

# Deutsche Akkreditierungsstelle GmbH

## Annex to the Accreditation Certificate D-K-15077-01-00 according to DIN EN ISO/IEC 17025:2018

**Valid from:** 23.11.2020

Date of issue 23.11.2020

Holder of certificate:

**Kolb & Baumann GmbH & Co. KG**  
**Daimlerstraße 24, 63741 Aschaffenburg**

Calibration in the fields:

### **Dimensional quantities**

#### **Length**

- Gauge blocks
- Length measuring instruments
- Length measuring devices <sup>a)</sup>
- Diameter
- Form error

<sup>a)</sup> also on-site calibration

*The management system requirements in DIN EN ISO/IEC 17025 are written in language relevant to operations of calibration laboratories and operate generally in accordance with the principles of DIN EN ISO 9001.*

*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>*

**Annex to the accreditation certificate D-K-15077-01-00**

**Permanent Laboratory**

**Calibration and Measurement Capabilities (CMC)**

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement <sup>1)</sup>	Remarks	
<b>Length</b> Gauge blocks made of steel according to DIN EN ISO 3650:1999	0.5 mm to 100 mm must be of the same nominal length	DKD-R 4-3 part 4.1:2018 Measurement of the deviation of the central length $l_c$ from the nominal value $l_n$ by comparison measurement	For the central length: $0.05 \mu\text{m} + 0.5 \cdot 10^{-6} \cdot l$ for the deviation $f_o$ and $f_u$ from the central length: $0.05 \mu\text{m}$	/ = gauge block length Quality of the measuring surface according to the commitments in the Laboratory Quality Manuel resp. in the calibration procedures	
	0.5 mm to 100 mm Unusual nominal length Combination of the standards and gauge block under test must be of the same nominal length	Measurement of the deviations $f_o$ and $f_u$ from the central length by 5 points comparison measurement	For the central length: $0.07 \mu\text{m} + 0.5 \cdot 10^{-6} \cdot l$ for the deviation $f_o$ and $f_u$ from the central length: $0.05 \mu\text{m}$		
Gauge blocks made of ceramics or tungsten carbide according to DIN EN ISO 3650:1999	0.5 mm to 100 mm must be of the same nominal length		For the central length: $0.07 \mu\text{m} + 0.6 \cdot 10^{-6} \cdot l$ for the deviation $f_o$ and $f_u$ from the central length: $0.05 \mu\text{m}$		
	0.5 mm to 100 mm Unusual nominal length Combination of the standards and gauge block under test must be of the same nominal length		For the central length: $0.09 \mu\text{m} + 0.6 \cdot 10^{-6} \cdot l$ for the deviation $f_o$ and $f_u$ from the central length: $0.05 \mu\text{m}$		
Gauge blocks made of steel according to DIN EN ISO 3650:1999	100 mm to 1000 mm must be of the same nominal length		DKD-R 4-3 part 4.1:2018 Measurement of the deviation of the central length $l_c$ from the nominal value $l_n$ by comparison measurement  Interferential measurement of the deviations $f_o$ and $f_u$ from the central length		For the central length: $0.05 \mu\text{m} + 0.5 \cdot 10^{-6} \cdot l$ for the deviation $f_o$ and $f_u$ from the central length: $0.05 \mu\text{m}$

<sup>1)</sup> The expanded uncertainties according to EA-4/02 M:2013 are part of CMC and are the best measurement uncertainties within accreditation. They have a coverage probability of approximately 95 % and have a coverage factor of  $k = 2$  unless stated otherwise. Uncertainties without unit are relative uncertainties referring to the measurement value unless stated otherwise.

