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

Český metrologický institut
CAB number 2202, CMI Calibration Laboratory
Okružní 772/31, 638 00 Brno

Calibration laboratory locations:

1.	**Regional Inspectorate Praha**	Radiová 1136/3, 102 00 Praha 10 – Hostivař
2.	**Regional Inspectorate České Budějovice**	U Sirkárny 33/5, 370 04 České Budějovice 4
3.	**Regional Inspectorate Plzeň**	Bendova 539/11, 301 00 Plzeň
4.	**Regional Inspectorate Liberec**	Slunečná 23, 460 01 Liberec
5.	**Regional Inspectorate Most**	Vladislava Vančury 1428/7, 434 01 Most
6.	**Regional Inspectorate Pardubice**	Průmyslová 455, 530 03 Pardubice
7.	**Regional Inspectorate Brno**	Okružní 31, 638 00 Brno
8.	**Regional Inspectorate Jihlava**	Romana Havelky 17, 586 01 Jihlava
9.	**Regional Inspectorate Kroměříž**	Kotojedy 73, 767 01 Kroměříž
10.	**Regional Inspectorate Opava**	Gudrichova 41, 746 01 Opava
11.	**Regional Inspectorate Olomouc**	I.P. Pavlova 671/141, 779 00 Olomouc
12.	**Laboratories for Primary Metrology in Prague**	V Botanice 4, 150 72 Praha 5
13.	**TESTCOM Praha**	Hvožďanská 3, 148 00 Praha 4

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CMC for the field of measured quantity: Length

Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range min.	unit		Nominal range max.	unit	Parameter(s) of the measurand	Lowest stated expanded mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Loca-tion
1*	Strain gauges for mechanical testing of materials	0 mm	to	25 mm				0.9 µm	ČSN EN ISO 9513	151-MP-C003	1, 6, 10
		25 mm	to	50 mm				1.3 µm			
		50 mm	to	1,000 mm				20 µm			
		0 mm	to	10 mm				0.9 µm	ASTM E83	151-MP-C005	
		10 mm	to	50 mm				1.3 µm			
		50 mm	to	1,000 mm				20 µm			
2	Gauge blocks	0.3 mm	to	1,000 mm			2nd order	(0.5L +0.05) µm	Mechanical comparison with a standard using a comparator or length gauge	614-MP-C033 (ČSN EN ISO 3650)	4, 6, 7
							3rd order	(1L +0.1) µm			
							4th order	(2L +0.2) µm			
							5th order	(5L +0.5) µm			
3*	Mechanical comparators of nominal length (0.3 to 100) mm	-0.01 mm	to	+0.01 mm				0.032 µm	Comparison using gauge blocks	614-MP-C005	4, 7
4*	Length measuring instruments and gauges	0 m	to	20 m				(0.4L +0.02) µm	Direct measurement by a laser interferometer	614-MP-C006	7, 12
5	Micrometers	0 mm	to	500 mm				(5L +1.5) µm	Comparison with gauge blocks and gauges	614-MP-C008	4, 6, 7
6	Calipers	0 mm	to	1,000 mm				20 µm	Comparison with gauge blocks, gauges and rings	614-MP-C009	4, 6, 7
7	Length measuring instruments, meters and gauges	0 mm	to	1,000 mm				(2L +0.2) µm	Direct measurement by a length gauge	614-MP-C029	4, 6, 7

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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 mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Loca-tion
8	Test sieves	0.005	mm	to	150	mm		(4L +1.5) μm	Calibration on a 2D optical instrument, using slide gauge or limit gauges	614-MP-C102	6, 7
9	Roundness / balls, rings, cylinders, cones (Maximum diameter 350 mm)	-2	mm	to	+2	mm		Q[0.025;0.01R] μm	Direct measurement by a ring gauge	614-MP-C103	7
	Straightness and parallelity / rings, cylinders, cones, straightness and parallelity standards (Maximum horizontal path: 200 mm Maximum vertical path: 300 mm)	-2	mm	to	+2	mm		Q[0.2;0.01R] μm			
10	Diameter / thread limit gauges, plain limit gauges	1	mm	to	100	mm		2.5 μm	Calibration on IAC MasterScanner XP 10060 analyzer	614-MP-C106	7
11	Gauges, standards, artefacts	0	mm	to	600	mm		(2.5L +1.2) μm	Calibration on a linear height gauge	614-MP-C104	6
		0	mm	to	2,550	mm		Q[0.09; 0.4L] μm	Measurement on a coordinate measuring machine	815-MP-C503	7, 12
12*	Coordinate measuring machine / system								Comparison with the standard	815-MP-C501	7, 12
	- tactile	0	m	to	6	m		Q[0.01;0.2L] μm			
	- optical	0	m	to	3	m		Q[0.01;0.2L] μm			
	- multisensor	0	m	to	3	m		Q[0.01;0.2L] μm			

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Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range min.	unit		Nominal range max.	unit	Parameter(s) of the measurand	Lowest stated expanded mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Loca-tion
	- optical 3D	0	m	to	3	m		Q[0.3;1L] μm			
	- articulated arm	0	m	to	4.5	m		Q[0.3;1L] μm			
	- computer tomography	0	m	to	1.5	m		Q[0.3;1L] μm			
	- laser-trackers	0	m	to	30	m		Q[0.3;1L] μm			
13	Tape measures, length and distance gauges								Comparison using a tape measure, micrometer head	815-MP-C510	6, 12
		0.3	m	to	30	m		Q[100; 3L] μm			
		0	m	to	300	m		Q[20; 20L] μm			
14*	Machines with electronic measurement of cubic content of wooden logs - length								Comparison using an artefact measured by a standard or direct comparison with a standard	411-MP-C003	4
		0	m	to	30	m		7 mm			
	- diameter	5	cm	to	100	m		0.2 mm			
15*	Roughness / setting standard	0.01	μm	to	1	μm	Pt	Q[20; 50Pt] nm	Contact measurement	813-MP-C306	12
		1	μm	to	100	μm	Pt	Q[20; 20Pt] nm			
	- geometrical standard type C						Ra, Rq, Rpm, Rk profiles, material ratios, Rsk, Rp3z, Rku, Rc, Rdq, Rδc				
		0.01	μm	to	100	μm		Q[10; 30Ra] nm			
							Rmax, RzISO, Rp, Rv, Rz, Rt, Rz1, Rz2, Rz3, Rz4, Rz5	Q[20; 40Rp] nm			
	- geometrical standard type D						Ra, Rq, Rpm, Rk profiles, material ratios, Rsk, Rp3z, Rku, Rc, Rdq, Rδc	Q[10; 40Ra] nm			
		0.01	μm	to	100	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 mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Loca-tion
	- geometrical standard type C and D	0.01	µm	to	1	µm	Rmax, RzISO, Rp, Rv, Rz, Rt, Rz1, Rz2, Rz3, Rz4, Rz5 Horizontal characteristics	Q[20; 50Rp] nm Q[20; 50Sm] nm			
16*	Roughness meter for setting standards	0.01	µm	to	1	µm	All characteristics	3.4 %	Contact measurement	813-MP-C306	12
		1	µm	to	6,000	µm		1.2 %			
	Roughness meter for geometrical standards	1	µm	to	6,000	µm		3.4 %			
17	Counting efficiency / Optical counters of aerosol particles	0	η	to	5	η	Particle size (0 to 50) µm	9 %	Comparison with PSL particles	614-MP-C105 ISO 21501-4, cl. 6.2, 6.4, 6.6	7
18	Linear thermal expansion / gauge blocks to 100 mm	0.1	µm·m^{-1}·K^{-1}	to	100	µm·m^{-1}·K^{-1}	At a temperature difference of 4 °C or more	0.29 µm·m^{-1}·K^{-1}	Measurement of length change at a defined temperature change	411-MP-C010	12
							At a temperature difference of 3 °C or more	0.35 µm·m^{-1}·K^{-1}			
							At a temperature difference of 2 °C or more	0.49 µm·m^{-1}·K^{-1}			
							At a temperature difference of 1 °C or more	0.95 µm·m^{-1}·K^{-1}			
19*	Length gauges rolling, contactless	0.1	m	to	10^5	m		0.005 %	Comparison using a tape measure, non-contact length gauges or non-contact length gauge reference standard	620-MP-C002	9
20*	Length sensors, thickness sensors, indicators	0	mm	to	150	mm		0.2 µm	Comparison with parallel gauge blocks	411-MP-C011	4

