

Accredited entity according to ČSN EN ISO/IEC 17025:2018:

TECHNICKÉ LABORATOŘE OPAVA, akciová společnost
Calibration Laboratory for Geometrical Quantities
Těšínská 2962/79b, 746 01 Opava

CMC for the field of measured quantity: Length

Ord. number 1	Calibrated quantity / Subject of calibration	Nominal range				Parameter(s) of the meas. quantity	Lowest expanded measurement uncertainty specified ²	Calibration principle	Calibration procedure identification 3	Work- place
		min.	unit	max.	unit					
1	Standard scale	0 mm	to	1,000 mm			$(2 \cdot L + 0.7) \mu\text{m}$	Measurement on a multi-sensor machine Werth Video-Check-HA	KP 1.1	
2	Parallel gauge blocks	0.5 mm	to	1,000 mm			$(0.8 \cdot L + 0.08) \mu\text{m}$	Comparison with standard parallel gauge blocks	KP 1.2	
3	Glass gauges for the check of surface flatness and parallelity	0 mm	to	100 mm			$0.2 \mu\text{m}$	Direct measurement by a distance meter	KP 1.3	
4	Holder of basic gauges and accessories	0 mm	to	1,500 mm			$0.25 \mu\text{m}$	Direct measurement by a distance meter	KP 1.4	
5	Slide gauges	0 mm	to	3,000 mm			$(20 \cdot L + 20) \mu\text{m}$	Direct measurement with standard parallel gauge blocks	KP 2.1	
6	Slide gauges with circular dial indicator and depth indicator	0 mm	to	1,000 mm			$(30 \cdot L + 30) \mu\text{m}$	Direct measurement with standard parallel gauge blocks	KP 2.2	
7	Sliding depth gauges	0 mm	to	3,000 mm			$(20 \cdot L + 20) \mu\text{m}$	Direct measurement with standard parallel gauge blocks	KP 2.3	
8	Slide height gauges	0 mm	to	1,000 mm			$(20 \cdot L + 20) \mu\text{m}$	Direct measurement with standard parallel gauge blocks	KP 2.4	
9	Depth gauges with dial indicator	0 mm	to	1,000 mm			$(30 \cdot L + 30) \mu\text{m}$	Direct measurement with standard parallel gauge blocks	KP 2.5	
10	Slide height gauges with a digital scale	0 mm	to	1,000 mm			$(20 \cdot L + 20) \mu\text{m}$	Direct measurement with standard parallel gauge blocks	KP 2.6	

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		min.	unit	max.	unit					
11	Slide depth gauges with a digital scale	0 mm	to	3,000 mm			$(20 \cdot L + 20) \mu\text{m}$	Direct measurement with standard parallel gauge blocks	KP 2.7	
12	Slide gauges with a digital scale	0 mm	to	3,000 mm			$(20 \cdot L + 20) \mu\text{m}$	Direct measurement with standard parallel gauge blocks	KP 2.8	
13	Standard height gauges with a micrometer screw	0 mm	to	1,000 mm			$(5 \cdot L + 2) \mu\text{m}$	Direct measurement with standard parallel gauge blocks	KP 2.9	
14	Micrometer callipers for external measurement with fixed anvils	0 mm	to	3,000 mm			$(10 \cdot L + 1.7) \mu\text{m}$	Direct measurement with standard parallel gauge blocks	KP 2.10	
15	Comparators	0 mm 1,000 mm	to to	1,000 mm 3,000 mm			$(1.2 \cdot L + 0.3) \mu\text{m}$ $(3 \cdot L + 2) \mu\text{m}$	Direct measurement by a distance meter	KP 2.10	
16	Micrometers with planar interchangeable measuring anvils	0 mm	to	3,000 mm			$(14 \cdot L + 2.5) \mu\text{m}$	Direct measurement with standard parallel gauge blocks	KP 2.11	
17	Comparators	0 mm 1,000 mm	to to	1,000 mm 3,000 mm			$(1.2 \cdot L + 0.3) \mu\text{m}$ $(3 \cdot L + 2) \mu\text{m}$	Direct measurement by a distance meter	KP 2.11	
18	Gear micrometers	0 mm	to	300 mm			$(10 \cdot L + 2) \mu\text{m}$	Direct measurement with standard parallel gauge blocks	KP 2.12	
19	Comparators	0 mm	to	1,000 mm			$(1.2 \cdot L + 0.3) \mu\text{m}$	Direct measurement with standard parallel gauge blocks	KP 2.12	
20	Micrometers for sheet metal	0 mm	to	100 mm			$(20 \cdot L + 3) \mu\text{m}$	Direct measurement with standard parallel gauge blocks	KP 2.13	
21	Micrometer calliper gauges with extended anvils	0 mm	to	100 mm			$(10 \cdot L + 2) \mu\text{m}$	Direct measurement with standard parallel gauge blocks	KP 2.14	
22	Micrometers for wires	0 mm	to	20 mm			$(10 \cdot L + 1.7) \mu\text{m}$	Direct measurement with standard parallel gauge blocks	KP 2.15	

