

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

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CAB number 2245, Calibration Laboratory – Metrology
NPP Temelín, 373 05 Temelín

Calibration laboratory locations:

1. Nuclear Power Plant Dukovany 675 50 Dukovany 269
2. Nuclear Power Plant Temelín 373 05 Temelín

CMC for the field of measured quantity: Length

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	Micrometer gauges, micrometers for external measurement	0 mm	to	100 mm		0.0012 mm	Direct comparison with reference gauges	J 62.03.G01	1, 2	
		100 mm	to	500 mm		0.0013 mm				
		500 mm	to	700 mm		0.0014 mm				
700 mm		to	900 mm	0.0015 mm						
900 mm		to	1,000 mm	0.0016 mm						
	Micrometers for internal measurement	5 mm	to	45 mm		0.0019 mm	Direct comparison with reference rings			
	Three-contact internal gauges	6 mm	to	200 mm		0.0019 mm				
2	Slide gauges	0 mm	to	2,000 mm		0.012 mm	Direct comparison with reference gauges	J 62.03.G02	1, 2	
3	Indicators / dial, digital, lever	0 mm	to	5 mm	division 0.001 mm	0.00033 mm	Direct comparison by a calibration instrument for indicators	J 62.03.G03	1, 2	
		5 mm	to	13 mm	0.00034 mm					
		0 mm	to	50 mm	division 0.01 mm	0.0012 mm				
		50 mm	to	100 mm	0.0013 mm					

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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: Mass

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*	Scales with non-automatic function, electronic	1 mg		to	19 kg		$U_{CMC} = \sum_{i=1}^n U_i$ <p>According to the weights used for calibration, U_i can have the following values</p> <ul style="list-style-type: none"> U_1 (1 mg) = $2.7 \cdot 10^{-3}$ mg U_2 (2 mg) = $2.7 \cdot 10^{-3}$ mg U_3 (5 mg) = $2.7 \cdot 10^{-3}$ mg U_4 (10 mg) = $3.6 \cdot 10^{-3}$ mg U_5 (20 mg) = $4.5 \cdot 10^{-3}$ mg U_6 (50 mg) = $5.3 \cdot 10^{-3}$ mg U_7 (100 mg) = $7.1 \cdot 10^{-3}$ mg U_8 (200 mg) = $8.9 \cdot 10^{-3}$ mg U_9 (500 mg) = $1.2 \cdot 10^{-2}$ mg U_{10} (1 g) = $1.4 \cdot 10^{-2}$ mg U_{11} (2 g) = $1.8 \cdot 10^{-2}$ mg U_{12} (5 g) = $2.3 \cdot 10^{-2}$ mg U_{13} (10 g) = $2.7 \cdot 10^{-2}$ mg U_{14} (20 g) = $3.6 \cdot 10^{-2}$ mg U_{15} (50 g) = $4.5 \cdot 10^{-2}$ mg U_{16} (100 g) = $7.1 \cdot 10^{-2}$ mg U_{17} (200 g) = $1.4 \cdot 10^{-1}$ mg U_{18} (500 g) = $3.6 \cdot 10^{-1}$ mg U_{19} (1 kg) = $7.1 \cdot 10^{-1}$ mg U_{20} (2 kg) = $1.3 \cdot 10^0$ mg U_{21} (5 kg) = $3.5 \cdot 10^0$ mg U_{22} (10 kg) = $7.1 \cdot 10^0$ mg 	Loading with E2 class reference standard	J 62.06.W01	1, 2

