

# Deutsche Akkreditierungsstelle GmbH

## Annex to the Accreditation Certificate D-K-17723-01-00 according to DIN EN ISO/IEC 17025:2018

**Valid from: 27.11.2019**

Date of issue: 27.11.2019

Holder of certificate:

**WENZEL Metrology GmbH**  
**Werner-Wenzel-Straße, 97859 Wiesthal**

Calibration in the fields:

**Dimensional quantities**

**Coordinate measuring technology**

– **Coordinate measuring machines <sup>a)</sup>**

<sup>a)</sup> On-Site Calibration

Abbreviations used: see last page

Annex to the accreditation certificate D-K-17723-01-00

**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>Coordinate measuring technology</b> Coordinate measuring machines with the following software: Metrosoft CM and QUARTIS of WENZEL Metromec Software AG Modus Metrology, Software of Renishaw INCA3D, Software of Mora Metrology PollyWorks, Software of Duwe 3d AG Metrologic, Software of Metrologic	Coordinate measuring machines featuring a space diagonal $\leq 4666$ mm	Calibration of metrological characteristics according to guideline DKD-R 4-3 part 18.1:2018, and the following standards and guidelines DIN EN ISO 10360 VDI/VDE 2617	without temperature compensation: $0,1 \mu\text{m} + 0,46 \cdot 10^{-6} \cdot l$  without temperature compensation: $0,2 \mu\text{m} + 0,46 \cdot 10^{-6} \cdot l$ (with one conjunction measurement)	Main field of application for this method are coordinate measuring machines in fixed, moving bridge and cantilever structure  $l$ = measured length
		Determination of the error of indication for size measurement $E_L$ ( $E_0$ and $E_{150}$ ) by using step gauges according to DIN EN ISO 10360-2:2010 (one conjunction measurement with displacement of the measuring standard).	with temperature compensation: $0,1 \mu\text{m} + 0,5 \cdot 10^{-6} \cdot l$ with $\Delta T = 2$ K  with temperature compensation: $0,2 \mu\text{m} + 0,5 \cdot 10^{-6} \cdot l$ with $\Delta T = 2$ K (with one conjunction measurement)	
		Determination of repeatability range $R_0$ according to DIN EN ISO 10360-2:2010	$0,07 \mu\text{m}$	
		Determination of probing error $P_{FTU}$ on a reference sphere according to DIN EN ISO 10360-5:2011	$0,13 \mu\text{m}$	
		Determination of scanning probing error $THP$ and scanning-test time $\tau$ on a reference sphere according to DIN EN ISO 10360-4:2003	$0,13 \mu\text{m}$ $0,2$ s	

<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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**On-site Calibration**

**Calibration and Measurement Capabilities (CMC)**

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement <sup>1)</sup>	Remarks
Coordinate measuring machines with the following software: Metrosoft CM and QUARTIS of WENZEL Metromec Software AG Modus Metrology, Software of Renishaw INCA3D, Software of Mora Metrology PolyWorks, Software of Duwe 3d AG Metrologic, Software of Metrologic	Coordinate measuring machines featuring a measuring volume with a space diagonal ≤ 9090 mm	The error of indication for size measurement $E_L$ ( $E_0$ and $E_{150}$ ) is determined by using demountable ball bar according to DIN EN ISO 10360-2:2010	without temperature compensation: $2 \cdot \sqrt{l} \cdot (0,4 \mu\text{m} + 0,51 \cdot 10^{-6} \cdot l)$  with temperature compensation: $2 \cdot \sqrt{l} \cdot (0,4 \mu\text{m} + 0,62 \cdot 10^{-6} \cdot l)$ with $\Delta T = 2 \text{ K}$	Main field of application for this method are coordinate measuring machines in cantilever design
		Determination of repeatability range $R_0$ according to DIN EN ISO 10360-2:2010	0,19 $\mu\text{m}$	$l$ = measured length
		Determination of probing error $P_{FTU}$ on a reference sphere according to DIN EN ISO 10360-5:2011	0,13 $\mu\text{m}$	
Coordinate measuring machines with CT-sensor and control software according to evaluation software: Metrosoft QUARTIS of WENZEL Metromec Software AG	Coordinate measuring machines featuring a measuring volume with a space diagonal ≤ 410 mm	Calibration of metrological characteristics according to guideline DKD-R 4-3 part 18.1:2018  The error of indication for size measurement $E_{(TS)}$ with a CT-artefact according to VDI/VDE 2630 Blatt 1.3:2011		Main field of application for this method are coordinate measuring machines  $l$ = measured length
		for length to 60 mm for length to 271 mm	0,9 $\mu\text{m}$ 1,1 $\mu\text{m}$	
		Determination of probing error $P_F$ on a reference sphere according to VDI/VDE 2630 part 1.3:2011	0,27 $\mu\text{m}$	
		Determination of probing error $P_S$ on a reference sphere according to VDI/VDE 2630 part 1.3:2011	0,28 $\mu\text{m}$	

**Abbreviations used:**

CMC	Calibration and measurement capabilities
DIN	Deutsches Institut für Normung e.V.
DKD-R	Guideline from Deutscher Kalibrierdienst (DKD), published by Physikalisch-Technische Bundesanstalt
VDI/VDE	Verband Deutscher Ingenieure / Verband der Elektrotechnik

<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.