

**The Appendix is an integral part of
Certificate of Accreditation No. 198/2017 of 28/03/2017**

Accredited entity according to ČSN EN ISO/IEC 17025:2005:

M&B Calibr, spol. s r. o.
Calibration Laboratory
Ke Karlovu 62/10, 664 91 Ivančice – Němčice

Field of measured quantity: length

Calibrations:

Nominal temperature for calibration: $(20 \pm 2) ^\circ\text{C}$

Ordinal number	Measured quantity ¹⁾	Measured quantity range	Calibration and Measurement Capability $[\pm]$ ²⁾	Calibration procedure identification
1	Steel parallels	(0.5 to 1000) mm	$(0.2+2\cdot L) \mu\text{m}$	KP D1
2	Steel length gauges*	(0 to 2) m	60 μm	KP D2
		(2 to 5) m	180 μm	
	Steel tape measures*	(0 to 2) m	0.14 mm	
		(0 to 3) m	0.28 mm	
		(0 to 5) m	0.42 mm	
3	Tape measures	(0 to 10) m	0.4 mm	KP D3
		(0 to 20) m	0.6 mm	
		(0 to 50) m	1.0 mm	
		(0 to 100) m	2.2 mm	
	Laser distance meters	(0 to 5) m	0.2 mm	
	4	Limit and end measuring rings	(1 to 100) mm (100 to 500) mm	$(0,5 + 2\cdot L) \mu\text{m}$ $(2,4 + 2\cdot L) \mu\text{m}$
Limit snap gauges		(1 to 100) mm (100 to 500) mm	$(0,5 + 2\cdot L) \mu\text{m}$ $(2,4 + 2\cdot L) \mu\text{m}$	
Feeler gauges Limit cylindrical gauges		(0.02 to 125) mm (100 to 500) mm	$(0,5 + 2\cdot L) \mu\text{m}$ $(2,4 + 2\cdot L) \mu\text{m}$	
Feeler gauges * Limit cylindrical gauges *		(1 to 100) mm (1 to 125) mm	1.9 μm 1.9 μm	
5	Limit plug gauges	(1 to 125) mm (125 to 200) mm	1.4 μm 1.9 μm	KP D5
	Threaded rings	(2 to 200) mm	$(3 + 3\cdot L) \mu\text{m}$	
	Limit plug gauges*	(1 to 125) mm	1.9 μm	
6	Slide gauges* (slide rules, height gauges, depth gauges)	(0 to 1000) mm (1000 to 3000) mm	12 μm 20 μm	KP D6

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Ordinal number ¹⁾	Measured quantity ¹⁾	Measured quantity range	Calibration and Measurement Capability [±] ²⁾	Calibration procedure identification
7	Micrometer gauges (micrometers, pasameters, micropasameters, micrometer heads, micrometer depth gauges)	(0 to 100) mm (100 to 1000) mm (1000 to 1500) mm	1.4 μm 2.5 μm 4.1 μm	KP D7
	Micrometer gauges * (micrometers, pasameters, micropasameters, micrometer depth gauges)	(0 to 100) mm (100 to 1000) mm	1.4 μm 2.5 μm	
8	Inside micrometers Three-contact internal gauges	(2 to 100) mm (100 to 300) mm	3.2 μm 5.0 μm	KP D8
9	Inside micrometer gauges	(10 to 100) mm (100 to 1000) mm	2.2 μm 5.1 μm	KP D9
10	Thickness gauges * electromagnetic ultrasonic	(0 to 1.5) mm (0 to 500) mm	1.3 μm (2.3 + 1·L) μm	
11	Dial indicators, direct and lever 0.001 mm 0.01 mm 0.1 mm	(0 to 100) mm (2 to 205) mm	0.3 μm 1.2 μm 12 μm	KP D11
	Two-contact internal gauges 0.001 mm 0.01 mm 0.1 mm		0.3 μm 1.2 μm 12 μm	
12	Calibrations carried out on a 3D CMM	(0 to 2000) mm	(1,7 + 4,5·L) μm	KP D12
	Calibrations carried out on a 2D microscope	(0 to 330) mm	(3.5 + 4.5·L) μm	
13	Profile projectors * Measuring microscopes *	(0 to 300) mm	(2.6 + 1·L) μm	KP D13
14	Calibrations carried out by a laserinterferometer* Measurement of position Measurement of flatness	(0 to 20) m	(0.1 + 1·L) μm 1.5 (μm / 1 m ²)	KPD 14

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Ordinal number ¹⁾	Measured quantity ¹⁾	Measured quantity range	Calibration and Measurement Capability [±] ²⁾	Calibration procedure identification
15	Calibration on a linear height gauge	(0 to 600) mm	(1.2 + 2.5·L) m	KP D15
16	Linear height gauges *	(0 to 600) mm	(0.5 + 0.8·L) μm	KP D16
17	Contour gauges *	(0 to 100) mm	(2.6 + 1·L) μm	KP D17
18	Length gauges *	up to 1000 mm	(0.2+2·L) μm	KP D18
19	3D coordinate measuring machines *	up to 1000 mm	(0.2+2·L) μm	KP D19
20	Roughness meters * Roughness standards	(0.01 to 6000) μm	5 % MV	KP DR1

¹⁾ Asterisk identifies the calibrations, which the Laboratory is qualified to carry out outside the permanent laboratory premises.

