

Deutsche Akkreditierungsstelle GmbH

Annex to the Accreditation Certificate D-K-15077-01-00 according to DIN EN ISO/IEC 17025:2005

Period of validity: 09.02.2016 to 08.02.2021

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Holder of certificate:

Kolb & Baumann GmbH & Co. KG
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Accredited as calibration laboratory since: 09.04.1979

Calibration in the fields:

Dimensional quantities

Length

- **Gauge blocks**
- **Length measuring instruments**
- **Length measuring devices ^{*)}**
- **Diameter**
- **Form error**

^{*)} also on-sit calibration

Abbreviations used: see last page

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Permanent Laboratory

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Best measurement capability ¹⁾	Remarks
Length Gauge blocks made of steel according to DIN EN ISO 3650:1999	0.5 mm to 100 mm Standard and gauge block under test must be of the same nominal length	DAKKS-DKD-R 4-3 part 4.1:2010 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 μm	l = gauge block length Quality of the measuring surface according to the commitments in the Laboratory Quality Manual 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 μm	
Gauge blocks made of ceramics or tungsten carbide according to DIN EN ISO 3650:1999	0.5 mm to 100 mm Standard and gauge block under test 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 μm	
	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 μm	
Gauge blocks made of steel according to DIN EN ISO 3650:1999	100 mm to 1000 mm Standard and gauge block under test must be of the same nominal length	DAKKS-DKD-R 4-3 part 4.1:2010 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 μm	
Gauge blocks made of steel or tungsten carbide according to DIN EN ISO 3650:1999	0.1 mm to < 0.5 mm Standard and gauge block under test must be of the same nominal length	DAKKS-DKD-R 4-3 part 4.1:2010 Measurement of the deviation of the central length l_c from the nominal value l_n by comparison measurement	For the mean size: 0.15 μm	

¹⁾ The best measurement capabilities are stated according to DAKKS-DKD-3 (EA-4/02). These are expanded uncertainties of measurement with a coverage probability of 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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Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Best measurement capability ¹⁾	Remarks
Pairs of gauge blocks made of steel or tungsten carbide according to DIN EN ISO 3650:1999	0.5 mm to 100 mm	DAkks-DKD-R 4-3 part 4.1:2010 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 µm 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 µm For the deviation from the central length: 0.03 µm (only for the nominal values 1.005 mm and 1.01 mm) else 0.05 µm	Quality of the measuring surface according to the commitments in the Laboratory Quality Manual resp. in the calibration procedures
Step-height Step-height-standard consisting of a plate with gauge blocks made of tungsten carbide according to DIN EN ISO 3650:1999 wrung on it	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 µm	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	DAkks-DKD-R 4-1:2010	$0.03 \mu\text{m} + 0.002 \cdot D$ for length difference $D \leq 10 \mu\text{m}$	
Micrometers	to 300 mm	DAkks-DKD-R 4-3 part 10.1:2010	$3 \mu\text{m} + 10 \cdot 10^{-6} \cdot l$	$l =$ measured length
	> 300 mm to 1000 mm		$5 \mu\text{m} + 10 \cdot 10^{-6} \cdot l$	
Dial gauges	to 100 mm	DAkks-DKD-R 4-3 part 11.1:2010	$3 \mu\text{m} + 10 \cdot 10^{-6} \cdot l$	over 30 mm in the horizontal position
Dial gauges	to 3 mm	DAkks-DKD-R 4-3 part 11.2:2010	0.6 µm	
Lever gauges	to 1.6 mm	DAkks-DKD-R 4-3 part 11.3:2010	0.8 µm	
Plug gauges Diameter	0.5 mm to 500 mm	DAkks-DKD-R 4-3 part 4.1:2010 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	∅ 10 mm to ∅ 200 mm			
Length	0.2 mm to 100 mm	7.5.1-DAK/DL-018: 2011/04 comparison measurement	$0.1 \mu\text{m} + 0.6 \cdot 10^{-6} \cdot l$	$l =$ measured length with gauge block comparator
deviation from parallelism			0.05 µm	
deviation from flatness		7.5.1-DAK/DL-032: 2009/11 interferometric	0.03 µm	

¹⁾ The best measurement capabilities are stated according to DAkks-DKD-3 (EA-4/02). These are expanded uncertainties of measurement with a coverage probability of 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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Plane-parallel length standards not in accordance with DIN EN ISO 3650:1999	(7 x 7) mm ² to (75 x 75) mm ² ∅ 8 mm to ∅ 100 mm			<i>l</i> = measured length with gauge block comparator
Length	0.2 mm to 100 mm	7.5.1-DAK/DL-018: 2011/04 comparison measurement	$0.1 \mu\text{m} + 0.5 \cdot 10^{-6} \cdot l$	
deviation from parallelism			0.05 μm	

On-side calibration

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Best measurement capability ¹⁾	Remarks
Length Gauge block measuring instrument for calibration of gauge blocks	0.5 mm to 100 mm	DAkkS-DKD-R 4-1:2010	$0.03 \mu\text{m} + 0.002 \cdot D$ for length difference $D \leq 10 \mu\text{m}$	

Abbreviations used:

DAkkS-DKD-R Guideline on Deutsche Akkreditierungsstelle GmbH

¹⁾ The best measurement capabilities are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties of measurement with a coverage probability of 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.