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L nominal length expressed in metres

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CMC for the field of measured quantity: Plane angle

Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range				Parameter(s) of the measurand	Lowest stated expanded mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Location
		min.	unit	max.	unit					
1	Autocollimators	-4,000	″ to	+4,000	″		Q[0.01; $2\cdot10^{-5}\cdot\varphi$; $6\cdot10^{-9}\cdot\varphi^2$]	Comparison with a small angle generator	411-MP-C004	4
2*	Levels, autocollimators, inclinometers	-180	° to	180	°		0.05″	Comparison with a rotary table or autocollimator	411-MP-C004	4
3*	Index heads and tables, goniometers, instruments for checking angular divisions, angle encoders, torque wrench angle sensors, built-in angle sensors, polygons, angle gauges, optical prisms	0	° to	360	°		0.03″	Comparison with an optical polygon, autocollimator or rotary table	411-MP-C006	4, 9
4	Polygons, optical prisms, angle gauges	0	° to	360	°		0.05″	Measurement using two autocollimators	411-MP-C006	4
5	Angle gauges	0	° to	360	°		60″	Comparison with angle gauges	411-MP-C006	4

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φ nominal angle of rotation in [″]

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CMC for the field of measured quantity: Volume, flow rate

Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range min.	unit		max.	unit	Parameter(s) of the measurand	Lowest stated expanded mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Location
1	Static volume/ Measuring vessels	0.2 mL	to	21,000 mL			Distilled water	0.01 %	Gravimetric method	616-MP-C016 (ČSN EN ISO 4787, EURAMET cg-19)	6, 7
2*	Static volume/ metal measuring vessels – limit, scaled, with a graduation mark	2 L	to	1,000 L			Distilled water / water	0.01 %	Gravimetric method	615-MP-C151 (ČSN EN ISO 4787, EURAMET cg-19)	6, 7, 10
3	Static volume / Piston volume meters piston pipettes and syringes	0.5 µL	to	10,000 µL			Distilled water	0.13 % + 0,01 µL	Gravimetric method	616-MP-C017 (ČSN EN ISO 8655-6 EURAMET cg-19)	6, 7
	other piston gauges	10 µL	to	200,000 µL				0.04 %.			
4*	Static volume/ Stationary reservoirs and tanks	5 dm^3	to	500 dm^3				0.3 %	Volume method	551-MP-C401	6
		20 dm^3	to	100 m^3				0.3 %	Flow method		
5	Volume and velocity gas meters and flow meters for gas	0.06 $m^3 \cdot h^{-1}$	to	1,200 $m^3 \cdot h^{-1}$				0.25 %	Flow method	512-MP-C103, chap. 5.1	6
		8 $m^3 \cdot h^{-1}$	to	10,000 $m^3 \cdot h^{-1}$				0.19 %	Volume method	512-MP-C103, chap. 5.2	
		0.3 $m^3 \cdot h^{-1}$	to	1,600 $m^3 \cdot h^{-1}$				0.20 %		512-MP-C103, chap. 5.3	
		0.016 $m^3 \cdot h^{-1}$	to	16 $m^3 \cdot h^{-1}$			Q_{min} to $0.1Q_{max}$	0.65 %		512-MP-C103, chap. 5.4	
							$0.1Q_{max}$ to Q_{max}	0.28 %			

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		0.02	$m^3 \cdot h^{-1}$	to	160	$m^3 \cdot h^{-1}$	Q_{min} to $0.1Q_{max}$	0.70 %		512-MP-C103, chap. 5.5	
				to			$0.1Q_{max}$ to Q_{max}	0.50 %			
		9.5	$dm^3 \cdot h^{-1}$	to	760	$dm^3 \cdot h^{-1}$		0.16 %	Gravimetric method	512-MP-C103, chap. 5.6	
		0.5	$m^3 \cdot h^{-1}$	to	280	$m^3 \cdot h^{-1}$		0.07 %	Volume method	512-MP-C103, chap. 5.7	
6	Float flow meters	0.01	$m^3 \cdot h^{-1}$	to	0.75	$m^3 \cdot h^{-1}$		1 %	Volume method	512-MP-C104	6
		0.75	$m^3 \cdot h^{-1}$	to	1.3	$m^3 \cdot h^{-1}$		1.3 %			
		1.3	$m^3 \cdot h^{-1}$	to	25	$m^3 \cdot h^{-1}$		1 %			
7	Conversion number Z / Gas calculators	0.8		to	275		(–30 to +80) °C (0.8 to 135) bar	0.06 %	Temperature and pressure measurement by volume flow simulation	512-MP-C105	6
8	Flow velocity anemometers	0.3	$m \cdot s^{-1}$	to	5	$m \cdot s^{-1}$	Air	0.3 % + 0.01 $m \cdot s^{-1}$	Comparison with a LDA standard	615-MP-C147	7
		5	$m \cdot s^{-1}$	to	50	$m \cdot s^{-1}$		0.5 %			
		0.5	$m \cdot s^{-1}$	to	5	$m \cdot s^{-1}$		0.5 % + 0.01 $m \cdot s^{-1}$	Comparison with a standard – Pitot tube		
		5	$m \cdot s^{-1}$	to	50	$m \cdot s^{-1}$		0.7 %			
	anemometers in the traction line	0.05	$m \cdot s^{-1}$	to	0.5	$m \cdot s^{-1}$		0.5 % + 0.005 $m \cdot s^{-1}$		615-MP-C149	

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9	Water flow meters (water meters), flow meters of heat meters and flow meters tested by water						Water			Gravimetric method	615-MP-C142	7
	volume or volume flow rate	0.05 $m^3 \cdot h^{-1}$	to		150 $m^3 \cdot h^{-1}$			(10 to 30) °C	0.10 %			
	mass or mass flow rate	0.05 $t \cdot h^{-1}$	to		150 $t \cdot h^{-1}$			(10 to 30) °C	0.10 %			
	volume or volume flow rate	0.002 $m^3 \cdot h^{-1}$	to		0.005 $m^3 \cdot h^{-1}$			(10 to 90) °C	0.25 %			
		0.005 $m^3 \cdot h^{-1}$	to		0.012 $m^3 \cdot h^{-1}$				0.16 %			
		0.012 $m^3 \cdot h^{-1}$	to		0.025 $m^3 \cdot h^{-1}$				0.09 %			
		0.025 $m^3 \cdot h^{-1}$	to		0.050 $m^3 \cdot h^{-1}$				0.07 %			
		0.050 $m^3 \cdot h^{-1}$	to		10 $m^3 \cdot h^{-1}$				0.05 %			
	volume or volume flow rate	0.002 $m^3 \cdot h^{-1}$	to		0.1 $m^3 \cdot h^{-1}$			(10 to 30) °C	0.10 %	Volume method with a piston		
								(30 to 90) °C	0.12 %			
		0.1 $m^3 \cdot h^{-1}$	to		6 $m^3 \cdot h^{-1}$			(10 to 30) °C	0.06 %			
								(30 to 90) °C	0.08 %			
	volume or volume flow rate	0.7 $m^3 \cdot h^{-1}$	to		60 $m^3 \cdot h^{-1}$			(10 to 30) °C	0.10 %	Gravimetric method		
								(30 to 90) °C	0.12 %			
10	Volume flow rate or volume / Flow meters	3 $dm^3 \cdot min^{-1}$	to		1,000 $dm^3 \cdot min^{-1}$		Hydrocarbons based liquids		0.10 %	Volume method with a piston	615-MP-C143	7

