strength, testing of ceramic raw materials
FGK-AV Reinigungsverhalten von Fliesen 2018-03	Application-technological investigation of the cleaning behaviour of tile surfaces

1.2 Thermal tests

DIN EN ISO 6872 2019-01	Dentistry - Ceramic materials (here only: <i>Chapter 7.4 Linear thermal expansion coefficient,</i> <i>Chapter 7.5 Glass transition temperature</i>)
DIN EN ISO 7459 2004-05	Glass containers - Thermal shock resistance and thermal shock endurance - Test methods
DIN EN ISO 10545-8 2014-09	Ceramic tiles - Part 8: Determination of linear thermal expansion

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DIN EN ISO 10545-9 2013-12	Ceramic tiles - Part 9: Determination of resistance to thermal shock
DIN EN ISO 10545-10 1997-12	Ceramic tiles - Part 10: Determination of moisture expansion
DIN EN 13310 2019-02	Kitchen sinks - Functional requirements and test methods (here only: <i>Chapter 5.3 Dry heat resistance</i>)
DIN EN 15284 2007-07	Materials and articles in contact with food stuffs - Test method for the resistance to microwave heating of ceramic, glass, glass-ceramic or plastic cookware
DIN 51006 2005-07	Thermal analysis (TA) - Thermogravimetry (TG) - Principles
DIN 51007 2019-04	Thermal analysis - Differential thermal analysis (DTA) and differential scanning calorimetry (DSC) - General Principles (here without: <i>Chapter 8 Purity determination of eutectic systems</i>)
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
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 51068 2008-11	Testing of ceramic raw and basic materials - Determination of resistance to thermal shock - Water quenching method for refractory bricks

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DIN 51730
2007-09 Testing of solid fuels - Determination of fusibility of fuel ash

FGK-AV Bestimmung der
Feuchtedehnung mittels
Dilatometer
2018-03 Determination of moisture expansion using a dilatometer

1.3 Physical tests

DIN EN ISO 6872
2019-01 Dentistry - Ceramic materials
(here only: *Chapter 7.3.1 Three-point- and four-point bending tests*)

DIN EN ISO 10545-3
2018-06 Ceramic tiles - Part 3: Determination of water absorption,
apparent porosity, apparent relative density and bulk density

DIN EN ISO 10545-16
2012-05 Ceramic tiles - Part 16: Determination of small colour
differences

DIN EN ISO 18757
2006-01 Fine ceramics (advanced ceramics, advanced technical
ceramics) - Determination of specific surface area of ceramic
powders by gas adsorption using the BET method

DIN ISO 9277
2014-01 Determination of the specific surface area of solids by gas
adsorption - BET method

ISO 18754
2013-03 Fine ceramics (advanced ceramics, advanced technical
ceramics) - Determination of density and apparent porosity

DIN EN 623-2
1993-11 Advanced technical ceramics - monolithic ceramics - General
and textural properties - Part 2: determination of density and
porosity

DIN EN 725-5
2007-04 Advanced technical ceramics - Methods of test for ceramic
powders - Part 5: Determination of the particle size distribution

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

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DIN EN 1183 1997-08	Materials and articles in contact with foodstuffs - Test methods for thermal shock endurance
DIN EN 1184 1997-08	Materials and articles in contact with foodstuffs - Test methods for translucency of ceramic articles
DIN EN 1217 1998-01	Materials and articles in contact with foodstuffs - Test methods for water absorption of ceramic articles
DIN EN 12980 2015-02	Materials and articles in contact with foodstuffs - Non-metallic articles for catering and industrial use - Method of test for the determination of impact resistance
DIN EN 13258 2003-07	Materials and articles in contact with foodstuffs - Test methods for crazing resistance of ceramic articles
DIN EN 13925-2 2003-07	Non-destructive testing - X-ray diffraction from polycrystalline and amorphous material - Part 2: Procedures
DIN 53019-1 2008-09	Viscometry - Measurement of viscosities and flow curves by means of rotational viscometers - Part 1: Principles and measuring geometry (here only: <i>Chapter 8</i>)
DIN 53019-2 2001-02	Viscometry - Measurement of viscosities and flow curves by means of rotation viscometers - Part 2: Viscometer calibration and determination of the uncertainty of measurement
DIN 66133 1993-06	Determination of pore volume distribution and specific surface area of solids by mercury intrusion (<i>withdrawn standard</i>)
DIN 66165-2 2016-08	Particle size analysis - Sieving analysis - Part 2: Procedure
FGK-AV Heliumpycnometer 2017-10	Determination of true and bulk density using a Helium pycnometer