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23	Micrometers for tube walls	0 mm	to	100 mm			$(10 \cdot L + 2.2) \mu\text{m}$	Direct measurement with standard parallel gauge blocks	KP 2.16	
24	Micrometers for threads with interchangeable anvils	0 mm	to	300 mm			$(10 \cdot L + 2) \mu\text{m}$	Direct measurement with standard parallel gauge blocks	KP 2.17	
25	Comparators	0 mm	to	500 mm			$(4 \cdot L + 1.5) \mu\text{m}$	Direct measurement by a distance meter	KP 2.17	
26	Inside micrometer gauges	3 mm	to	1,000 mm			$(12 \cdot L + 3) \mu\text{m}$	Direct measurement with standard rings	KP 2.18	
27	Micrometers for products with a concave surface	0 mm	to	100 mm			$(10 \cdot L + 2) \mu\text{m}$	Direct measurement with standard parallel gauge blocks	KP 2.19	
28	Micrometers with shape measuring anvils	0 mm	to	3,000 mm			$(10 \cdot L + 2) \mu\text{m}$	Direct measurement with standard parallel gauge blocks	KP 2.20	
29	Micrometers with prismatic measuring anvils	0 mm	to	200 mm			$(10 \cdot L + 2.2) \mu\text{m}$	Direct measurement with standard parallel gauge blocks	KP 2.21	
30	Micrometers with a digital scale	0 mm	to	3,000 mm			$(8 \cdot L + 1) \mu\text{m}$	Direct measurement with standard parallel gauge blocks	KP 2.22	
31	Micrometer depth gauges	0 mm	to	200 mm			$(10 \cdot L + 1.5) \mu\text{m}$	Direct measurement with standard parallel gauge blocks	KP 2.23	
32	Micrometric heads	0 mm	to	100 mm			$(8 \cdot L + 1.5) \mu\text{m}$	Direct measurement by a distance meter	KP 2.24	
33	Rigid inside micrometer gauges	0 mm	to	3,000 mm			$(4 \cdot L + 2) \mu\text{m}$	Direct measurement by a distance meter	KP 2.25	
34	Folding inside micrometer gauges with extension pieces	0 mm 1,000 mm	to to	1,000 mm 3,000 mm			$(1.5 \cdot L + 0.3) \mu\text{m}$ $(4 \cdot L + 2) \mu\text{m}$	Direct measurement by a distance meter	KP 2.26	