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		min	unit	max	unit					
2	F1, F2, M class weight	1 mg	to	5 mg		4.6·10 ⁻³ mg	Comparison with a class E2 reference weight	J 62.03.W02	1	
				10 mg		4.9·10 ⁻³ mg				
				20 mg		5.3·10 ⁻³ mg				
				50 mg		5.8·10 ⁻³ mg				
				100 mg		6.8·10 ⁻³ mg				
				200 mg		8.0·10 ⁻³ mg				
				500 mg		1.0·10 ⁻² mg				
				1 g		1.1·10 ⁻² mg				
				2 g		1.4·10 ⁻² mg				
				5 g		1.8·10 ⁻² mg				
				10 g		2.1·10 ⁻² mg				
				20 g		2.7·10 ⁻² mg				
				50 g		3.4·10 ⁻² mg				
				100 g		5.5·10 ⁻² mg				
				200 g		1.1·10 ⁻¹ mg				
				500 g		8.2·10 ⁰ mg				
				1 kg		8.2·10 ⁰ mg				
				2 kg		8.3·10 ⁰ mg				
				5 kg		8.6·10 ⁰ mg				
				10 kg		8.2·10 ¹ mg				

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CMC for the field of measured quantity: Mechanical motion

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	Effective value of linear harmonic mechanical vibrations / Vibrometers, vibration sensors acceleration velocity amplitude	3 m·s ⁻²	to	60 m·s ⁻²		30 Hz to 1,000 Hz	2.7 %	Comparison with a reference standard	J 62.09.V01	2
		0.5 m·s ⁻¹	to	320 m·s ⁻¹						
		0 μm	to	4,800 μm						
2	Sensitivity of vibration sensors	0.01 mV/m·s ⁻²	to	10,000 mV/m·s ⁻²		30 Hz to 1,000 Hz	2.7 %	Comparison with a reference standard	J 62.09.V01	2

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CMC for the field of measured quantity: Torque

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	Torque / Torque wrenches, torque screwdrivers	1 N·m		to	1,000 N·m		0.7 %	Calibration with a reference torque device	J 62.03.S01	1, 2

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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	Workplace
		min	unit	max	unit					
1*	Deformation and digital manometers, pressure transducers including differential, pressure measuring chains	0 kPa	to	63 kPa	gas absolute pressure	7.4 Pa 0.007 %	Comparison with a reference digital manometer	J62.03.P01, J62.03.P02, J62.03.P03	1, 2	
		63 kPa	to	7 MPa						
		-100 kPa	to	-72 kPa	positive gauge pressure	0.01 % 8.5 Pa 0.2 Pa	Comparison with a standard piston pressure gauge			
		-72 kPa	to	0 kPa						
		0 Pa	to	500 Pa	0.027 % 8.5 Pa	Comparison with a reference digital manometer				
		0.5 kPa	to	16 kPa						
		16 kPa	to	72 kPa	0.007 % 0.005 %	Comparison with a standard piston pressure gauge				
		72 kPa	to	7 MPa						
7 MPa	to	20 MPa								
0 kPa	to	500 kPa	pressure difference at stat. pressure (0.1 to 20.1) MPa	0.014 %						
70 kPa	to	110 kPa	barometric pressure	0.011 %	Comparison with a reference digital manometer					
0 kPa	to	350 kPa	oil gauge pressure, absolute pressure	0.042 kPa 0.009 % 0.46 kPa 0.005 %	Comparison with a standard piston pressure gauge					
350 kPa	to	3 MPa								
3 MPa	to	10 MPa								
10 MPa	to	100 MPa								

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- ⁴ The lowest calibration uncertainty is stated without accounting for the effect of the calibrated meter.

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CMC for the field of measured quantity: Temperature

