The Appendix is an integral part of
Certificate of Accreditation No. 515/2023 of 02/10/2023

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

František Knížek
CAB number 2290, František Knížek - KALEX, Calibration Centre
A. Dvořáka 719, 533 41 Lázně Bohdaneč

Calibration laboratory locations:

1. **Workplace Lázně Bohdaneč** A. Dvořáka 719, 533 41 Lázně Bohdaneč
2. **Workplace Vlčí Habřina** Vlčí Habřina 122, 533 41 Lázně Bohdaneč

CMC for the field of measured quantity: Length

Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range min.	unit		max.	unit	Parameter(s) of the measurand	Lowest stated expanded measurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Work-place
1	Parallel gauge blocks	0.5 mm		to	100 mm			(2L + 0.2) µm	Comparison with parallel gauge blocks in vertical position on a comparator	KPA-1.01	1
		125 mm		to	500 mm			(2.2L + 0.3) µm	Comparison with parallel gauge blocks in horizontal position on a length gauge		1, 2
		500 mm		to	1,000 mm			(2.2L + 0.3) µm	Comparison with parallel gauge blocks in horizontal position on a length gauge		2
2*	Slide gauges, depth gauges, height gauges	0 mm		to	3,000 mm			(8.7L + 11) µm	Measurement using parallel gauge blocks	KPA-1.02	1
3	Micrometers for external measurement								Measurement using parallel gauge blocks	KPA-1.03	1
	Micrometer calliper gauges	0 mm		to	500 mm			(3L + 1) µm			
	Pasameters	0 mm		to	500 mm			(3L + 1) µm			
	Micropasameters	0 mm		to	500 mm			(3L + 1) µm			
4	Micrometers for internal measurement								Measurement using parallel gauge blocks	KPA-1.04	1
	Inside micrometer gauges	14 mm		to	500 mm			(3L + 1) µm			
	Micrometer depth gauges	14 mm		to	500 mm			(2L + 1.1) µm			
	Inside micrometers	14 mm		to	500 mm			(2L + 1.1) µm			
	Micrometric heads	0 mm		to	500 mm			(3L + 1) µm			

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Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range min.	unit		max.	unit	Parameter(s) of the measurand	Lowest stated expanded measurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Work-place
5	Deviation meters								Measurement on a dial indicator calibration instrument	KPA-1.05	1
	Dial gauges	0 mm		to	100 mm			0.88 µm			
	Pupitasts	0 mm		to	100 mm			1.2 µm			
	Somcators	0 mm		to	100 mm			1.2 µm			
	Internal gauges	0 mm		to	100 mm			1.2 µm			
6	Limit gauges for external measurement								Measurement on a length gauge	KPA-1.06	1
	Micrometer calliper gauges	1 mm		to	500 mm			(3L + 1) µm			
	Plain rings	1 mm		to	500 mm			(3.6L + 1.2) µm			
	Threaded rings	1 mm		to	500 mm			(7.4L + 2.1) µm			
7	Limit gauges for internal measurement								Measurement on a length gauge	KPA-1.07	1
	cylinder, flat	0 mm		to	500 mm			(5.3L + 0.75) µm			
	Thread gauges	0 mm		to	500 mm			(2.8L + 2.8) µm			
	Feeler gauges	0 mm		to	500 mm			3.6 µm			
	Measuring wires	0 mm		to	500 mm			0.54 µm			
	Gauges for radius	0 mm		to	500 mm			4.0 µm			
	Gauges for threads	0 mm		to	500 mm			4.0 µm			
	Gauges for paint thickness	0 mm		to	500 mm			1.4 µm			
8*	Rules								Measurement on a coordinate measuring machine	KPA-1.08	1, 2
	Steel rules	0 mm		to	10,000 mm			(4.6L + 4.7) µm			
	Measuring magnifier	0 mm		to	100 mm			(4.6L + 4.7) µm			
	Steel tape measures	0 mm		to	10,000 mm			(3.8L + 140) µm	Comparison with a steel gauge		
	Tapes	0 m		to	100 m			(0.06L + 0.3) mm			