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		min.	unit	max.	unit					
35	Micrometer heads with a digital scale	0 mm	to	100 mm			$(2 \cdot L + 1.5) \mu\text{m}$	Direct measurement by a distance meter	KP 2.27	
36	Pasameters and micropasameters	0 mm	to	300 mm			$(4 \cdot L + 0.4) \mu\text{m}$	Direct measurement with standard parallel gauge blocks	KP 2.28	
37	Lever gauges (callipers) for sheer metal and walls with dial indicator	0 mm	to	100 mm			$(15 \cdot L + 1.5) \mu\text{m}$	Direct measurement with standard parallel gauge blocks	KP 2.29	
38	Two-contact internal dial gauges	0 mm	to	1,000 mm		DS = 1 μm DS = 10 μm	$(8 \cdot L + 1.5) \mu\text{m}$ $(10 \cdot L + 2.5) \mu\text{m}$	Direct measurement by a special measuring device	KP 2.30	
39	Multipoint and special internal gauges	3 mm	to	500 mm		DS = 1 μm DS = 10 μm	$(6 \cdot L + 2) \mu\text{m}$ $(7 \cdot L + 2.5) \mu\text{m}$	Direct measurement with measuring rings	KP 2.31	
40	Internal gauges with a digital scale	0 mm	to	1,000 mm			$(6 \cdot L + 2) \mu\text{m}$	Direct measurement with measuring rings	KP 2.32	
41	Dial indicators with division 0.01 mm	0 mm	to	100 mm			$(40 \cdot L + 2) \mu\text{m}$	Measurement by a special measuring device	KP 3.1	
42	Dial indicators with division 0.001 mm	0 mm	to	100 mm			$(10 \cdot L + 0.5) \mu\text{m}$	Measurement by a special measuring device	KP 3.2	
43	Somcators (microcators), mycators, minimeters, milisoms, orthotests, with division from 0.1 μm	0 mm	to	1 mm			$(5 \cdot L + 0.1) \mu\text{m}$	Direct measurement with parallel gauge blocks	KP 3.3	
44	Lever dial indicators with division 0.01 mm	0 mm	to	10 mm			$(50 \cdot L + 3) \mu\text{m}$	Measurement by a special measuring device	KP 3.4	

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45	Lever dial indicators with division from 0.001 mm	0 mm	to	10 mm			$(80 \cdot L + 0.35) \mu\text{m}$	Measurement by a special measuring device	KP 3.5	
46	Dial indicators with a digital scale	0 mm	to	100 mm			$(6 \cdot L + 1.2) \mu\text{m}$	Measurement by a special measuring device	KP 3.6	
47	Cylindrical gauges	0 mm	to	1,000 mm			$(2.5 \cdot L + 0.2) \mu\text{m}$	Direct measurement by a distance meter	KP 4.1	
48	Slot gauges	0 mm	to	3,000 mm			$(2.5 \cdot L + 0.2) \mu\text{m}$	Direct measurement by a distance meter	KP 4.2	
49	Inside micrometers with spherical surfaces	0 mm	to	3,000 mm			$(1.5 \cdot L + 0.15) \mu\text{m}$	Direct measurement by a distance meter	KP 4.3	
50	Single- and double-ended snap gauges	0.5 mm 10 mm	to to	10 mm 500 mm			0.5 μm $(4 \cdot L + 0.3) \mu\text{m}$	Direct measurement by a distance meter	KP 4.4	
51	Measuring rings	0.3 mm 2 mm	to to	2 mm 1,000 mm			1.1 μm $(6 \cdot L + 0.6) \mu\text{m}$	Direct measurement by a distance meter	KP 4.6	
52	Cylindrical plug gauges for checks and drawing	0 mm	to	300 mm			$(4 \cdot L + 0.4) \mu\text{m}$	Direct measurement by a distance meter	KP 4.7	
53	Thread gauges and comparison pin gauges for metric threads	0 mm	to	300 mm			$(7 \cdot L + 2) \mu\text{m}$	Direct measurement on a length gauge	KP 4.9	
54	Good fixed and faulty fixed thread rings for metric threads	1 mm 3 mm	to to	3 mm 300 mm			7 μm $(10 \cdot L + 3) \mu\text{m}$	Direct measurement by a distance meter	KP 4.10	