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1.4 Chemical tests

DIN EN 4531 2018-12	Vitreous and porcelain enamels - Release from enamelled articles in contact with food - Methods of test and limits
DIN EN ISO 6872 2019-01	Dentistry - Ceramic materials (here only: <i>Chapter 7.6 Chemical solubility</i>)
DIN EN ISO 10545-13 2017-04	Ceramic tiles - Part 13: Determination of chemical resistance
DIN EN ISO 10545-14 2016-02	Ceramic tiles - Part 14: Determination of resistance to stains
DIN EN ISO 10545-15 1997-12	Ceramic tiles - Part 15: Determination of lead and cadmium - given off by glazed tiles
DIN EN ISO 13356 2011-08	Implants for surgery - Ceramic materials based on yttria-stabilized tetragonal zirconia (Y-TZP) (here only: <i>Chapter 4.3 Chemical Composition</i>)
DIN EN ISO 28706-1 2011-08	Vitreous and porcelain enamels - Determination of resistance to chemical corrosion - Part 1: Determination of resistance to chemical corrosion by acids at room temperature
DIN EN ISO 28706-2 2017-07	Vitreous and porcelain enamels - Determination of resistance to chemical corrosion - Part 2: Determination of resistance to chemical corrosion by boiling acids, boiling neutral liquids, alkaline liquids and/or their vapours (here only: <i>Chapter 11 Boiling citric acid,</i> <i>Chapter 12 Boiling sulfuric acid,</i> <i>Chapter 14 Boiling distilled or demineralized water,</i> <i>Chapter 15 Standard detergent solution</i>)
DIN EN ISO 28706-3 2018-04	Vitreous and porcelain enamels - Determination of resistance to chemical corrosion - Part 3: Determination of resistance to chemical corrosion by alkaline liquids using a hexagonal vessel or a tetragonal glass bottle

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DIN EN ISO 28706-4 2016-07	Vitreous and porcelain enamels - Determination of resistance to chemical corrosion - Part 4: Determination of resistance to chemical corrosion by alkaline liquids using a cylindrical vessel
ISO 10694 1995-03	Soil quality - Determination of organic and total carbon after dry combustion (elementary analysis)
DIN EN 993-16 1995-09	Dense shaped refractory products - Methods of test - Part 16: Determination of resistance to sulphuric acid
DIN EN 1388-1 1995-11	Materials and articles in contact with foodstuffs - Silicate surfaces - Part 1: Determination of the release of lead and cadmium from ceramic ware
DIN EN 1388-2 1995-11	Materials and articles in contact with foodstuffs - Silicate surfaces - Part 2: Determination of the release of lead and cadmium from silicate surfaces other than ceramic ware
DIN EN 13310 2019-02	Kitchen sinks - Functional requirements and test methods (here only: <i>Chapter 5.5 Resistance to chemicals and staining agents</i>)
DIN 51001 2003-08	Testing of oxidic raw materials and basic materials - General bases of work for X-ray fluorescence method (XRF)
DIN 51001 Supplement 1 2010-05	Testing of oxidic raw materials and basic materials - General bases of work for X-Ray fluorescence method (XRF) - General survey on disintegration methods referred to groups of materials for the determination of test specimens for XRF
DIN 51081 2002-12	Testing of oxidic raw materials and materials - Determination of change in mass on ignition
DIN 51084 2008-11	Testing of oxidic raw and basic materials for ceramic, glass and glazes - Determination of fluoride content
DIN 51085 2015-01	Testing of oxidic raw and basic materials - Determination of total sulphur content