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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 mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Location
	for liquids other than water										
11*	Mass flow rate or mass / meters and measuring systems for cryogenic liquids	70	$kg \cdot min^{-1}$	to	400	$kg \cdot min^{-1}$	Cryogenic liquids	0.50 %	Mass method with a measuring loop	615-MP-C148	7
12	Mass or mass flow rate / Micro-flow meters	1	$g \cdot h^{-1}$	to	50	$g \cdot h^{-1}$	Distilled water (20 to 30) °C	0.30 %	Gravimetric method	615-MP-C158	7
		50	$g \cdot h^{-1}$	to	6, 000	$g \cdot h^{-1}$		0.16 %			
	Volume or volume flow rate / Micro-flow meters	1	$ml \cdot h^{-1}$	to	50	$ml \cdot h^{-1}$		0.30 %	Volumetric method with a flow meter or a piston		
		50	$ml \cdot h^{-1}$	to	6 ,000	$ml \cdot h^{-1}$		0.16 %			

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v velocity in $m \cdot s^{-1}$

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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 mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Location
		min.	unit	max.	unit					
1	Mass of weights	1	mg	20	mg		0.0010 mg	Comparison with a reference weight	612-MP-C131	1 to 11
				50	mg		0.0013 mg			
				100	mg		0.0016 mg			
				200	mg		0.0020 mg			
				500	mg		0.0026 mg			
				1	g		0.003 mg			
				2	g		0.004 mg			
				5	g		0.005 mg			
				10	g		0.006 mg			
				20	g		0.008 mg			
				50	g		0.010 mg			
				100	g		0.016 mg			
				200	g		0.030 mg			
				500	g		0.080 mg			
				1	kg		0.15 mg			
				2	kg		0.30 mg			
				5	kg		0.80 mg			
				10	kg		1.5 mg			
				20	kg		3.3 mg			
				50	kg		8 mg			
				100	kg		50 mg			
				200	kg		100 mg			
				500	kg		250 mg			
				1,000	kg		500 mg			

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Ord. number [1]	Calibrated quantity / Subject of calibration	Nominal range				Parameter(s) of the measurand		Lowest stated expanded mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Location
		min.	unit	max.	unit						
2*	Balances with non-automatic and automatic function								Loading using a reference weight	612-MP-C132	1-11
		0 g	to	20 kg		Weight	E_2	$5 \cdot 10^{-7}$			
		20 kg	to	50 kg			F_1	$1.6 \cdot 10^{-6}$			
		50 kg	to	600 kg			F_2	$5 \cdot 10^{-6}$			
		600 kg	to	200,000 kg			M	$1.6 \cdot 10^{-5}$			

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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 mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Loca-tion
		min.	unit	max.	unit					
1*	Acceleration of linear harmonic mechanical vibrations / vibration sensors	0.01	$m \cdot s^{-2}$	to 400	$m \cdot s^{-2}$	0.1 Hz to 5 kHz 5 to 20 kHz	1.0 % 1.5 %	Comparison with a standard sensor	812-MP-C207	12
2*	Sensitivity of vibration sensors / vibration transducers[4)]	0.01	$pC/m \cdot s^{-2}$	to 1,000	$pC/m \cdot s^{-2}$	0.1 Hz to 5 kHz 5 to 20 kHz	1.0 % 1.5 %	Comparison with a standard sensor	812-MP-C207	12
		0.01	$mV/m \cdot s^{-2}$	to 10,000	$mV/m \cdot s^{-2}$	0.1 Hz to 5 kHz 5 to 20 kHz	1.0 % 1.5 %			
		0.1	$mV/m \cdot s^{-1}$	to 10,000	$mV/m \cdot s^{-1}$	0.1 Hz to 5 kHz 5 to 20 kHz	1.0 % 1.5 %			
3*	Transmission / amplifiers and filters	10^{-7}	V/V	to 10^{7}	V/V	0.1 Hz to 100 kHz	0.5 % or[6] 0.1 dB	By simulated electrical signal	812-MP-C207	12
		0.001	mV/pC	to 1,000	mV/pC					
4*	Acceleration / vibrometers without a sensor[4]	0.01	$m \cdot s^{-2}$	to 10,000	$m \cdot s^{-2}$	0.1 Hz to 100 kHz	0.5 %	By simulated electrical signal	812-MP-C207	12
	Velocity / vibrometers without a sensor4	0.01	$m \cdot s^{-1}$	to 1,000	$mm \cdot s^{-1}$	0.1 Hz to 100 kHz	0.5 %			
5*	Maximum value of half-sine wave mechanical shock / acceleration sensors[4]	1	$m \cdot s^{-2}$	to 100,000	$m \cdot s^{-2}$		1.2 %	Comparison with a standard sensor	812-MP-C208	12
6*	Vibration frequency	0.1	Hz	to 10	kHz		0.01 %	Measurement using a counter	812-MP-C207; 812-MP-C210	12

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Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range				Parameter(s) of the measurand	Lowest stated expanded mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Loca-tion
		min.	unit	max.	unit					
7*	Velocity of transport vehicles and objects	1	$km \cdot h^{-1}$	999	$km \cdot h^{-1}$		0.2 $km \cdot h^{-1}$	Comparison with a standard speedometer	812-MP-C209	
		0.1	$km \cdot h^{-1}$	320	$km \cdot h^{-1}$		0.01 %	Measurement using an optoelectronic delay line		
8*	Revolution – impulse generators and meters[5]	0.01	min^{-1}	100,000	min^{-1}		1 %	Contact method	812-MP-C212	12
		0.01	s^{-1}	10,000,000	s^{-1}		10^{-10}	Contactless method		
9*	Linear motion velocity / velocity meters for mechanical parts	0.01	$mm \cdot s^{-1}$	1,000	$m \cdot s^{-1}$		0.01 %	Measurement of time and distance using an electric, optoelectronic or electronic delay line	812-MP-C201	12
10*	Linear motion acceleration / acceleration meters for mechanical parts	-200	$m \cdot s^{-2}$	200	$m \cdot s^{-2}$		0.01 %	Measurement of time and distance using an electric, optoelectronic or electronic delay line	812-MP-C201	12

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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).

[4] Acceleration can be specified also in g, sensor sensitivity in pC/g, resp. mV/g units, where 1 g = 9.81 $m.s^{-2}$

[5] Revolutions - impulses can be specified also in Hz as the number of revolutions - impulses per 1 s.