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55	Thread gauges for pipe threads not fitting to threads – male gauge	0 mm	to	300 mm			$(10 \cdot L + 2.2) \mu\text{m}$	Direct measurement by a distance meter	KP 4.11	
56	Thread gauges for pipe threads not fitting to threads – ring	3 mm	to	300 mm			$(10 \cdot L + 3) \mu\text{m}$	Direct measurement by a distance meter	KP 4.11	
57	Limit thread snap gauges – male gauge	0 mm	to	300 mm			$(10 \cdot L + 2) \mu\text{m}$	Direct measurement by a distance meter	KP 4.12	
58	Limit thread snap gauges – ring	3 mm	to	300 mm			$(20 \cdot L + 10) \mu\text{m}$	Comparison with a comparison pin gauge	KP 4.12	
59	Thread gauges for other threads – male gauge	0 mm	to	300 mm			$(10 \cdot L + 2) \mu\text{m}$	Direct measurement by a distance meter	KP 4.13	
60	Thread gauges for other threads – ring	1 mm 3 mm	to to	3 mm 300 mm			$7 \mu\text{m}$ $(10 \cdot L + 3) \mu\text{m}$	Direct measurement by a distance meter	KP 4.13	
61	Thread-measuring wires	0 mm	to	10 mm			$(5 \cdot L + 0.15) \mu\text{m}$	Direct measurement by a distance meter	KP 4.14	
62	Feeler gauges for radius	0 mm	to	100 mm			$(10 \cdot L + 3) \mu\text{m}$	Direct measurement on a profile projector	KP 5.1	
63	Feeler gauges	0 mm	to	100 mm			$(2.5 \cdot L + 0.7) \mu\text{m}$	Direct measurement by a distance meter	KP 5.2	
64	Thread gauges for metric threads	0 mm	to	10 mm			$3 \mu\text{m}$	Direct measurement on a profile projector	KP 5.3	
65	Thread gauges for Whitworth and tube thread	0 mm	to	10 mm			$3 \mu\text{m}$	Direct measurement on a profile projector	KP 5.4	

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66	Gauges for the measurement of fillet welds	0 mm	to	100 mm			40 μm	Direct measurement with standard parallel gauge blocks	KP 5.5	
67	Gauges for thread tools for metric and Whitworth thread	0 mm	to	20 mm			5 μm	Direct measurement on a profile projector	KP 5.10	
68	Gauges for flat and sharp thread tools	0 mm	to	100 mm			5 μm	Direct measurement on a profile projector	KP 5.11	
69	Layer thickness measuring gauges	0 mm	to	10 mm			(20·L +3) μm	Direct measurement with standard setting sheets	KP 5.12	
70	External and internal gauges for radius	0 mm	to	500 mm			(10·L +4) μm	Direct measurement on a profile projector	KP 5.13	
71	Steel tape measures	0 mm	to	2,000 mm			100 μm	Direct measurement with a linear scale of a steel ruler	KP 6.1	
72	Steel tape measures	0 mm	to	10,000 mm			(10·L +100) μm	Direct measurement with a linear scale of a steel ruler	KP 6.2	
73	Steel length gauges	0 mm	to	5,000 mm			(20·L +10) μm	Direct measurement with a linear scale of a steel ruler	KP 6.3	
74	Tape measures, distance meters	0 m 20 m 0 m	to to to	20 m 100 m 20 m			(15·L +100) μm (40·L +200) μm (60·L +500) μm	Direct measurement with a linear scale of a steel ruler	KP 6.4	
75*	Flatness / surface plates; straightness / ribbed surface rules, surface blocks, cast-iron ribbed rules	0 μm	to	500 μm		length up to 5,000 mm	1.5 μm	Measurement by a laser interferometer	KP 7.1	

