

# Deutsche Akkreditierungsstelle GmbH

## Annex to the Accreditation Certificate D-K-15089-01-02 according to DIN EN ISO/IEC 17025:2005

**Valid from: 25.07.2019**

Date of issue: 25.07.2019

Holder of certificate:

**Perschmann Calibration GmbH  
Hauptstraße 46d, 38110 Braunschweig**

with its calibration laboratory:

**Virnsberger Straße 43, 90431 Nürnberg**

Head:	Dr. Detlef Rübesame
Deputy head:	Dipl.-Wirtsch.-Ing. Lars Ahrendt
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Accredited as calibration laboratory since: 18.09.2006

**Annex to the accreditation certificate D-K-15089-01-02**

Calibration in the fields:

**Dimensional quantities**

**Length**

- Length measuring instruments
- Length measuring devices
- Diameter
- Thread

**Mechanical quantities**

- Torque

**Thermodynamic quantities**

**Temperature quantities**

- Resistance thermometers
- Radiation thermometers
- Temperature transmitters, data loggers
- Thermocouples
- Direct reading thermometers

**Humidity quantities**

- Devices for relative humidity

Within the measurands/calibration items marked with 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.

Abbreviations used: see last page

<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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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>				
Angle meter *	0° to 360°	DAkkS-DKD-R 4-3 part 7.2:2010	1' 30"	
Graduator	0° to 180°	Annex F/46:2017-11	12'	
Calipers for external, internal and depth dimensions *	0 mm to 1000 mm	DAkkS-DKD-R 4-3 part 9.1:2010	$30 \mu\text{m} + 30 \cdot 10^{-6} \cdot l$	$l =$ measured length
Depth calipers *	0 mm to 1000 mm	DAkkS-DKD-R 4-3 part 9.2:2010	$30 \mu\text{m} + 30 \cdot 10^{-6} \cdot l$	
Height gauge *	0 mm to 1000 mm	DAkkS-DKD-R 4-3 part 9.3:2010	$20 \mu\text{m} + 10 \cdot 10^{-6} \cdot l$	with contact help
Micrometers *	0 mm to 100 mm	DAkkS-DKD-R 4-3 part 10.1:2010	$3 \mu\text{m} + 10 \cdot 10^{-6} \cdot l$	100 mm = final value of the measuring range
Internal micrometers with three-point contact *	3 mm to 200 mm	DAkkS-DKD-R 4-3 part 10.8:2010	$3 \mu\text{m} + 5 \cdot 10^{-6} \cdot d$	$d =$ measured diameter
Dial gauges with scales * Scale interval > 1 $\mu\text{m}$	to 100 mm	DAkkS-DKD-R 4-3 part 11.1:2010	$3 \mu\text{m} + 10 \cdot 10^{-6} \cdot l$	$l =$ measured length
Dial gauges with scales * Scale interval 1 $\mu\text{m}$	to 5 mm		1.5 $\mu\text{m}$	error of measurement $y_i$
			2 $\mu\text{m}$	deviation span $f_e, f_{ges}, f_u, f_i$ and $f_w$
Dial gauges with scales * Scale interval > 1 $\mu\text{m}$	to 100 mm	VDI/VDE/DGQ 2618 part 11.1:2014	$3 \mu\text{m} + 10 \cdot 10^{-6} \cdot l$	$l =$ measured length
Dial gauges with scales * Scale interval 1 $\mu\text{m}$	to 5 mm		1.5 $\mu\text{m}$	error of measurement $y_i$
			2 $\mu\text{m}$	deviation span $MPE_r, MPE_e, MPE_{ges}, MPE_{1/1}, MPE_{1/2}, MPE_{1/10}, MPE_u$
Dial gauges with digital display Numerical interval 0.1 $\mu\text{m}$	to 25 mm	Annex F/04-2 V5:2014	$0.6 \mu\text{m} + 10 \cdot 10^{-6} \cdot l$	error of measurement $y_i$
			$0.8 \mu\text{m} + 10 \cdot 10^{-6} \cdot l$	deviation span $f_e, f_i$ and $f_w$
Dial gauges with digital display Numerical interval 1 $\mu\text{m}$	to 100 mm		$1 \mu\text{m} + 10 \cdot 10^{-6} \cdot l$	error of measurement $y_i$
			$1.5 \mu\text{m} + 10 \cdot 10^{-6} \cdot l$	deviation span $f_e, f_i$ and $f_w$
Dial indicators * Scale interval > 0.5 $\mu\text{m}$	to 3 mm	DAkkS-DKD-R 4-3 part 11.2:2010	0.6 $\mu\text{m}$	
Lever gauges *	to 1.6 mm	DAkkS-DKD-R 4-3 part 11.3:2010	1 $\mu\text{m}$	