²⁾ Expressed like uncertainty in accordance with the requirements of the document EA 4/02 at k = 2.

KP Calibration Procedure

L Nominal length in metres

MV Measured Value

CMM Coordinate Measuring Machine

Measured instruments or devices:

(In accordance with the above list of measured quantities and the ranges of measurement the following types of instruments or devices can be measured.)

Ordinal number	Measured instrument/device type
1	Steel parallels
2	Steel length gauges, steel tape measures
3	Tape measures, laser distance meters
4	Limit and end measuring rings, limit snap gauges. Feeler gauges, limit cylindrical gauges.
5	Limit plug gauges, threaded rings
6	Slide gauges (slide rules, height gauges, depth gauges)
7	Micrometer gauges (micrometers, pasameters, micropasameters, micrometer heads, micrometer depth gauges)
8	Inside micrometers, three-contact internal gauges
9	Inside micrometer gauges
10	Electromagnetic and ultrasonic thickness gauges

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Ordinal number	Measured instrument/device type
11	Direct and lever dial indicators (0.001; 0.01; 0.1) mm, two-contact internal gauges (0.001; 0.01; 0.1) mm
12	Gauges, jigs, templates measurable by a 3D coordinate measuring machine and 2D microscope
13	Profile projectors, measuring microscopes
14	Profile projectors, measuring microscopes, length gauges, 3D coordinate measuring machine, surface plates
15	Gauges, jigs, templates measurable by a height gauge
16	Linear height gauges
17	Contour gauges
18	Length gauges
19	3D coordinate measuring machines
20	Roughness meters, roughness standards and samples

Field of measured quantity: plane angle

Calibrations:

Nominal calibration temperature: $(20 \pm 2) ^\circ\text{C}$

Ordinal number	Measured quantity	Measured quantity range	Calibration and Measurement Capability $[\pm] ^1)$	Calibration procedure identification
1	Levels Builder's levels Liquid and electronic levels	up to 2 m from 0.01 mm/m	0.05 mm/m	KP R1
2	Angles arm length 2000mm	90°	$(1,7 + 4.5 \cdot L) \mu\text{m}$	KP R2
	Angle gauges	$(0 \text{ to } 360)^\circ$	5'	

¹⁾ Expressed like uncertainty in accordance with the requirements of the document EA 4/02 at $k = 2$.

L Nominal length in metres

Measured instruments or devices:

(In accordance with the above list of measured quantities and the ranges of measurement the following types of instruments or devices can be measured.)

Ordinal number	Measured instrument/device type
1	Builder's, liquid and electronic levels
2	Angles, angle gauges

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Field of measured quantity: force, moment of force

Calibrations:

Nominal temperature for calibration: $(21 \pm 5) ^\circ\text{C}$

Ordinal number	Measured quantity ¹⁾	Measured quantity range	Calibration and Measurement Capability $[\pm]^{2)}$	Calibration procedure identification
1	Torque wrenches	(0.2 to 1,100) Nm (>1.1 to 3) kNm	0.65 % MV 0.90 % MV	KP S1
	Equipment for the measurement of moment of force Torque drivers	(0.2 to 500) Nm	0.40 % MV	
	Force meters and extensometric sensors	(0 to 5) kN (>5 to 20) kN	0.20 % MV 0.30% MV	
	Torque wrenches *	(0.2 to 1,100) Nm (>1.1 to 3) kNm	0.65 % MV 0.90 % MV	
	Equipment for the measurement * of moment of force, torque drivers	(0.2 to 500) Nm	0.50 % MV	

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²⁾ Expressed like uncertainty in accordance with the requirements of the document EA 4/02 at $k = 2$.

MV Measured Value

The Calibration and Measurement Capability is listed without accounting for the effect of the calibrated meter.

Measured instruments or devices:

(In accordance with the above list of measured quantities and the ranges of measurement the following types of instruments or devices can be measured.)

Ordinal number	Measured instrument/device type
1	Torque wrenches, equipment for the measurement of moment of force, torque drivers, torque sensors Force meters and extensometric sensors

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Field of measured quantity: temperature

Calibrations:

Nominal temperature for calibration: $(22 \pm 5) ^\circ\text{C}$

Ordinal number ¹⁾	Measured quantity	Measured quantity range	Calibration and Measurement Capability $[\pm]^{2)}$	Calibration procedure identification
1*	Electronic direct indicating thermometers	(- 30 to 0) °C (>0 to 100) °C (>100 to 200) °C (>200 to 300) °C (>300 to 400) °C (>400 to 500) °C (>500 to 650) °C (>650 to 1100) °C	0.06 °C 0.05 °C 0.06 °C 0.09 °C 0.4 °C 0.5 °C 0.6 °C 1.5 °C	KP TE1
	Contactless thermometers	(50 to 500)°C	2.2°C	

¹⁾ Asterisk at the ordinal number identifies the calibrations, which the Laboratory is qualified to carry out outside the permanent laboratory premises.