[6] Acc. To the type of transmission expression

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CMC for the field of measured quantity: Force, mechanical tests

Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range				Parameter(s) of the measurand	Lowest stated expanded mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Loca-tion
		min.	unit	max.	unit					
1	Force / force-proving instruments	1 N	to	20 kN			0.00004	Calibration using a standard instrument or by suspending weights (ČSN EN ISO 376)	811-MP-C101	12
		20 kN	to	1 MN			0.0002			
2*	Force / force-proving instruments	0.02 N	to	5 N			0.002	Calibration by a force transmission standard (force-proving instrument) or by suspending weights	811-MP-C111	1, 4, 6, 9, 10
		5 N	to	2 MN			0.001			
3*	Torque / torque measuring instruments	0.02 N·m	to	0.2 N·m			0.001	Calibration by a standard torque measuring instrument, torque transmission standard (torque sensor) or using weights and torque arms	811-MP-C102	4, 9, 12
		0.2 N·m	to	1 N·m			0.00009			
		1 N·m	to	100 N·m			0.00008			
		100 N·m	to	1 kN·m			0.0001			
		1 kN·m	to	10 kN·m			0.0004			
4*	Torque / torque wrenches	0.02 N·m	to	3 kN·m			0.005	Calibration by a torque transmission standard (torque sensor) (ČSN EN ISO 6789-1, ČSN EN ISO 6789-2)	811-MP-C103	4, 9, 12

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Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range min. unit		Nominal range max. unit	Parameter(s) of the measurand	Lowest stated expanded mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Loca-tion
5*	Torque / equipment for the calibration of torque wrenches	0.02 N·m 500 N·m	to to	500 N·m 10 kN·m		0.001 0.0004	Calibration by reference torque wrench, torque transmission standard (torque sensor) or by means of weights and torque arms	811-MP-C104	9, 12
6*	Torque / tightening tools and systems	0.25 N·m	to	10 kN·m		0.005	Calibration by a calibration device for torque wrenches, torque screwdrivers and tighteners	411-MP-C103	4, 9
7*	Machines for mechanical testing of materials	0.02 N	to	5 MN	Pressure	0.28 %	Calibration by a force transmission standard (force-proving instrument) or weights (ASTM E4, ČSN EN ISO 7500)	151-MP-C001; 151-MP-C004	1, 4, 6, 10
		0.02 N	to	2 MN	Tension	0.28 %			
		200 kN	to	2 MN	Self-setting of the upper pressure plate	0.34 %	ČSN EN 12390-4 Annex A	151-MP-C001	1, 4 ,6, 10
		0.01 kN/s	to	150 kN/s	Increase in force	0.7 %	Direct comparison with force and time standards, program AED PANEL32	151-MP-C006	6
8*	Pendulum hammers for notch impact strength testing of materials	0.01 J	to	2.5 kJ		0.42 % + 0.1 J	Calibration by a force transmission standard (force-proving instrument) and length standard (ČSN EN ISO 148-2,	151-MP-C002	1, 6, 10

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Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range min.	unit		Nominal range max.	unit	Parameter(s) of the measurand	Lowest stated expanded mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Loca-tion
									ČSN EN ISO 13802, ASTM E23, BS 131-4)		
9*	Hardness plates and products	10	HRA	to	100	HRA	Rockwell A	0.2 HR	ČSN EN ISO 6508-3, ASTM E18	813-MP-C301	12
		10	HRB	to	110	HRB	Rockwell B				
		10	HRC	to	80	HRC	Rockwell C				
		10	HRD	to	90	HRD	Rockwell D				
		10	HREW	to	110	HREW	Rockwell E				
		10	HRFW	to	110	HRFW	Rockwell F				
		10	HRGW	to	100	HRGW	Rockwell G				
		10	HRHW	to	110	HRHW	Rockwell H				
		6	HRKW	to	110	HRKW	Rockwell K				
		10	HR15N	to	100	HR15N	Rockwell 15N	0.26 HR			
		10	HR30N	to	100	HR30N	Rockwell 30N				
		10	HR45N	to	90	HR45N	Rockwell 45N				
		10	HR15TW	to	100	HR15TW	Rockwell 15T				
		10	HR30TW	to	90	HR30TW	Rockwell 30T				
		6	HR45TW	to	80	HR45TW	Rockwell 45T				
		20	HV	to	3,000	HV	Vickers HV0.01 to HV0.5	0.59 %	ČSN EN ISO 6507-3, ASTM E384	813-MP-C301	12
							HV0.5 to HV1	0.51 %			
							HV1 to HV5	0.44 %			
							HV5 to HV10	0.44 %			
							HV10 to HV30	0.38 %			
							HV30 to HV50	0.36 %			
							HV50 and more	0.34 %			

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Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range min. unit		Nominal range max. unit	Parameter(s) of the measurand	Lowest stated expanded mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Loca-tion
		20 HBW	to	650 HBW	Brinell scale with 2.5mm and 1mm balls Scale with a 5mm ball Scale with a 10 mm ball	0.24 % 0.20 % 0.20 %	ČSN EN ISO 6506-3, ASTM E10	813-MP-C301	12
		1 ShA		110 ShA	Shore	0.26 Sh	Direct measurement using a standard hardness tester	813-MP-C308	12
		1 °IRHD		110 °IRHD	IRHD N, H, L	0.44 °IRHD			
		1 °IRHD		110 °IRHD	IRHD M	0.70 °IRHD			
10	Rockwell penetrating bodies - cone angle - radius of curvature	 118 ° 100 µm	 to to	 122 ° 300 µm		 0.04° 0.08 µm	ČSN EN ISO 6508-2	813-MP-C301	12
11	Vickers penetrating bodies - angle of opposite walls	134 °	to	138 °		0.04°	ČSN EN ISO 6507-2	813-MP-C301	12
12*	Hardness – hardness testers	10 HRA	to	100 HRA	Rockwell A	0.38 HR	ČSN EN ISO 6508-2, ASTM E18	813-MP-C307	7, 10
		10 HRBW	to	110 HRBW	Rockwell B				
		10 HRC	to	80 HRC	Rockwell C				
		10 HRD	to	90 HRD	Rockwell D				
		10 HREW	to	110 HREW	Rockwell E				
		10 HRFW	to	100 HRFW	Rockwell F				
		10 HRGW	to	100 HRGW	Rockwell G				
		10 HRHW	to	110 HRHW	Rockwell H				

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Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range min. unit		Nominal range max. unit	Parameter(s) of the measurand	Lowest stated expanded mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Loca-tion
		6 HRKW	to	110 HRKW	Rockwell K				
		10 HR15N	to	100 HR15N	Rockwell 15N	0.57 HR			
		10 HR30N	to	100 HR30N	Rockwell 30N				
		10 HR45N	to	90 HR45N	Rockwell 45N				
		10 HR15TW	to	100 HR15TW	Rockwell 15T				
		10 HR30TW	to	90 HR30TW	Rockwell 30T				
		6 HR45TW	to	80 HR45TW	Rockwell 45T				
		20 HV	to	225 HV	Vickers	0.32 %	ČSN EN ISO 6507-2, ASTM E384		
		225 HV	to	700 HV					
		700 HV	to	3,000 HV					
		20 HBW		200 HBW	Brinell	0.30 %	ČSN EN ISO 6506-2; ASTM E10		
		200 HBW		500 HBW					
		500 HBW		650 HBW					
		1 ShA		110 ShA	Shore A	0.22 ShA	Combined measurement (force, hardness, penetration of the penetrating body)	813-MP-C308 (chap. 5.1.)	12
		1 ShB		110 ShB	Shore B	0.22 ShB			
		1 ShC		110 ShC	Shore C	0.22 ShC			
		1 ShD		110 ShD	Shore D	0.22 ShD			
		1 ShD		110 ShD	Shore DO	0.22 ShDO			
		1 ShDO		110 ShDO	IRHD M	0.42 °IRHD M			
		1 °IRHD M		110 °IRHD M	IRHD N	0.22 °IRHD N			
		1 °IRHD N		110 °IRHD N	IRHD H	0.22 °IRHD H			
		1 °IRHD H		110 °IRHD H	IRHD L	0.22 °IRHD L			