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	Platinum resistance thermometers	0.01 °C			0.004 °C	Direct measurement at triple point of water	J 62.03.T04	1
		-40 °C to 0 °C 0 °C to 232 °C 232 °C to 420 °C		(1.3 · 10 ⁻⁵ · t + 0.008) °C (4.8 · 10 ⁻⁵ · (t - 232) + 0.011) °C	Comparison with a reference resistance thermometer in a liquid bath.			
2*	Resistance temperature sensors	0.01 °C			0.01 °C	Direct measurement at triple point of water	J 62.03.T01	1, 2
		-40 °C to 0 °C 0 °C to 232 °C 232 °C to 400 °C 400 °C to 550 °C		(5 · 10 ⁻⁵ · t + 0.02) °C (5 · 10 ⁻⁵ · (t - 232) + 0.032) °C (2 · 10 ⁻⁴ · (t - 400) + 0.06) °C	Comparison with a reference resistance thermometer in a liquid bath.			
3	Glass thermometers	-40 °C	to 100 °C		0.03 °C	Comparison with a reference resistance thermometer in a liquid bath	J 62.03.T03	1, 2
4	Thermocouple temperature sensors	-40 °C	to 0 °C 0 °C to 400 °C 400 °C to 550 °C		0.5 °C (2.5 · 10 ⁻⁴ · t + 0.4) °C (2 · 10 ⁻³ · (t - 400) + 0.5) °C	Comparison with a reference resistance thermometer in a liquid bath.	J 62.03.T02	1, 2
5	Temperature sensors with transducer	-40 °C	to 0 °C 0 °C to 400 °C 400 °C to 550 °C		0.03 °C (1 · 10 ⁻⁴ · t + 0.03) °C (4 · 10 ⁻⁴ · (t - 400) + 0.07) °C	Comparison with a reference resistance thermometer in a liquid bath.	J 62.03.T06	1, 2

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		min unit	max unit					
6*	Direct-indicating thermometers	0.01 °C			0.004 °C	Direct measurement at triple point of water	J 62.03.T05	1, 2
		-40 °C to 0 °C 0 °C to 400 °C 400 °C to 550 °C		0.02 °C (1 · 10 ⁻⁴ · t + 0.02) °C (2 · 10 ⁻⁴ · (t - 400) + 0.06) °C	Comparison with a reference resistance thermometer in a liquid bath.			
7*	Temperature measuring chains, including thermal sensors	-30 °C to 0 °C 0 °C to 400 °C 400 °C to 660 °C			0.1 °C (2.5 · 10 ⁻⁴ · t + 0.1) °C 1.5 · 10 ⁻³ · (t - 400) + 0.2) °C	Comparison with a reference electronic thermometer in a vertical furnace	J 62.03.T05	1, 2

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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	Analogue and digital hygrometers, humidity transducers and humidity measuring chains, including humidity probes	10 % RV		70 % RV		(15 to 35) °C	2.0 % RV 2.3 % RV	Comparison with a reference humidity transducer in a climatic chamber	J 62.03.M01	1

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CMC for the field of measured quantity: Electrical quantities

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	DC voltage / DC voltage meters and generators	0 mV	to	220 mV		11 $\mu\text{V/V}$ + 0.4 μV	Direct generation with a calibrator	J 62.03.E01.0, J 62.03.E08.0, J 62.03.E15.0	1, 2	
		220 mV	to	2.2 V		6.4 $\mu\text{V/V}$				
		2.2 V	to	11 V		4.9 $\mu\text{V/V}$				
		11 V	to	22 V		4.7 $\mu\text{V/V}$				
		22 V	to	220 V		6.4 $\mu\text{V/V}$				
		220 V	to	1,100 V		8.5 $\mu\text{V/V}$				
		0 mV	to	100 mV		9 $\mu\text{V/V}$ + 0.3 μV	Direct measurement using a multimeter			
		100 mV	to	1 V		6.2 $\mu\text{V/V}$				
		1 V	to	10 V		5.4 $\mu\text{V/V}$				
		10 V	to	1,000 V		8.2 $\mu\text{V/V}$				
2	DC current / DC current meters and generators	0 μA	to	220 μA		80 $\mu\text{A/A}$ + 6 nA	Direct generation with a calibrator	J 62.03.E03.0, J 62.03.E10.0, J 62.03.E15.0	1, 2	
		220 μA	to	2.2 mA		46 $\mu\text{A/A}$				
		2.2 mA	to	22 mA		44 $\mu\text{A/A}$				
		22 mA	to	220 mA		57 $\mu\text{A/A}$				
		220 mA	to	2.2 A		0.01 %				
		2.2 A	to	20 A		0.048 %				
		20 A	to	120 A		0.035 %				
		120 A	to	1,000 A		0.65 %	Calibrator generation with current simulation using a current coil			
		0 μA	to	10 μA		0.018 % + 1.2 nA	Direct measurement using a multimeter			