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Lever gauges for external measurements *	0 mm to 70 mm	DAkKS-DKD-R 4-3 part 12.1:2010	$7 \mu\text{m} + 10 \cdot 10^{-6} \cdot l$	$l$ = measured length up to a probe length of 200 mm
Lever gauges for internal measurements *	2.5 mm to 80 mm	DAkKS-DKD-R 4-3 part 13.1:2010	$7 \mu\text{m} + 10 \cdot 10^{-6} \cdot l$	$l$ = measured length
Bore gauges with two-point contact *	to 3 mm	VDI/VDE/DGQ 2618 part 13.2:2005 (image 1)	0.8 $\mu\text{m}$	range of application: with gauge slider $d = 1.75 \text{ mm}$ to $d = 25 \text{ mm}$
		VDI/VDE/DGQ 2618 part 13.2:2005 (image 2)	0.8 $\mu\text{m}$	range of application: to $d = 300 \text{ mm}$
			1.2 $\mu\text{m}$	range of application: $d > 300 \text{ mm}$ to $d = 600 \text{ mm}$
		VDI/VDE/DGQ 2618 part 13.2:2005 (image 3)	0.8 $\mu\text{m}$	range of application: plug gauge to $d = 100 \text{ mm}$
Height gauges *	0 mm to 1000 mm	VDI/VDE/DGQ 2618 part 16.1:2009	$1.5 \mu\text{m} + 3 \cdot 10^{-6} \cdot L$	$L$ = measured length
Deviation from straightness and Perpendicularity	to 30 $\mu\text{m}$	to 800 mm lead length	$2.5 \mu\text{m} + 1 \cdot 10^{-6} \cdot l_z$	$l_z$ = lead length
Setting ring gauges * made of steel Diameter	2 mm to 200 mm	DAkKS-DKD-R 4-3 part 4.1:2010 Option 5.3.3 and 5.3.4	$0.6 \mu\text{m} + 5 \cdot 10^{-6} \cdot d$	$d$ = measured diameter
Setting plug gauges * made of steel Diameter	1 mm to 200 mm		$0.6 \mu\text{m} + 5 \cdot 10^{-6} \cdot d$	
Measuring pins * made of steel Diameter	0.17 mm to 20 mm	DAkKS-DKD-R 4-3 part 4.2:2010 Option 5.3.3	0.6 $\mu\text{m}$	

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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
Thread gauges * (single-start and multi-start cylindrical and conical external and internal threads with straight flanks, symmetrical and asymmetrical profile)				
External thread	3 mm to 90 mm	Scanning method DAkkS-DKD-R 4-3 part 4.8:2010, Option 1 to option 4  (Specifying the thread angle $\alpha$ )		$l_F$ = side length
Simple pitch diameter	Nominal diameter		2.5 $\mu$ m	
Outside diameter			2 $\mu$ m	
Core diameter or recess diameter			5 $\mu$ m	
Lead or pitch	0.5 mm to 8 mm		1 $\mu$ m	
Thread angle $\alpha$	$\geq 27^\circ$		(1.2 + 3 mm / $l_F$ )', but not lower at 6'	
Internal thread	3 mm to 100 mm	Scanning method DAkkS-DKD-R 4-3 part 4.9:2010, Option 1 to option 4  (Specifying the thread angle $\alpha$ )		$l_F$ = side length
Simple pitch diameter	Nominal diameter		2.5 $\mu$ m	
Outside diameter or recess diameter			5 $\mu$ m	
Core diameter			2 $\mu$ m	
Lead or pitch	0.5 mm to 8 mm		1 $\mu$ m	
Thread angle $\alpha$	$\geq 27^\circ$		(1.2 + 3 mm / $l_F$ )', but not lower at 6'	
Thread plug gauge * Simple pitch diameter	1.4 mm to 150 mm	DAkkS-DKD-R 4-3 part 4.8:2010, Option 1 (Three wire procedure)	2.5 $\mu$ m + 7.5 · 10 <sup>-6</sup> · $d$	$d$ = measured diameter $P_h$ = lead $P_h \geq 0.3$ mm to $\leq 6$ mm
<b>Torque *</b> Hand torque assembly tools	1 N·m to 1000 N·m	DIN EN ISO 6789-2:2017	0.5 %	only operated torque tools
<b>Temperature quantities</b> Resistance thermometers and direct reading thermometers with resistance sensor *	-25 °C to 140 °C > 140 °C to 300 °C > 300 °C to 400 °C > 400 °C to 500 °C	DAkkS-DKD-R 5-1:2010 in temperature block calibrator	0.2 K 0.4 K 0.6 K 0.8 K	Comparison with resistance thermometers
	0 °C	Ice point	50 mK	
Radiation thermometers *	5 °C to 120 °C > 120 °C to 500 °C	Black body radiators VDI/VDE 3511 part 4.4:2005	1.5 K 3 K	Calibration with plate radiators

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Measurement quantity / Calibration item	Range		Measurement conditions / procedure	Expanded uncertainty of measurement <sup>1)</sup>	Remarks
Thermometers for air temperature (Data loggers)	10 °C to	50 °C	Annex F/22-N V4:2013 in climatic chambers	0.3 K	Comparison with resistance thermometers
Thermocouples *	-25 °C to > 140 °C to	140 °C 500 °C	DAkkS-DKD-R 5-3:2010 in temperature block calibrator	1 K 2.2 K	Comparison with resistance thermometers
<b>Humidity quantities</b> Devices for relative humidity in air	7 % to	90 %	Annex F/22-N V4:2013 Climate chamber with humidity generator, temperature 23 °C	1.2 %	Comparison with reference humidity sensor Measurement uncertainty given in percent relative humidity

**Abbreviations used:**

CMC	Calibration and measurement capabilities (Kalibrier- und Messmöglichkeiten)
DIN	Deutsches Institut für Normung e.V.
DAkkS-DKD-R	Guideline: Deutsche Akkreditierungsstelle GmbH
VDI/VDE/DGQ 2618	Guideline: Inspection of measuring and test equipment
VDI/VDE 3511	Guideline: Temperature measurement in industry
VDE	Verband der Elektrotechnik, Elektronik und Informationstechnik
VDI	Verein Deutscher Ingenieure

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