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CMC for the field of measured quantity: Pressure, mechanical stress

Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range min.	unit		Nominal range max.	unit	Parameter(s) of the measurand		Lowest stated expanded mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Loca-tion
1	Deformation pressure gauges; digital pressure gauges; piston pressure gauges	1	Pa	to	20	Pa	Absolute pressure	Gas	10 %	Cross-floating method, determination of the effective area of the pressure gauge and the mass of weights	133-MP-C007, 601-MP-C046, 601-MP-C047	1, 6, 10
		20	Pa	to	5,000	Pa			3.5 Pa			
		5	kPa	to	18	kPa			3.8 Pa			
		18	kPa	to	2,000	kPa			$9 \cdot 10^{-5} \cdot p$			
		2	MPa	to	8	MPa			$2.3 \cdot 10^{-5} \cdot p$ + 56 Pa			
		-100	kPa	to	-10	kPa	Positive gauge pressure	Gas	$8.5 \cdot 10^{-5} \cdot \lvert p_e \rvert$			
		-10	kPa	to	-3.45	kPa			$9.3 \cdot 10^{-5} \cdot \lvert p_e \rvert$			
		-3.45	kPa	to	-2	kPa			32 Pa			
		-2,000	Pa	to	-6	Pa			$1.3 \cdot 10^{-4} \cdot \lvert p_e \rvert$ + 48 Pa			
		-6	Pa	to	6	Pa			1.5 Pa			
		6	Pa	to	2,000	Pa			$1.3 \cdot 10^{-4} \cdot p_e$ + 48 Pa			
		2	kPa	to	3.45	kPa			32 Pa			
		3.45	kPa	to	10	kPa			$9.3 \cdot 10^{-5} \cdot p_e$			
		10	kPa	to	100	kPa			$8.5 \cdot 10^{-5} \cdot p_e$			
		100	kPa	to	345	kPa			$8.8 \cdot 10^{-5} \cdot p_e$			
		345	kPa	to	2,000	kPa			$9 \cdot 10^{-5} \cdot p_e$ + 1 Pa			
		2	MPa	to	8	MPa			$2.3 \cdot 10^{-5} \cdot p_e$ +55 Pa			
		20	kPa	to	600	kPa	Absolute pressure $p = p_e + p_{amb}$	Liquid	49 Pa			
		0.6	MPa	to	40	MPa			$8.2 \cdot 10^{-5} \cdot p_e$ + 10 Pa			

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Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range min. unit		Nominal range max. unit	Parameter(s) of the measurand	Lowest stated expanded mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Location
		40 MPa	to	100 MPa		$8.7 \cdot 10^{-5} \cdot p_e + 10$ Pa			
		100 MPa	to	120 MPa		$1.2 \cdot 10^{-4} \cdot p_e + 10$ Pa			
					Positive gauge pressure Liquid				
		20 kPa	to	600 kPa		48 Pa			
		0.6 MPa	to	40 MPa		$8.2 \cdot 10^{-5} \cdot p_e$			
		40 MPa	to	100 MPa		$8.7 \cdot 10^{-5} \cdot p_e$			
		100 MPa	to	120 MPa		$1.2 \cdot 10^{-4} \cdot p_e$			
2*	Pressure sensors and transducers[4]						Comparison with a reference pressure gauge	601-MP-C049	1
		1 Pa	to	20 Pa	Absolute pressure Gas	10 %			
		20 Pa	to	5,000 Pa		$2 \cdot 10^{-5} \cdot p + 3.5$ Pa			
		5 kPa	to	18 kPa		$2 \cdot 10^{-5} \cdot p + 3.8$ Pa			
		18 kPa	to	2,000 kPa		$9 \cdot 10^{-5} \cdot p$			
		2 MPa	to	8 MPa		$3 \cdot 10^{-5} \cdot p + 56$ Pa			
					Positive gauge pressure Gas				
		-100 kPa	to	-10 kPa		$8.6 \cdot 10^{-5} \cdot \lvert p_e \rvert$			
		-10 kPa	to	-3.45 kPa		$9.4 \cdot 10^{-5} \cdot \lvert p_e \rvert$			
		-3.45 kPa	to	-2 kPa		$2 \cdot 10^{-5} \cdot \lvert p_e \rvert + 32$ Pa			
		-2,000 Pa	to	-6 Pa		$1.3 \cdot 10^{-4} \cdot \lvert p_e \rvert + 48$ Pa			
		-6 Pa	to	+6 Pa		1.5 Pa			
		6 Pa	to	2,000 Pa		$1.3 \cdot 10^{-4} \cdot p_e + 48$ Pa			
		2 kPa	to	3.45 kPa		$2 \cdot 10^{-5} \cdot p_e + 32$ Pa			
		3.45 kPa	to	10 kPa		$9.4 \cdot 10^{-5} \cdot p_e$			
		10 kPa	to	100 kPa		$8.6 \cdot 10^{-5} \cdot p_e$			
		100 kPa	to	345 kPa		$8.9 \cdot 10^{-5} \cdot p_e$			
		345 kPa	to	2,000 kPa		$9 \cdot 10^{-5} \cdot p_e + 1$ Pa			
		2 MPa	to	8 MPa		$3 \cdot 10^{-5} \cdot p_e + 55$ Pa			

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Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range min. unit		Nominal range max. unit	Parameter(s) of the measurand	Lowest stated expanded mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Loca-tion
		20 kPa	to	600 kPa	Absolute Liquid	$2 \cdot 10^{-5} \cdot p_e$ + 49 Pa			
		0.6 MPa	to	40 MPa	pressure	$8.3 \cdot 10^{-5} \cdot p_e$ + 10 Pa			
		40 MPa	to	100 MPa	$p = p_e + p_{amb}$	$8.8 \cdot 10^{-5} \cdot p_e$ + 10 Pa			
		100 MPa	to	120 MPa		$1.2 \cdot 10^{-4} \cdot p_e$ + 10 Pa			
					Positive gauge				
		20 kPa	to	600 kPa	pressure Liquid	$2 \cdot 10^{-5} \cdot p_e$ + 48 Pa			
		0.6 MPa	to	40 MPa		$8.3 \cdot 10^{-5} \cdot p_e$			
		40 MPa	to	100 MPa		$8.8 \cdot 10^{-5} \cdot p_e$			
		100 MPa	to	120 MPa		$1.2 \cdot 10^{-4} \cdot p_e$			

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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).