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Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range min.	unit		max.	unit	Parameter(s) of the measurand	Lowest stated expanded measurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Work-place
9*	Two-coordinate measuring machines, Measuring microscopes, Profile projectors	0 mm		to	1,000 mm			3.2 µm	Measuring with a glass ruler	KPA-1.09	1
10	Atypical length gauges	0 mm		to	250 mm			4.0 µm	Measurement on a coordinate measuring machine	KPA-1.10	1
11*	Surface plates, blocks, plates (longer side up to 5,000 mm) - flatness, straightness	0 m		to	10 m			3.8 µm	Measurement by an electronic level	KPA-1.13	1
12*	Length gauges	0 mm		to	1,000 mm			(2L + 0.25) µm	Comparison with parallel gauge blocks	KPA-1.14	1

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[2] The expanded measurement uncertainty is in accordance with ILAC-P14 and EA-4/02 M a 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 measured value. The uncertainty value stated herein is based on the best conditions achievable by the laboratory; the uncertainty value of a specific calibration may be higher depending on the conditions of such a calibration. For identical extreme values of adjacent ranges, the lower uncertainty value always applies.

[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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CMC for the field of measured quantity: Plane angle

Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range min.	unit		max.	unit	Parameter(s) of the measurand	Lowest stated expanded measurement uncertainty[2]	Calibration principle	Calibration procedure identification [3]	Work-place
1	Rigid angle gauges								Measurement on a coordinate measuring machine	KPA-1.11	1
	check squares – angle between arms	0	°	to	180	°		32 µm/m			
	taper gauges	0	°	to	90	°		7´´			
	centre squares	0	°	to	90	°		32 µm/m	Measurement on a small angle generator		
	gauges for threads	0	°	to	90	°		7´´			
2	Angle gauges	0	°	to	360	°		1.8´	Measurement using angle gauges	KPA-1.12	1
3	Machinery levels – sensitivity measurement	-1	°	to	1	°	Nominal sensitivity up to 0.02 mm/m	5 µm/m	Measurement on a small angle generator	KPA-1.11	1

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CMC for the field of measured quantity: Mass

Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range min.	unit		max.	unit	Parameter(s) of the measurand	Lowest stated expanded measurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Work-place
1*	Scales with non-automatic function, mechanical, digital								Loading using a reference weight	KPA-2.01	1
		0 kg	to		2 kg			$1.6 \cdot 10^{-6}$	class E2		
		2 kg	to		3 kg			$5 \cdot 10^{-6}$	class F1		
		3 kg	to		45 kg			$1.6 \cdot 10^{-5}$	class F2		
		45 kg	to		6,000 kg			$5 \cdot 10^{-5}$	class M1		
		6,000 kg	to		30,000 kg			$1.6 \cdot 10^{-4}$	class M1 with substitute load		
2	Weights and other objects	1 g	to		500 g			8.2 mg	Comparison with a standard weight	KPA-2.01	1, 2
		0.5 kg	to		1 kg			8.6 mg			
		1 kg	to		2 kg			10 mg			
		2 kg	to		5 kg			16 mg			
		5 kg	to		20 kg			59 mg			

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CMC for the field of measured quantity: Force, torque

Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range min.	unit		Nominal range max.	unit	Parameter(s) of the measurand	Lowest stated expanded measurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Work-place
1*	Torque drivers	0.25	Nm	to	50	Nm		0.01	Measurement by a torque sensor	KPA-5.01	1
	Torque wrenches, screwdrivers, Moment of force meters	0.25	Nm	to	0.5	Nm		0.01			
		0.5	Nm	to	200	Nm		0.005			
		200	Nm	to	500	Nm		0.005			1, 2
		500	Nm	to	2,000	Nm		0.005			2
2*	Force meters, force measuring devices	0	N	to	500	N	Tension, Pressure	0.001	Measurement by a reference force meter	KPA-5.02	1
		500	N	to	10,000	N		0.003			
		10,000	N	to	100,000	N		0.005			

