

Accreditation



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

Carl Zeiss Jena GmbH Carl-Zeiss-Promenade 10, 07745 Jena

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 calibration 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 calibration laboratories and confirm generally 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 14.02.2024 with accreditation number D-K-12037-01.

It consists of this cover sheet, the reverse side of the cover sheet and the following annex with a total of 9 pages.

Registration number of the accreditation certificate: D-K-12037-01-00

Berlin, 14.02.2024

Dr. Florian Witt Head of Technical Unit Translation issued: 14.02.2024

Dr. Florian Witt 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.

Deutsche Akkreditierungsstelle GmbH

Office Berlin Spittelmarkt 10 10117 Berlin Office Frankfurt am Main Europa-Allee 52 60327 Frankfurt am Main Office Braunschweig Bundesallee 100 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

This accreditation certificate is the property of the German Accreditation Body.



Deutsche Akkreditierungsstelle

Annex to the Accreditation Certificate D-K-12037-01-00 according to DIN EN ISO/IEC 17025:2018

 Valid from:
 14.02.2024

 Date of issue:
 28.02.2024

Holder of accreditation certificate:

Carl Zeiss Jena GmbH Carl-Zeiss-Promenade 10, 07745 Jena

with the location

Carl Zeiss Jena GmbH Kompetenzzentrum Qualität/Kalibrierlabor Carl-Zeiss-Promenade 10, 07745 Jena

The calibration laboratory meets the requirements of DIN EN ISO/IEC 17025:2018 to carry out the conformity assessment activities listed in this annex. The calibration 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 calibration 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.



Calibration in the fields:

Dimensional quantities

- Length
- Length gauges
- Line scales, distances
- Diameter
- Form error
- Length measuring devices ^{a)}
- Coordinate measuring technology
- Coordinate measuring machines ^{a)}

^{a)} only on-site calibration

Within the measurands/calibration items marked with * the calibration laboratory is permitted, without being required to inform and obtain prior approval from DAkkS, to use calibration standards or equivalent calibration procedures listed here with different issue dates.

The calibration laboratory maintains a current list of all calibration standards / equivalent calibration procedures within the flexible scope of accreditation.



Permanent Laboratory

Measurement quantity / Calibration item	R	lange		Measurement conditions / procedure	Expanded uncertainty of measurement	Remarks
Length Gauge blocks * made of steel according to DIN EN ISO 3650:1999	0.5 mm	to	100 mm	VDI/VDE/DGQ 2618 part 3.1:2004 DKD-R 4-3 part 3.1:2018 featuring the nominal values of the standards Measurement of the deviation of the central length <i>l</i> _c from the nominal value <i>l</i> _n by comparison measurement	For the central length: 0.05 μ m + 0.5 \cdot 10 ⁻⁶ \cdot <i>l</i> For the deviations f_o and f_u from the central length: 0.05 μ m	<i>l</i> = gauge block length; Measuring surface quality as stated in QMH rsp. in the test specifications
				Measurement of the deviations f_0 and f_u from the central length by 5 points comparison		
Gauge blocks * made of ceramics according to DIN EN ISO 3650:1999	0.5 mm	to	100 mm	VDI/VDE/DGQ 2618 part 3.1:2004 DKD-R 4-3 part 3.1:2018 For the smallest meas- urement uncertainties, the wringability and the wringing characteristics of both measuring surfaces must be checked using an appropriate optical flat.	For the central length: 0.07 μ m + 0.5 \cdot 10 ⁻⁶ \cdot <i>l</i> For the deviations f_o and f_u from the central length: 0.05 μ m	
Gauge blocks * made of steel according to DIN EN ISO 3650:1999	40 mm	to	300 mm	VDI/VDE/DGQ 2618 part 3.1:2004 DKD-R 4-3 part 3.1:2018 For nominal lengths from 40 mm to 100 mm the difference to the nominal length of the standard has to be ≤ 25 mm. For nominal lengths ≥ 100 mm to 300 mm the difference to the nominal length of the standard has to be ≤ 50 mm. Measurement of the deviation l_c from the nominal l_n by comparison measurement.	For the central length: 0.12 μm + 1 · 10 ⁻⁶ · <i>l</i>	Measurement using ULM 600