[4] The uncertainties stated apply to the measurement of analogue output signals of pressure sensors and transducers. For digital output, the uncertainties for digital pressure gauges apply.

p absolute pressure value
p_{amb} ambient pressure value
p_e gauge pressure value, $p_e = (p - p_{amb})$

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CMC for the field of measured quantity: Temperature

Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range min.	unit		max.	unit	Parameter(s) of the measurand	Lowest stated expanded mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Loca-tion
1	Glass thermometers	-90	°C	to	100	°C	Division < 0.1 °C	0.015 °C	Comparison with a reference resistance temperature sensor in liquid bath.	133-MP-C001	1, 6, 7
		100	°C	to	150	°C		0.020 °C			
		150	°C	to	210	°C		0.040 °C			
		210	°C	to	360	°C		0.050 °C			
		360	°C	to	420	°C	0.1 °C ≤ division < 1 °C	0.15 °C			
		420	°C	to	550	°C		0.20 °C			
2*	Resistance temperature sensors				0.01	°C		0.002 °C	Direct measurement at triple point of water	133-MP-C002	1, 7
					660.32	°C		0.05 °C	Comparison with a reference resistance temperature sensor at a fixed point		
					-196	°C		0.03 °C	Comparison with a reference resistance temperature sensor near the boiling point of nitrogen		
		-100	°C	to	-90	°C		0.2 °C	Comparison with a reference resistance temperature sensor in a vertical furnace		
		-90	°C	to	-80	°C		0.015 °C	Comparison with a reference resistance temperature sensor in liquid bath.		
		-80	°C	to	160	°C		0.01 °C			
		160	°C	to	300	°C		0.02 °C			
		300	°C	to	420	°C		0.03 °C			

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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 mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Loca-tion
		420 °C		to	550 °C			0.05 °C			
		550 °C		to	660 °C			0.09 °C	Comparison with a reference resistance temperature sensor in a vertical furnace		
3	Thermocouple temperature sensors	0 °C		to	220 °C		Noble metals	0.4 °C	Comparison with a reference resistance temperature sensor in liquid bath.	133-MP-C003	1, 7
		220 °C		to	550 °C			0.5 °C			
		550 °C		to	1,100 °C			0.8 °C	Comparison with a reference thermoelectric temperature sensor in a horizontal furnace		
		1,100 °C		to	1,300 °C			1.3 °C			
		1,300 °C		to	1,600 °C			2.1 °C			
					-196 °C		Base metals	0.3 °C	Comparison with a reference resistance temperature sensor near the boiling point of nitrogen		
		-100 °C		to	-90 °C			0.3 °C	Comparison with a reference resistance temperature sensor in a vertical furnace		
		-90 °C		to	220 °C			0.2 °C	Comparison with a reference resistance temperature sensor in liquid bath.		
		220 °C		to	550 °C			0.4 °C			
		550 °C		to	1,100 °C			1.0 °C	Comparison with a reference thermoelectric temperature sensor in a horizontal furnace		
		1,100 °C		to	1,300 °C			1.4 °C			

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4*	Indication thermometers including temperature measuring chains, their temperature probes and characterization of thermal chambers				0.01 °C			0.002 °C	Direct measurement at triple point of water	133-MP-C004	1, 6, 7
					660.32 °C			0.05 °C	Comparison with a reference resistance temperature sensor at a fixed point		
					-196 °C			0.03 °C	Comparison with a reference resistance temperature sensor near the boiling point of nitrogen		
		-196 °C		to	-100 °C			0.3 °C	Comparison with a reference resistance temperature sensor on customer equipment		
		-100 °C		to	-90 °C			0.2 °C	Comparison with a reference resistance temperature sensor in a vertical furnace		
		-90 °C		to	-80 °C			0.015 °C	Comparison with a reference resistance temperature sensor in liquid bath		
		-80 °C		to	160 °C			0.01 °C			
		160 °C		to	300 °C			0.02 °C			
		300 °C		to	420 °C			0.03 °C			
		420 °C		to	550 °C			0.05 °C			

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		550 °C	to		660 °C			0.09 °C	Comparison with a reference resistance temperature sensor in a vertical furnace		
		660 °C	to		1,100 °C			0.8 °C	Comparison with a reference thermoelectric temperature sensor in a horizontal furnace		
		1,100 °C	to		1,200 °C			1.3 °C			
		1,200 °C	to		1,600 °C			2.1 °C			
5*	Infrared non-contact thermometers and measuring chains of infrared non-contact thermometers						Measuring chains with range limited to (-15 to 500) °C		Comparison with the standard	133-MP-C005	1, 7
		-30 °C	to		-15 °C			2.2 °C			
		-15 °C	to		0 °C			1.6 °C			
		0 °C	to		20 °C			1.1 °C			
		20 °C	to		100 °C			0.8 °C			
		100 °C	to		200 °C			1.1 °C			
		200 °C	to		300 °C			1.4 °C			
		300 °C	to		400 °C			1.7 °C			
		400 °C	to		500 °C			2.2 °C			
		500 °C	to		600 °C			2.6 °C			
		600 °C	to		700 °C			2.9 °C			
6*	Measuring chains								Simulation of sensor electrical input signal	133-MP-C006	1
		-200 °C	to		0 °C		"K" [4] type Thermoelectric temperature sensor	0.1 % + 0.1 °C			
		0 °C	to		1,000 °C			0.007 % + 0.1 °C			
		1,000 °C	to		1,372 °C			0.017 %			
		-200 °C	to		0 °C		"J" [4] type Thermoelectric temperature sensor	0.06 % + 0.08 °C			

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		0	°C	to	1,200	°C		0.006 % + 0.08 °C			
							"N" [4] type Thermoelectric temperature sensor				
		-200	°C	to	-100	°C		0.2 %			
		-100	°C	to	0	°C		0.05 % + 0.15 °C			
		0	°C	to	800	°C		0.15 °C			
		800	°C	to	1 300	°C		0.01 % + 0.07 °C			
							"S" [4] type Thermoelectric temperature sensor				
		0	°C	to	100	°C		0.7 °C			
		100	°C	to	300	°C		0.55 °C			
		300	°C	to	1,768	°C		0.45 °C			
							"T" type Thermoelectric temperature sensor[4]				
		-200	°C	to	0	°C		0.1 % + 0.1 °C			
		0	°C	to	400	°C		0.1 °C			
							"B" type Thermoelectric temperature sensor[4]				
		200	°C	to	500	°C		2 °C			
		500	°C	to	800	°C		0.8 °C			
		800	°C	to	1,820	°C		0.5 °C			
							"R" type Thermoelectric temperature sensor[4]				1
		0	°C	to	150	°C		0.7 °C			
		150	°C	to	400	°C		0.45 °C			
		400	°C	to	1,768	°C		0.4 °C			
							Pt 100 Resistance temperature sensor				1
		-200	°C	to	0	°C		0.05 °C			
		0	°C	to	850	°C		0.014 % + 0.05 °C			
							Pt 1000 Resistance temperature sensor				1
		-200	°C	to	-150	°C		0.011 °C			
		-150	°C	to	-50	°C		0.03 °C			

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Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range min.	unit		Nominal range max.	unit	Parameter(s) of the measurand	Lowest stated expanded mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Loca-tion
		-50 °C	to		0 °C			0.043 °C + 0.043 0.019 % °C			
		0 °C	to		850 °C						
							Voltage output of transducers				1
		-1 V	to		1 V			0.007 % + 4 µV			
		1 V	to		24 V			0.007 % + 0.1 mV			
							Current output of transducers				
		0 mA	to		25 mA			0.01 % + 1 µA			
		25 mA	to		55 mA			0.01 % + 2 µA			
7	Platinum resistance thermometers				-189.3442 °C		Temperature scale definition points ITS-90 – triple point Ar	0.9 mK	Direct measurement at a fixed point	112-MP-C001	1
8	Thermocouple temperature sensors				1153 °C		Fe-C	1.2 °C	Comparison with a standard at eutectic fixed point	112-MP-C002	1
					1324 °C		Co-C	0.9 °C			
9	Contactless thermometers (TC)				156.5985 °C		Measuring point diameter less than 5 mm In	0.2 °C	Direct measurement at a fixed point	112-MP-C003	1
					231.928 °C		Sn	0.2 °C			
					660.323 °C		Al	0.15 °C			
					1,084.62 °C		Cu	0.10 °C			
									Comparison with a reference standard		
		100 °C	to		300 °C			0.5 °C			
		300 °C	to		600 °C			0.7 °C			
		600 °C	to		1,000 °C			0.8 °C			
		1,000 °C	to		1,300 °C			1.0 °C			
		1,300 °C	to		1,800 °C			1.5 °C			