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CMC for the field of measured quantity: Pressure

Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range				Parameter(s) of the measurand		Lowest stated expanded measurement uncertainty[2]	Calibration principle	Calibration procedure identification [3]	Work-place
		min.	unit	max.	unit						
1*	Deformation manometers, Digital manometers, Pressure measuring chains, Pressure transducers with electrical output	-95 kPa	to	350 kPa		Underpressure / overpressure	Gases	0.26 kPa	Comparison with a standard manometer	KPA-4.01, KPA-4.02	1
		350 kPa	to	1,000 kPa				0.58 kPa			
		1 MPa	to	3.5 MPa				2.1 kPa			
		3.5 MPa	to	6 MPa				6.9 kPa			
		0 MPa	to	20 MPa			Liquids	35 kPa			
		20 MPa	to	50 MPa				87 kPa			

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CMC for the field of measured quantity: Temperature

Ord. number [1]	Calibrated quantity / Subject of calibration	Nominal range min.	unit		Nominal range max.	unit	Parameter(s) of the measurand	Lowest stated expanded measurement uncertainty [2]	Calibration principle	Calibration procedure identification [3]	Work-place
1	Glass thermometers	- 40 °C		to	200 °C			0.07 °C	Comparison with a standard thermometer in a liquid bath	KPA-3.01	2
					0 °C			0.05 °C			
2*	Direct indicating thermometers, temperature controllers	-40 °C		to	200 °C			0.08 °C	Comparison with a standard thermometer in a liquid bath	KPA-3.02	1
		200 °C		to	400 °C			0.44 °C	Comparison with a standard thermometer in a vertical furnace		
		400 °C		to	650 °C			1.5 °C			
		650 °C		to	900 °C			1.8 °C			
		900 °C		to	1,200 °C			2.4 °C			
3*	Infrared thermometers	50 °C		to	500 °C			3.2 °C	Comparison with a standard (black body)	KPA-3.03	1
4*	Contact thermometers	0 °C		to	50 °C			1.7 °C	Comparison with a standard thermometer	KPA-3.04	1
		50 °C		to	100 °C			1.9 °C			
		100 °C		to	200 °C			2.3 °C			
		200 °C		to	400 °C			2.6 °C			
		400 °C		to	600 °C			3.5 °C			
5*	Thermoelectric sensors and measuring chains						K, J, N			KPA-3.05	1
	Thermocouple sensors	-40 °C		to	200 °C			0.4 °C	Comparison with a standard thermometer in a liquid bath		
		200 °C		to	400 °C			0.6 °C	Comparison with a standard thermometer in a vertical furnace		
		400 °C		to	650 °C			1.6 °C			

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Ord. number [1]	Calibrated quantity / Subject of calibration	Nominal range				Parameter(s) of the measurand	Lowest stated expanded measurement uncertainty [2]	Calibration principle	Calibration procedure identification [3]	Work-place
		min.	unit	max.	unit					
		650 °C	to	900 °C			2.3 °C			
		900 °C	to	1,100 °C			2.6 °C			
	Measuring chain without a sensor	-100 °C	to	1,100 °C			0.3 °C	Direct measurement on a calibrator		
6*	Resistance sensors and measuring chains								KPA-3.06	1
	Resistance sensors	-40 °C	to	200 °C			0.2 °C	Comparison with a standard thermometer in a liquid bath		
		200 °C	to	400 °C			0.5 °C	Comparison with a standard thermometer in a vertical furnace		
	Measuring chain without a sensor	-100 °C	to	400 °C			0.2 °C	Direct measurement on a calibrator		

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CMC for the field of measured quantity: Humidity

Ord. number [1]	Calibrated quantity / Subject of calibration	Nominal range				Parameter(s) of the measurand	Lowest stated expanded measurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Work place
		min	unit	max	unit					
1*	Instruments for measuring air humidity	10 % RH	to	90 % RH		Temperature range (15 to 60) °C	0.01 + 1.6 % RH	Comparison with a reference hygrometer	KPA-6.01	1

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