Permanent Laboratory

Measurement quantity / Calibration item	F	Range		Measurement conditions / procedure	Expanded uncertainty of measurement	Remarks
Gauge blocks * made of steel according to DIN EN ISO 3650:1999	≥ 100 mm	to	800 mm	VDI/VDE/DGQ 2618 part 3.1:2004 DKD-R 4-3 part 3.1:2018 For nominal lengths from 100 mm to 300 mm the difference to the nominal length oft he standard has to be ≤ 50 mm. For nominal lengths ≥ 300 mm to 800 mm the difference to the nominal length of the standard has to be ≤ 100 mm. Measurement of the deviation l_c from the nominal l_n by comparison measurement.	For the central length: 0.1 μm + 1 · 10 ⁻⁶ · <i>l</i>	Measurement using ULM Rubin 800
Line scales made of glass, quartz glass, plastic or metal	0 mm	to	600 mm	WI 0230 SJQ: 2017-03 Measurement in reflected or transmitted light	0.03 μm + 2 · 10 ⁻⁷ · <i>l</i>	 <i>l</i> = measured length Maximum thickness of the graduation carrier of 40 mm
Setting ring gauges and				VDI/VDE/DGQ 2618		
Diameter *	2 mm	to	10 mm	Option 3 and 4	0.4 μm	
	> 10 mm	to	300 mm	DKD-R 4-3 part 4.1:2018 Option 5.3.3 and. 5.3.4	$0.2 \ \mu m + 1.5 \cdot 10^{-6} \cdot d$	d = measured diameter
Setting plug gauges and outside cylinders Diameter *	1 mm	to	300 mm		0.2 μm + 1.5 · 10 ^{.6} · <i>d</i>	
Measuring pins and thread testing pins Diameter *	0.17 mm	to	20 mm	VDI/VDE/DGQ 2618 part 4.2:2007 option 3 DKD-R 4-3 part 4.2:2018 Option 5.3.3	0.2 μm + 1.5 · 10 ⁻⁶ · <i>d</i>	



Permanent Laboratory

Measurement quantity / Calibration item	F	lange		Measurement conditions / procedure	Expanded uncertainty of measurement	Remarks
Roundness deviation * of abovementioned rings, inside cylinders, plugs or outside cylinders, test pins and thread test pins		to	40 µm	VDI/VDE/DGQ 2618 part 4.1:2006 and part 4.2:2007 Option 1 and 2 DKD-R 4-3 part 4.1 and 4.2:2018 Option 5.3.1 and 5.3.2 Form testing of test pins and thread test pins from Ø 1 mm	0.05 μm	
Straightness deviation of surface lines * of abovementioned rings, inside cylinders, plugs or outside cylinders, test pins and thread test pins		to	40 µm	axial length: ≤ 100 mm	0.15 μm	<i>l</i> = measured length in direction of cylinder
				axial length: > 100 mm	0.15 μ m + 2 \cdot 10 ⁻⁷ \cdot l	axis
Parallelism deviation of surface lines * of abovementioned rings, inside cylinders, plugs or outside cylinders,		to	40 µm	axial length: ≤ 100 mm axial length: > 100 mm	0.2 μm 0.2 μm + 5 · 10 ⁻⁷ · <i>l</i>	<i>l</i> = measured length in direction of cylinder axis
Balls						<i>d</i> = measured diameter
Diameter	2 mm	to	100 mm	KA 12/38:2017-03	0.2 μ m + 1.5 \cdot 10 ⁻⁶ \cdot d	
Roundness deviation					0.1 µm	
Optical flats and optical parallels Central length	0.5 mm	to	100 mm	KA 12/01:2017-02 maximal diameter 60 mm	0.15 μm + 1 · 10 ⁻⁶ · <i>l</i>	 <i>l</i> = measured length in direction of cylinder axis
Optical flats and optical parallels Flatness deviation	for d 0 mm	iamete to	er 150 mm	KA 12/01:2017-02 digital interferometer	0.03 μm	
Parallelism deviation					0.05 μm	



Permanent Laboratory

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement	Remarks
optical 2D-structures on flat substrates and structure carriers Positions and distances	Measuring area 400 mm x 400 mm	KA 12/39:2017-02 Measurement in reflected or transmitted light	 1D: 0.4 μm + 2 · 10⁻⁶ · <i>l</i> 2D: 0.5 μm + 2 · 10⁻⁶ · <i>l</i> 	For example center coordinates and positions of circles, ellipses, lines, reticles, polygons and unidirec- tional edges on optical calibration standards and calibration boards Minimum struture size 5 µm, structure height << 1 mm l = measured length
	Measuring area 700mm x 1000mm	KA 12/39:2017-02 Measurement in reflected light	 1D: 1 μm + 2 · 10⁻⁶ · <i>l</i> 2D: 2 μm + 1 · 10⁻⁶ · <i>l</i> 	For example center coordinates and positions of circles, ellipses, lines, reticles, polygons and unidirec- tional edges on optical calibration standards and calibration boards Minimum structure size 10 µm, structure height << 1 mm l = measured length
optical edges on flat substrates and structure carriers Straigthness deviation	Measuring area 400 mm x 400 mm Measuring area 700 mm x 1000 mm	KA 12/39:2017-02 Measurement in reflected or transmitted light KA 12/39:2017-02 Measurement in reflected light	$\frac{\sqrt{(0,9\mu m)^2 + (2,4 \cdot 10^{-6} \cdot l)^2}}{\sqrt{(2,6\mu m)^2 + (2,5 \cdot 10^{-6} \cdot l)^2}}$	Structure height << 1 mm <i>l</i> = length of the edge
optical circles on flat substrates and structure carriers Roundness deviation	for diameter: 0.01 mm to 400 mm > 400 mm to 700 mm	KA 12/39:2017-02 Measurement in reflected or transmitted light KA 12/39:2017-02 Measurement in reflected light	$\sqrt{(0.9\mu m)^2 + (6 \cdot 10^{-6} \cdot d)^2}$ $\sqrt{(2.6\mu m)^2 + (6 \cdot 10^{-6} \cdot d)^2}$	Recording of at least 32 equal distributed edge points Structure height << 1 mm d = diameter of a circle