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10*	Black bodies								Direct comparison of two black bodies using a transfer thermometer	112-MP-C004	1
		-30 °C	to		45 °C			0.2 °C			
		45 °C	to		230 °C			0.22 °C			
		230 °C	to		600 °C			0.21 °C			
									Comparison with a reference standard		
		600 °C	to		1,000 °C			0.5 °C			
		1,000 °C	to		1,300 °C			0.6 °C			
		1,300 °C	to		1,800 °C			1.0 °C			
11*	Thermal cameras	-30 °C	to		500 °C			0.8 °C	Comparison with the standard	112-MP-C005	1, 7
		500 °C	to		1,000 °C			1.0 °C			
		1,000 °C	to		1,300 °C			1.5 °C			
		1,300 °C	to		1,800 °C			2.0 °C			
12	Temperature calibrators								Comparison with a calibrator or electrical measurement with a multimeter	611-MP-C130	1, 7
		-50 °C	to		1,760 °C		TC - R	0.12 °C			
		-50 °C	to		1,760 °C		TC - S	0.16 °C			
		0 °C	to		1,820 °C		TC - B	0.14 °C			
		-210 °C	to		1,200 °C		TC - J	0.04 °C			
		-270 °C	to		400 °C		TC - T	0.04 °C			
		-270 °C	to		1,000 °C		TC - E	0.04 °C			
		-270 °C	to		1,370 °C		TC - K	0.05 °C			
		-270 °C	to		1,300 °C		TC - N	0.05 °C			
		-200 °C	to		100 °C		TC - M	0.03 °C			
		-200 °C	to		800 °C		TC - L	0.03 °C			
		0 °C	to		2,500 °C		TC - A	0.24 °C			
		-200 °C	to		900 °C		TC – Fe-ko	0.04 °C			

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Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range				Parameter(s) of the measurand	Lowest stated expanded mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Loca-tion
		min.	unit		max. unit					
		-200 °C	to	850 °C		RTD - Pt100	0.02 °C			
		-200 °C	to	850 °C		RTD - Pt200	0.02 °C			
		-200 °C	to	850 °C		RTD - Pt500	0.03 °C			
		-200 °C	to	850 °C		RTD - Pt1000	0.02 °C			
		-60 °C	to	250 °C		RTD - Ni100	0.01 °C			
		-60 °C	to	250 °C		RTD - Ni1000	0.01 °C			

[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).

[4] Applies to the CJC temperature = 0 °C.

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CMC for the field of measured quantity: Air humidity

Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range			Parameter(s) of the measurand	Lowest stated expanded mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Loca-tion
		min. unit		max. unit					
1*	Relative humidity / hygrometers and humidity measuring chains including humidity probes, characterization of climatic chambers	5 % RH	to	30 % RH	Air temperature (10 to 90) °C	0.6 % RH	Comparison with a standard hygrometer	636-MP-C119	1, 7
		30 % RH	to	50 % RH		0.7 % RH			
		50 % RH	to	70 % RH		0.8 % RH			
		70 % RH	to	80 % RH		0.9 % RH			
		80 % RH	to	90 % RH		1.0 % RH			
		90 % RH	to	95 % RH		1.5 % RH			
2	Dew point temperature / hygrometers	-75 °C	to	-65 °C		0.24 °C	Comparison with a standard thermometer	636-MP-C120	7
		-65 °C	to	-50 °C		0.16 °C			
		-50 °C	to	-30 °C		0.10 °C			
		-30 °C	to	60 °C		0.08 °C			
		60 °C	to	80 °C		0.10 °C			
		80 °C	to	90 °C		0.15 °C			

[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).

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CMC for the field of measured quantity: Electrical quantities

Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range min.	unit		Nominal range max.	unit	Parameter(s) of the measurand	Lowest stated expanded mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Location
1*	DC voltage / DC voltage sources and meters	0 mV		to	20 mV			$15 \cdot 10^{-6} \cdot U + 0.05\ \mu V$	Direct comparison with a calibrator or direct measurement with a multimeter	611-MP-C097, 611-MP-C098	1,7
		20 mV		to	200 mV			$5.0 \cdot 10^{-6} \cdot U$			
		200 mV		to	2 V			$2.6 \cdot 10^{-6} \cdot U$			
		2 V		to	20 V			$2.1 \cdot 10^{-6} \cdot U$			
		10 V		to	10 V			1.5 µV			
		20 V		to	1,100 V			$2.9 \cdot 10^{-6} \cdot U$			
2	DC voltage / DC voltage sources and meters	0 V		to	2 V			$1.5 \cdot 10^{-6} \cdot U + 0.05\ \mu V$	Comparison with a voltage reference using a resistor divider	611-MP-C005	7
		2 V		to	20 V			$0.8 \cdot 10^{-6} \cdot U$			
		20 V		to	1,100 V			$1.6 \cdot 10^{-6} \cdot U$			
3*	AC voltage / AC voltage sources and meters	0.9 mV		to	2 mV		10 Hz to 75 kHz	0.20 %	Direct comparison with a calibrator or direct measurement with a multimeter	611-MP-C097 611-MP-C098	1,7
							75 kHz to 400 kHz	0.31 %			
							400 kHz to 750 kHz	0.33 %			
							750 kHz to 1 MHz	0.35 %			
		2 mV		to	20 mV		10 Hz to 25 kHz	$360 \cdot 10^{-6} \cdot U$			
							25 kHz to 75 kHz	$330 \cdot 10^{-6} \cdot U$			
							75 kHz to 200 kHz	$530 \cdot 10^{-6} \cdot U$			
							200 kHz to 400 kHz	$710 \cdot 10^{-6} \cdot U$			
							400 kHz to 750 kHz	$790 \cdot 10^{-6} \cdot U$			
							750 kHz to 1 MHz	$1100 \cdot 10^{-6} \cdot U$			

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Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range			Parameter(s) of the measurand	Lowest stated expanded mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Location
		min.	unit	max. unit					
		20 mV	to	200 mV	10 Hz to 25 kHz	$98 \cdot 10^{-6} \cdot U$			
					25 kHz to 75 kHz	$190 \cdot 10^{-6} \cdot U$			
					75 kHz to 200 kHz	$370 \cdot 10^{-6} \cdot U$			
					200 kHz to 400 kHz	$590 \cdot 10^{-6} \cdot U$			
					400 kHz to 750 kHz	$650 \cdot 10^{-6} \cdot U$			
					750 kHz to 1 MHz	$1{,}000 \cdot 10^{-6} \cdot U$			
		200 mV	to	2 V	10 Hz to 35 Hz	$37 \cdot 10^{-6} \cdot U$			
					35 Hz to 40 kHz	$26 \cdot 10^{-6} \cdot U$			
					40 kHz to 75 kHz	$37 \cdot 10^{-6} \cdot U$			
					75 kHz to 200 kHz	$48 \cdot 10^{-6} \cdot U$			
					200 kHz to 400 kHz	$120 \cdot 10^{-6} \cdot U$			
					400 kHz to 750 kHz	$230 \cdot 10^{-6} \cdot U$			
					750 kHz to 1 MHz	$590 \cdot 10^{-6} \cdot U$			
		2 V	to	20 V	10 Hz to 35 Hz	$37 \cdot 10^{-6} \cdot U$			
					35 Hz to 40 kHz	$26 \cdot 10^{-6} \cdot U$			
					40 kHz to 75 kHz	$33 \cdot 10^{-6} \cdot U$			
					75 kHz to 200 kHz	$40 \cdot 10^{-6} \cdot U$			
					200 kHz to 400 kHz	$110 \cdot 10^{-6} \cdot U$			
					400 kHz to 750 kHz	$210 \cdot 10^{-6} \cdot U$			
					750 kHz to 1 MHz	$560 \cdot 10^{-6} \cdot U$			
		20 V	to	200 V	10 Hz to 35 Hz	$42 \cdot 10^{-6} \cdot U$			
					35 Hz to 175 Hz	$37 \cdot 10^{-6} \cdot U$			
					175 Hz to 40 kHz	$28 \cdot 10^{-6} \cdot U$			
					40 kHz to 75 kHz	$40 \cdot 10^{-6} \cdot U$			
					75 kHz to 150 kHz	$71 \cdot 10^{-6} \cdot U$			
					150 kHz to 200 kHz	$240 \cdot 10^{-6} \cdot U$			