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76	Check and drawing blocks	0 mm	to	500 mm			$(6 \cdot L + 2) \mu\text{m}$	Direct measurement on a 3D machine	KP 7.21	
77	Point instruments	0 mm	to	1,200 mm			$(2 \cdot L + 3) \mu\text{m}$	Measurement using male gauges and a dial indicator	KP 7.22	
78	Flatness / measuring tables for comparative measurement	0 mm	to	1,000 mm			0.8 μm	Direct measurement on a 3D machine	KP 7.23	
79	Sliding mechanical gear tooth calipers	0 mm	to	200 mm			20 μm	Direct measurement with standard parallel gauge blocks	KP 8.1	
80	Optical gear tooth calipers	0 mm	to	100 mm			15 μm	Direct measurement with standard parallel gauge blocks	KP 8.2	
81	Surface roughness standards	0 mm	to	12.5 μm			6 %	Direct measurement by a roughness meter	KP 8.3	
82*	Universal length meters	0 mm	to	6,000 mm			$(1 \cdot L + 0.15) \mu\text{m}$	Measurement by a laser interferometer	KP 8.4	
83*	Universal measuring microscopes	0 mm	to	3,000 mm			$(1 \cdot L + 0.15) \mu\text{m}$	Measurement by a laser interferometer	KP 8.5	
84*	Profile projectors	0 mm	to	3,000 mm			$(1 \cdot L + 0.15) \mu\text{m}$	Measurement by a laser interferometer	KP 8.6	
85*	One- to three-axis coordinate measuring machines	0 mm	to	6,000 mm			$(1.3 \cdot L + 0.15) \mu\text{m}$	Measurement by a laser interferometer	KP 8.7	
86*	Three-axis coordinate measuring machines	0 mm	to	6,000 mm			$(1.3 \cdot L + 0.15) \mu\text{m}$	Measurement by a laser interferometer	KP 8.8	
87	Checking instruments for dial indicators	0 mm	to	100 mm			$(0.5 \cdot L + 0.06) \mu\text{m}$	Direct measurement with standard parallel gauge blocks	KP 8.9	
88*	Instruments for checking of steel parallels by comparative method	0 mm	to	200 mm			$(0.5 \cdot L + 0.06) \mu\text{m}$	Direct measurement with standard parallel gauge blocks	KP 8.10	

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89*	Roughness meters	0 mm	to	100 μm			8 %	Direct measurement with a roughness standard	KP 8.11	
90	Length gauges							Special measurement on 1, 2 and 3-axis measuring machines	KP 8.12	
	1 axis	0 mm	to	3,000 mm			(3·L +0.5) μm			
	2 axes	0 mm	to	1,000 mm			(3·L +0.7) μm			
	3 axes	0 mm	to	1,000 mm			(3·L +0.1) μm			
91	Check rules	0 μm	to	50 μm		length up to 5,000 mm	(1.8·L +1.2) μm	Measurement by a laser interferometer	KP 7.2	
92	Shop rules	0 μm	to	50 μm		length up to 5,000 mm	(1.8·L +1.5) μm	Measurement by a laser interferometer	KP 7.3	
93	Blade measuring rules	0 μm	to	30 μm		length up to 5,000 mm	3 μm	By parallel gauge blocks on a surface plates	KP 7.4	
94	Squareness measuring cylinders	0 mm	to	5 mm		height up to 1,000 mm	(2.5·L +0.5) μm	Measurement using a pasameter, length gauge and dial indicator	KP 7.14	
95	Check squares 90°	0 mm	to	4 mm		length up to 200 mm	(4·L +1) μm	Direct measurement with standard parallel gauge blocks and perpendicularity standard	KP 7.15	
						length up to 1,000 mm	(5·L +2) μm	Direct measurement on a 3D machine		
96	Check squares 90°	0 mm	to	8 mm		length up to 2,500 mm	(30·L +10) μm	Direct measurement on a 3D machine	KP 7.16	

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

² The expanded measurement uncertainty is in accordance with ILAC-P14 and EA-4/02 M, part of CMC, and it is the lowest value of the respective uncertainty. If not stated otherwise, its coverage probability is approx. 95 %. If not stated otherwise, the uncertainty values stated without a unit are relative to the value measured. If the calibration is carried out outside the laboratory premises, the measurement uncertainty may be affected.