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DIN 51086-2 2004-07	Testing of oxidic raw materials and materials for ceramics, glass and glazes - Part 2: Determination of Ag, As, B, Ba, Be, Bi, Ca, Cd, Ce, Co, Cr, Cu, Er, Eu, Fe, La, Mg, Mn, Mo, Nd, Ni, P, Pb, Pr, S, Sb, Se, Sn, Sr, Ti, V, W, Y, Yb, Zn, Zr by optical emission spectrometry with inductively coupled plasma (ICP OES)
FGK-AV Blei- und Cadmiumbestimmung im Na ₂ CO ₃ -Schmelzaufschluss 2017-12	Determination of lead and cadmium by means of ICP-OES in digests based on DIN EN ISO 21078-1
FGK-AV Borbestimmung im Na ₂ O ₂ / NaOH-Schmelzaufschluss 2014-07	Determination of boron by means of ICP-OES in digests based on DIN 51086-1, method II
FGK-AV Cu-KAK 2014-07	Determination of cation exchange capacity of clayey raw materials using the Cu-Triethylenetetramine complex method
FGK-AV Glühverlust 2012-12	Determination of loss on ignition (LOI) at 1050 °C
FGK-AV Lithiumbestimmung im Na ₂ CO ₃ - Schmelzaufschluss 2017-12	Determination of lithium by means of ICP-OES in digests based on DIN EN ISO 21078-1
FGK-AV Lithiumbestimmung im Na ₂ O ₂ _ NaOH-Schmelzaufschluss 2017-12	Determination of lithium by means of ICP-OES in Na ₂ O ₂ /NaOH digests based on DIN 51086-1, method II
FGK AV-ZrO ₂ 2017-09	Determination of Al ₂ O ₃ , CaO, Fe ₂ O ₃ , HfO ₂ , MgO, SrO, TiO ₂ , and Y ₂ O ₃ in ZrO ₂ by means of standard addition and ICP-OES

2 Physical, physico-chemical and chemical testing on water, aqueous solutions and eluates

DIN EN ISO 10304-1 2009-07	Water quality - Determination of dissolved anions by liquid chromatography of ions - Part 1: Determination of bromide, chloride, fluoride, nitrate, nitrite, phosphate and sulfate
DIN EN ISO 10523 2012-04	Water quality - Determination of pH

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DIN EN ISO 11885 2009-09	Water quality - Determination of selected elements by inductively coupled plasma optical emission spectrometry (ICP-OES)
DIN EN ISO 17294-1 2007-02	Water quality - Application of inductively coupled plasma mass spectrometry (ICP-MS) - Part 1: General guidelines
DIN EN ISO 17294-2 2017-01	Water quality - Application of inductively coupled plasma mass spectrometry (ICP-MS) - Part 2: Determination of selected elements including uranium isotopes (here without: <i>determination of Uranium isotopes</i>)
DIN EN ISO 17294-2 2017-01	Water quality - Application of inductively coupled plasma mass spectrometry (ICP-MS) - Part 2: Determination of selected elements including uranium isotopes (here only: <i>deviating matrix: 3 and 4 per cent acetic acid (without determination of Uranium isotopes)</i>)
DIN EN 27888 1993-11	Water quality - Determination of electrical conductivity
DIN 38404-4 1976-12	German Standard Methods for Analysing of Water, Waste Water and Sludge - Physical and Physical-chemical Parameters (Group C) - Determination of Temperature (C4)
DIN 38409-6 1986-01	German standard methods for the examination of water, waste water and sludge - summary indices of actions and substances (group H) - water hardness (H 6)

abbreviations used:

DIN	German Institute for Standardization
EN	European Standard
ISO	International Organization for Standardization
FGK-AV	In house method of the Forschungsinstitut für Anorganische Werkstoffe - Glas/Keramik - GmbH