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Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement <sup>1)</sup>	Remarks
Gauge blocks made of steel or tungsten carbide according to DIN EN ISO 3650:1999	0.1 mm to < 0.5 mm must be of the same nominal length	DKD-R 4-3 part 4.1:2018 Measurement of the deviation of the central length $l_c$ from the nominal value $l_n$ by comparison measurement  For the smallest measurement uncertainties, the wringability and the wringing characteristics of both measuring surfaces must be checked using an appropriate optical flat	For the mean size: 0.15 $\mu\text{m}$	
Pairs of gauge blocks made of steel or tungsten carbide according to DIN EN ISO 3650:1999	0.5 mm to 100 mm	DKD-R 4-3 part 4.1:2018 Measurement of the difference of the central lengths for pairs of gauge blocks with the same nominal length, respectively of difference of the central lengths up to 10 $\mu\text{m}$ Measurement of the deviations $f_0$ and $f_u$ from the central length by 5 points comparison measurement	For the difference of the central length of the pairs: 0.03 $\mu\text{m}$ For the deviation from the central length: 0.03 $\mu\text{m}$ (only for the nominal values 1.005 mm and 1.01 mm) else 0.05 $\mu\text{m}$	
Step-height Step-height-standard consisting of a plate with gauge blocks made of tungsten carbide according to DIN EN ISO 3650:1999	0 mm to 25 mm	7.5.1-DAK/DL-046: 2015/12 The step height $h$ is determined from the difference between measurements for the centre length	For the Step-height: 0.15 $\mu\text{m}$	Ensuring the wringing of the gauge blocks on the base plate is done by interferential measurement of parallelism of the steps relating to the base plate
Gauge block measuring instrument for calibration of gauge blocks	0.5 mm to 100 mm	DKD-R 4-1:2018	$0.03 \mu\text{m} + 0.002 \cdot D$	$D \leq 10 \mu\text{m}$ , for nominal length difference
Micrometers	to 300 mm	DKD-R 4-3 part 10.1:2018	$3 \mu\text{m} + 10 \cdot 10^{-6} \cdot l$	$l =$ measured length
	> 300 mm to 1000 mm		$5 \mu\text{m} + 10 \cdot 10^{-6} \cdot l$	
Dial gauges	to 100 mm	DKD-R 4-3 part 11.1:2018	$3 \mu\text{m} + 10 \cdot 10^{-6} \cdot l$	over 30 mm in the horizontal position
Dial gauges	to 3 mm	DKD-R 4-3 part 11.2:2018	0.6 $\mu\text{m}$	
Lever gauges	to 1.6 mm	DKD-R 4-3 part 11.3:2018	0.8 $\mu\text{m}$	

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Plug gauges Diameter	0.5 mm to 500 mm	DKD-R 4-3 part 4.1:2018 option 5.3.3 and 5.3.4	$2 \mu\text{m} + 2 \cdot 10^{-6} \cdot d$	$d$ = measured diameter
Ring gauges Diameter	2 mm to 250 mm			
Optical flats and optical parallels	$\varnothing$ 10 mm to $\varnothing$ 200 mm			
Length	0.5 mm to 100 mm	QM-APA 8.5.1.002.013 2020-07 comparison measurement	$0.1 \mu\text{m} + 0.6 \cdot 10^{-6} \cdot l$	$l$ = measured length with gauge block comparator  Parallelism measurement only up to $\varnothing$ 80 mm
deviation from parallelism	to 5 $\mu\text{m}$		0.05 $\mu\text{m}$	
deviation from flatness	to 5 $\mu\text{m}$		QM-APA 8.5.1.002.010 2020-07 interferometric	
Plane-parallel length standards not in accordance with DIN EN ISO 3650:1999	(7 x 7) mm <sup>2</sup> to (75 x 75) mm <sup>2</sup>  $\varnothing$ 8 mm to $\varnothing$ 100 mm			$l$ = measured length with gauge block comparator  Parallelism measurement only up to $\varnothing$ 80 mm
Length	0.5 mm to 100 mm	QM-APA 8.5.1.002.013 2020-07 comparison measurement	$0.1 \mu\text{m} + 0.5 \cdot 10^{-6} \cdot l$	
deviation from parallelism			0.05 $\mu\text{m}$	

**On-site Calibration**

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement <sup>1)</sup>	Remarks
<b>Length</b> Gauge block measuring instrument for calibration of gauge blocks	0.5 mm to 100 mm	DKD-R 4-1:2018	$0.03 \mu\text{m} + 0.002 \cdot D$	$D \leq 10 \mu\text{m}$ , for nominal length difference

**Abbreviations used:**

CMC	Calibration and measurement capabilities (Kalibrier- und Messmöglichkeiten)
DKD-R	Guideline of Deutschen Kalibrierdienstes (DKD), published by the Physikalisch-Technischen Bundesanstalt
QM-APA	In-house method of the Kolb & Baumann GmbH & Co. KG
DAK/DL	In-house method of the Kolb & Baumann GmbH & Co. KG

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