³ If the document identifying the calibration procedure is dated, only these specific procedures are used. If the document identifying the calibration procedure is not dated, the latest edition of the specified procedure is used (including any changes).

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Explanatory notes:

L - Length in [m]

DS - Division of the Scale - for lengths in [μm]

KP - Calibration Procedure

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CMC for the field of measured quantity: Plane angle

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1	Gauges for cone-face joints – male gauge	0 °		to 50°		diameter up to 300mm	9“	Direct measurement on a 3D machine	KP 4.5	
2	Gauges for cone-face joints – ring	0 °		to 50°		diameter up to 300mm	13“	Direct measurement on a 3D machine	KP 4.5	
3	Gauges for checking straight groove joints - male gauge	0 °		to 60°		diameter up to 200 mm	9“	Direct measurement on a 3D machine	KP 4.8	
4	Gauges for checking straight groove joints - ring	0°		to 60 °		diameter 3 mm to 200 mm	13“	Direct measurement on a 3D machine	KP 4.8	
5	Meter for checking screw augers	0 °		to 120 °		diameter up to 100 mm	9´	Direct measurement on a profile projector	KP 5.6	
6	Meters for checking the angle of face of circular thread tools	-30 °		to +30 °			9´	Direct measurement on a profile projector	KP 5.7	
7	Gauges for the measurement of angle of turning tools with sintered carbide cutting edges	0 °		to 180 °			4´	Direct measurement on a profile projector	KP 5.8	
8	Gauges for angles of backs of cylindrical cutters	0 °		to 180 °			5´	Direct measurement on a profile projector	KP 5.9	
9	Sine bars	0 °		to 50 °		length up to 1,000 mm	2.2“	Measurement with standard parallel gauge blocks	KP 7.5	
10	Sine bars with centres	0 °		to 50 °		length up to 1,000 mm	2.1“	Measurement with standard parallel gauge blocks	KP 7.6	
11	Sine bars for checking cones	0 °		to 50 °		length up to 500 mm	4“	Measurement with standard parallel gauge blocks	KP 7.7	
12	Angle sine bars	0 °		to 50 °		length up to 200 mm	4“	Measurement with standard parallel gauge blocks	KP 7.8	
13	Cross sine bars	0 °		to 50 °		length up to 200 mm	4“	Measurement with standard parallel gauge blocks	KP 7.9	
14	Folding sine bars with a stop	0 °		to 50 °		length up to 200 mm	4“	Measurement with standard parallel gauge blocks	KP 7.10	
15	Sine vices	0 °		to 50 °		length up to 200 mm	5“	Measurement with standard parallel gauge blocks	KP 7.11	

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16	Levels	-20 mm/m		to	+20 mm/m		3 μm/m	Comparison with standard parallel gauge blocks and sine rule	KP 7.12	
17	Clinometers	0 °		to	360 °		1′	Comparison with standard parallel gauge blocks and sine rule	KP 7.13	
18	Mechanical angle gauges with vernier	0 °		to	360 °		6′	Comparison with an angle standard	KP 7.17	
19	Optical angle gauges	0 °		to	360 °		3′	Comparison with an angle standard	KP 7.18	
20	Angle gauges with a digital scale	0 °		to	360 °		1′10″	Comparison with an angle standard	KP 7.19	
21	Angle gauges with a dial indicator	0 °		to	360 °		3′	Comparison with an angle standard	KP 7.20	
22	Angle gauges	0 °		to	100 °		7″	Direct measurement on 3D machines	KP 7.24	
23	Special gauges on 2- axis and 3-axis measuring machines	0 °		to	360 °	length up to 1,000 mm	9″	Measured on 2D and 3D machines	KP 8.12	

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