Permanent Laboratory

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	F	Range		Measurement conditions / procedure	Expanded uncertainty of measurement	Remarks
optical 2D-structures on flat substrates and structure carriers angle deviation	0°	to	360°	KA 12/39:2017-02 Measurement in reflected or transmitted light	0.6´´ + (0.19 m / <i>l)</i> ´´	Maximal leg length 400 mm Structure height << 1 mm <i>l</i> = length of the legs (symmetrical); in case of different leg lengths <i>U</i> will be calculated individually
	0°	to	360°	KA 12/39:2017-02 Measurement in reflected light	0.6´´ + (0.72 m / <i>l)</i> ´´	Maximal leg length 1000 mm Structure height << 1 mm <i>l</i> = length of the legs (symmetrical); in case of different leg lengths <i>U</i> will be calculated individually

On-site calibration

Measurement quantity / Calibration item		Range	5	Measurement conditions / procedure	Expanded uncertainty of measurement	Remarks
Length						
Length measuring devices * Horizontal type with max. 3000 mm measuring range of the measuring element	Measur 0 mm	ring ele to	ement 3000 mm	VDI/VDE/DGQ 2618 part 17.1:2015	0.08 μm + 1 · 10 ⁻⁶ · <i>l</i>	<i>l</i> = length measured by the measuring element



On-site calibration

Measurement quantity / Calibration item	Range			Measurement conditions / procedure	Expanded uncertainty of measurement	Remarks
Coordinate measuring technology Measuring microscopes, measuring projectors 2D optical coordinate measuring machines *	0 mm	to	909 mm	DKD-R 4-3 part 18.1:2018 Calibration of metrological characteristics of coordinate measuring machines according to DIN EN ISO 10360 and VDI/VDE 2617		Measuring devices with visual probing or opto-electronic edge detection
				Probing size error $P_{\rm S}$ and probing size error of the imaging probing system $P_{\rm SV}$ using a line width / CD standard according to VDI/VDE 2617 part 6.1:2021	0.075 μm	
				Probing form error P_{F2D} and probing form error of the imaging probing system P_{FV2D} using a test circle according to DIN EN ISO 10360-7:2011 and VDI/VDE 2617 part 6.1:2021	0.15 μm (including the calibrated form error of the test circle) 0.042 μm (excluding the calibrated form error of the test circle)	
				Probing size error P_{S2D} and P_{SV2D} using a test circle according to VDI/VDE 2617 part 6.1:2021	0.14 μm	
			Unidirectional length measurement error E_{UX} , E_{UY} , E_{UXY} and unidirectional length measurement error of the imaging probing system E_{UV} using linear glass scales according to DIN EN ISO 10360-7:2011 and VDI/VDE 2617 part 6.1:2021	0.04 μm + 0.36 · 10 ⁻⁶ · <i>l</i>		
				Bidirectional length measurement error E_{BX} , E_{BY} , E_{BXY} and bidirectional length measurement error of the imaging probing system E_{BV} using line scales according to DIN EN ISO 10360-7:2011 and VDI/VDE 2617 part 6.1:2021	0.08 μm + 0.36 · 10 ⁻⁶ · <i>l</i>	<i>l</i> = measured length in m



On-site calibration

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item		Rang	e	Measurement conditions / procedure	Expanded uncertainty of measurement	Remarks
Measuring microscopes, measuring projectors, 2D optical coordinate measuring machines *	0 mm	to	909 mm	Repeatability range of the length measurement error $R_{\rm U}$, $R_{\rm B}$ according to DIN EN ISO 10360-7:2011 and VDI/VDE 2617 part 6.1:2021 and R _{UXY} according to VDI/VDE 2617 part 6.1:2021	0.05 μm	Measuring devices with visual probing or opto-electronic edge detection <i>l</i> = measured length in m
				Squareness error of the measurement axis using a right angle standard (COG- line plate)	0.25″	

Abbreviations used:

СМС	Calibration and measurement capabilities
DIN	Deutsches Institut für Normung e.V.
DKD-R	Guideline of Deutscher Kalibrierdienst (DKD),
	published by Physikalisch-Technische Bundesanstalt
EURAMET	European Association of National Metrology Institutes
VDE	Verband der Elektrotechnik, Elektronik und Informationstechnik e.V.
VDI	Verein Deutscher Ingenieure e.V.
DGQ	Deutsche Gesellschaft für Qualität e.V.
КА	Calibration guide of Carl Zeiss Jena GmbH
WI	Work Instruction of Carl Zeiss Jena GmbH