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		min unit	max unit					
		10 μ A	to	100 μ A	63 μ A/A			
		100 μ A	to	1 mA	39 μ A/A			
		1 mA	to	10 mA	38 μ A/A			
		10 mA	to	100 mA	54 μ A/A			
		100 mA	to	1 A	0.015 %			
		1 A	to	20 A	0.024 %	Measurement with a multimeter on a current shunt		
		20 A	to	100 A	0.058 %			
3	DC resistance / DC resistance meters and generators					Direct generation by calibrator/reference resistors/resistance boxes	J 62.03.E05.0, J 62.03.E12.0, J 62.03.E13.0, J 62.03.E15.0	1, 2
				0 Ω	50 $\mu\Omega$			
		0.01 Ω	to	0.1 Ω	1 %			
		0.1 Ω	to	1 Ω	0.2 %			
		1 Ω	to	10 Ω	0.05 %			
		10 Ω	to	100 k Ω	0.01 %			
		100 k Ω	to	1 M Ω	0.02 %			
		1 M Ω	to	10 M Ω	0.05 %			
		10 M Ω	to	100 M Ω	0.1 %			
		100 M Ω	to	100 G Ω	1 %			
		100 G Ω	to	1,000 G Ω	4 %			
				1 m Ω	0.01 %			
				10 m Ω	0.01 %			
				100 m Ω	0.01 %			
				1 Ω	0.01 %			
				1.9 Ω	0.011 %			
				10 Ω	27 $\mu\Omega/\Omega$			

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		min unit	max unit					
		220 mV	to 2.2 V	40 Hz to 20 kHz	0.015 %			
		2.2 V	to 11 V	40 Hz to 20 kHz	59 μV/V			
		11 V	to 22 V	40 Hz to 20 kHz	57 μV/V			
		22 V	to 220 V	40 Hz to 20 kHz	65 μV/V			
		220 V	to 1,100 V	50 Hz to 1 kHz	97 μV/V			
		1 mV	to 10 mV	40 Hz to 20 kHz	0.14 %	Direct measurement using a multimeter		
		10 mV	to 10 V	40 Hz to 20 kHz	0.034 %			
		10 V	to 100 V	40 Hz to 20 kHz	0.040 %			
		100 V	to 1,000 V	40 Hz to 20 kHz	0.080 %			
5	AC current / AC current meters and generators	10 μA	to 220 μA	40 Hz to 1 kHz	0.026 %	Direct generation with a calibrator	J 62.03.E04.0 J 62.03.E11.0 J 62.03.E15.0	1, 2
		220 μA	to 22 mA	40 Hz to 1 kHz	0.017 %			
		22 mA	to 220 mA	40 Hz to 1 kHz	0.016 %			
		220 mA	to 2.2 A	40 Hz to 1 kHz	0.033 %			
		2.2 A	to 20 A	40 Hz to 1 kHz	0.11 %			
		20 A	to 120 A	50 Hz to 1 kHz	0.11 %			
		120 A	to 1,000 A	45 Hz to 65 Hz	0.67 %	Calibrator generation with current simulation using a current coil		
		10 μA	to 100 μA	45 Hz to 5 kHz	0.11 %	Direct measurement using a multimeter		
		100 μA	to 100 mA	45 Hz to 5 kHz	0.092 %			
		100 mA	to 1 A	45 Hz to 5 kHz	0.11 %			
		1 A	to 100 A	50 Hz to 1 kHz	0.14 %	measurement with a multimeter on a current shunt		

The Appendix is an integral part of
Certificate of Accreditation No: 19/2024 of 18/01/2024