²⁾ Expressed like uncertainty in accordance with the requirements of the document EA 4/02 at $k = 2$.

Measured instruments or devices:

(In accordance with the above list of measured quantities and the ranges of measurement the following types of instruments or devices can be measured.)

Ordinal number	Measured instrument/device type
1	Electronic direct indicating thermometers Contactless thermometers

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Field of measured quantity: humidity

Calibrations:

Nominal calibration temperature: $(22 \pm 5) ^\circ\text{C}$

Ordinal number	Measured quantity	Measured quantity range	Calibration and Measurement Capability $[\pm]$ ¹⁾	Calibration procedure identification
1	Hygrometers	(10 to 95) % RH	1.5 % RH	KP VL1

¹⁾ Expressed like uncertainty in accordance with the requirements of the document EA 4/02 at $k = 2$.

r.h. Relative Humidity

Measured instruments or devices:

(In accordance with the above list of measured quantities and the ranges of measurement the following types of instruments or devices can be measured.)

Ordinal number	Measured instrument/device type
1	Relative humidity meters except psychrometers

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Field of measured quantity: pressure

Calibrations: Nominal temperature for calibration: $(20 \pm 2) ^\circ\text{C}$

Ordinal number ¹⁾	Measured quantity	Measured quantity range	Calibration and Measurement Capability [\pm] ²⁾	Calibration procedure identification
1*	over/under pressure – gaseous medium	(-100 to 0) kPa (>0 to 35) kPa (>35 to 160) kPa (>0.16 to 2) MPa	130 Pa 18 Pa 130 Pa 0.1 % MH	KP T1 KP T2
	overpressure – liquid medium (oil)	(25 to 600) kPa (>0.6 to 6) MPa (>6 to 60) MPa (>60 to 70) MPa	180 Pa 0.03 % MH 0.05 % MH 0.1 % MH	

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MV Measured Value

KP T1 Calibration procedure for the calibration of deformation manometers

KP T2 Calibration procedure for the calibration of electromechanical manometers (digital manometers and pressure converters with digital output of the measured quantity)

Measured instruments or devices:

(In accordance with the above list of measured quantities and the ranges of measurement the following types of instruments or devices can be measured.)

Ordinal number	Measured instrument/device type
1	Deformation manometers, tyre pressure gauges, electromechanical manometers (digital manometers, pressure converters with digital output of the measured quantity)

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Field of measured quantity: mass

Calibrations: Nominal calibration temperature: according to method specification

Ordinal number ¹⁾	Measured quantity	Measured quantity range	Calibration and Measurement Capability [±] ²⁾	Calibration procedure identification
1*	Electronic scales, mechanical scales	m ≤ 610 g 610 g < m ≤ 9.6 kg 9.6 kg < m ≤ 600 kg	2.7·10 ⁻⁶ MV 1.4·10 ⁻⁵ MV 5.0·10 ⁻⁵ MV	KP VA1 weight E2 weight F2 weight M1

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²⁾ Expressed like uncertainty in accordance with the requirements of the document EA 4/02 at k = 2.

MV Measured Value

The Calibration and Measurement Capability is listed without accounting for the effect of the calibrated meter.

Measured instruments or devices:

(In accordance with the above list of measured quantities and the ranges of measurement the following types of instruments or devices can be measured.)

Ordinal number	Measured instrument/device type
1	Electronic scales with non-automatic function, mechanical scales with non-automatic function – inclination balance with continuous indication scale

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Field of measured quantity: rotational speed

Calibrations:

Nominal calibration temperature: $(22 \pm 5) ^\circ\text{C}$

Ordinal number ¹⁾	Measured quantity	Measured quantity range	Calibration and Measurement Capability [\pm] ²⁾	Calibration procedure identification
24*	Revolution counters	(30 to 40 000) min ⁻¹	(1.1 %MV +0,5 d)	KP OT1

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²⁾ Expressed like uncertainty in accordance with the requirements of the document EA 4/02 at $k = 2$.

MV Measured Value

d - division

Measured instruments or devices:

(In accordance with the above list of measured quantities and the ranges of measurement the following types of instruments or devices can be measured.)

Ordinal number	Measured instrument/device type
1	rpm meters

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Field of measured quantity: hardness

Calibrations:

Nominal temperature for calibration: $(22 \pm 5) ^\circ\text{C}$

Ordinal number	Measured quantity ¹⁾	Measured quantity range	Calibration and Measurement Capability [±] ²⁾	Calibration procedure identification
1	Rockwell hardness plates and samples	(70 to 85) HRA (60 to 100) HRB (20 to 70) HRC	0.40 HR	KP TV1
	Hardness meters for metals * Rockwell	(70 to 85) HRA (60 to 100) HRB (20 to 70) HRC	0.50 HR	

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²⁾ Expressed like uncertainty in accordance with the requirements of the document EA 4/02 at $k = 2$.

Measured instruments or devices:

(In accordance with the above list of measured quantities and the ranges of measurement the following types of instruments or devices can be measured.)

Ordinal number	Measured instrument/device type
1	Hardness meters, hardness plates and samples