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6	Electrical power/power meters (50 Hz, up to 740 V)	0.1 kW	to 37 kW	(0.011 to 11) A $\cos \varphi = 1$ $\cos \varphi = 0.8$ to 0.9 $\cos \varphi = 0.1$ to 0.7	0.058 % 0.093 % 0.14 %	Direct generation with a calibrator	J 62.03.E14.0	1
		(11 to 50) A $\cos \varphi = 1$ $\cos \varphi = 0.8$ to 0.9 $\cos \varphi = 0.1$ to 0.7	0.075 % 0.11 % 0.16 %					
		37 kW	to 740 kW	(50 to 1000) A $\cos \varphi = 1$ $\cos \varphi = 0.8$ to 0.9 $\cos \varphi = 0.1$ to 0.7	0.76 % 0.77 % 0.78 %	Calibrator generation with current simulation using a current coil		
7	pH / pH meters (only the electrical part of the instrument)	0 pH	to 14 pH		0.001 pH	Simulation of pH using voltage	J 62.03.Q01.0	1, 2
8	Conductivity / conductivity meters (only the electrical part of the instrument)	0.1 μ S 1 μ S 10 μ S 100 mS	to 1 μ S 10 μ S 100 mS 500 mS		0.024 % 0.012 % 0.012 % 0.058 %	Simulation of conductivity using resistance	J 62.03.Q02.0	1, 2
9	Measurement and simulation of temperature sensors / temperature gauges	0 Ω	to 100 Ω	OST ⁴	20 m Ω	Direct resistance generation by a calibrator/resistance box	J 62.03.T07	1, 2
		100 Ω 400 Ω	to 400 Ω 4,000 Ω		0.01 % + 10 m Ω 0.015 % + 20 m Ω			
		-10 mV	to 60 mV	TC ⁵	0.007 % + 4 μ V	Direct voltage generation by a calibrator		

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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					
10	Mains impedance / Inspection instruments			25 mΩ	5 mΩ	Direct generation with a calibrator	62.03.E15.0 chap. 7.3.6	1, 2
				50 mΩ	5 mΩ			
				100 mΩ	5 mΩ			
				330 mΩ	7 mΩ			
				500 mΩ	8 mΩ			
				1 Ω	10 mΩ			
				1.8 Ω	18 mΩ			
				5 Ω	30 mΩ			
				10 Ω	60 mΩ			
				18 Ω	100 mΩ			
				50 Ω	300 mΩ			
				100 Ω	500 mΩ			
				180 Ω	1 Ω			
				500 Ω	2.5 Ω			
		1 kΩ	5 Ω					
		1.8 kΩ	10 Ω					
11	Leakage current / Inspection instruments	0.1 mA	to	1 mA	0.5 %	Direct generation with a calibrator	62.03.E15.0 chap. 7.3.7	1, 2
		1 mA	to	30 mA	0.32 %			

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 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).

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

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CMC for the field of measured quantity: Time and frequency quantities

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	Frequency / Electronic counters and generators	1 Hz	to	100 Hz		$2.5 \cdot 10^{-6}$ Hz	Direct generation (measurement) by a generator (counter) controlled from a GPS receiver	J 62.03.E06.0, J 62.03.E07.0	1	
		100 Hz	to	1 kHz		$1.2 \cdot 10^{-6}$ Hz				
		1 kHz	to	10 kHz		$1.5 \cdot 10^{-6}$ Hz				
		10 kHz	to	100 kHz		$1.6 \cdot 10^{-6}$ Hz				
		100 kHz	to	1 MHz		$3.6 \cdot 10^{-5}$ Hz				
		1 MHz	to	10 MHz		$3.6 \cdot 10^{-5}$ Hz				
		10 MHz	to	100 MHz		$1.5 \cdot 10^{-4}$ Hz				
		100 MHz	to	1 GHz		$3.5 \cdot 10^{-2}$ Hz				
2	Time / Inspection equipment	10 ms	to	50 ms		0.52 %	Direct generation with a calibrator	62.03.E15.0 chap. 7.3.9	1, 2	
		50 ms	to	100 ms		0.27 %				
		100 ms	to	500 ms		0.07 %				
		500 ms	to	1 s		0.045 %				
		1 s	to	5 s		0.025 %				

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 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).