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Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range min.	unit		Nominal range max.	unit	Parameter(s) of the measurand	Lowest stated expanded mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Location
		200	V	to	1,100	V	10 Hz to 5 kHz	$40 \cdot 10^{-6} \cdot U$			
							5 kHz to 25 kHz	$45 \cdot 10^{-6} \cdot U$			
							25 kHz to 40 kHz	$76 \cdot 10^{-6} \cdot U$			
							40 kHz to 750 kHz	$120 \cdot 10^{-6} \cdot U$			
							Generation only to 750 V 75 kHz to 100 kHz	$350 \cdot 10^{-6} \cdot U$			
4	Low AC voltage / AC voltage meters	0.1	µV	to	1	µV	50 Hz to 200 Hz	0.50 %	Comparison or measurement using an impedance divider	611-MP-C061	7
							200 Hz to 10 kHz	0.20 %			
							10 kHz to 100 kHz	0.70 %			
		1	µV	to	1	mV	50 Hz to 200 Hz	0.20 %			
							200 Hz to 10 kHz	0.07 %			
							10 kHz to 100 kHz	0.30 %			
5	DC voltage / Low DC current generators	0	pA	to	1	pA		1 fA	Direct measurement with a picoammeter	611-MP-C034	7
		1	pA	to	20	pA		0.13 %			
		20	pA	to	200	pA		0.11 %			
		0.2	nA	to	2	nA		0.08 %			
		2	nA	to	20	nA		0.06 %			
		20	nA	to	200	nA		0.05 %			
		0.2	µA	to	2	µA		0.04 %			
	DC current / Low DC current meters	0	pA	to	1	pA		1 fA	Indirect generation using DC voltage source and reference resistors	611-MP-C034	
		1	pA	to	20	pA		0.11 %			
		20	pA	to	200	pA		0.06 %			

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		0.2	nA	to	2	nA		0.03 %			
		2	nA	to	20	nA		0.025 %			
		20	nA	to	200	nA		0.020 %			
		0.2	µA	to	2	µA		0.008 %			
6*	DC current / DC current generators								Direct measurement with a multimeter or indirect measurement with a current shunt	611-MP-C097	1, 7
		0	µA	to	1	µA		0.10 nA			
		1	µA	to	100	µA		$21 \cdot 10^{-6} \cdot I$			
		100	µA	to	200	µA		$12 \cdot 10^{-6} \cdot I$			
		200	µA	to	2	A		$6.0 \cdot 10^{-6} \cdot I$			
		2	A	to	20	A		$15 \cdot 10^{-6} \cdot I$			
		20	A	to	100	A		$20 \cdot 10^{-6} \cdot I$			
	DC current / DC current meters								Direct generation with a calibrator	611-MP-C098	1, 7
		0	µA		1	µA		0.10 nA			
		1	µA	to	100	µA		$21 \cdot 10^{-6} \cdot I$			
		100	µA	to	200	µA		$15 \cdot 10^{-6} \cdot I$			
		200	µA	to	20	mA		$6.0 \cdot 10^{-6} \cdot I$			
		20	mA	to	200	mA		$8.0 \cdot 10^{-6} \cdot I$			
		200	mA	to	2	A		$15 \cdot 10^{-6} \cdot I$			
		2	A	to	100	A		$30 \cdot 10^{-6} \cdot I$			
7*	AC current / AC current generators								Direct measurement with a multimeter or indirect measurement with current shunts	611-MP-C097	1, 7
		9	µA	to	2	mA	10 Hz to 20 Hz	$100 \cdot 10^{-6} \cdot I$			
							20 Hz to 40 Hz	$90 \cdot 10^{-6} \cdot I$			
							40 Hz to 5 kHz	$70 \cdot 10^{-6} \cdot I$			
							5 kHz to 10 kHz	$80 \cdot 10^{-6} \cdot I$			

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Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range min. unit	Nominal range max. unit	Parameter(s) of the measurand	Lowest stated expanded mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Location
				10 kHz to 30 kHz	$300 \cdot 10^{-6} \cdot I$			
		2 mA to	20 mA	10 Hz to 20 Hz	$90 \cdot 10^{-6} \cdot I$			
				20 Hz to 40 Hz	$75 \cdot 10^{-6} \cdot I$			
				40 Hz to 1 kHz	$65 \cdot 10^{-6} \cdot I$			
				1 kHz to 10 kHz	$70 \cdot 10^{-6} \cdot I$			
				10 kHz to 30 kHz	$300 \cdot 10^{-6} \cdot I$			
		20 mA to	200 mA	10 Hz to 20 Hz	$80 \cdot 10^{-6} \cdot I$			
				20 Hz to 1 kHz	$65 \cdot 10^{-6} \cdot I$			
				1 kHz to 5 kHz	$70 \cdot 10^{-6} \cdot I$			
				5 kHz to 10 kHz	$80 \cdot 10^{-6} \cdot I$			
				10 kHz to 30 kHz	$300 \cdot 10^{-6} \cdot I$			
		200 mA to	2 A	10 Hz to 20 Hz	$120 \cdot 10^{-6} \cdot I$			
				20 Hz to 40 Hz	$100 \cdot 10^{-6} \cdot I$			
				40 Hz to 1 kHz	$90 \cdot 10^{-6} \cdot I$			
				1 kHz to 5 kHz	$100 \cdot 10^{-6} \cdot I$			
				5 kHz to 10 kHz	$120 \cdot 10^{-6} \cdot I$			
				10 kHz to 30 kHz	$500 \cdot 10^{-6} \cdot I$			
		2 A to	20 A	10 Hz to 20 Hz	$180 \cdot 10^{-6} \cdot I$			
				20 Hz to 40 Hz	$160 \cdot 10^{-6} \cdot I$			
				40 Hz to 1 kHz	$110 \cdot 10^{-6} \cdot I$			
				1 kHz to 5 kHz	$140 \cdot 10^{-6} \cdot I$			
				5 kHz to 10 kHz	$160 \cdot 10^{-6} \cdot I$			
		20 A to	100 A	10 Hz to 20 Hz	$250 \cdot 10^{-6} \cdot I$			
				20 Hz to 40 Hz	$160 \cdot 10^{-6} \cdot I$			
				40 Hz to 1 kHz	$120 \cdot 10^{-6} \cdot I$			
				1 kHz to 5 kHz	$150 \cdot 10^{-6} \cdot I$			
				5 kHz to 10 kHz	$200 \cdot 10^{-6} \cdot I$			

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Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range min. unit		Nominal range max. unit	Parameter(s) of the measurand	Lowest stated expanded mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Location
	AC current / AC current meters	9 µA	to	200 µA	10 Hz to 35 Hz	$130 \cdot 10^{-6} \cdot I$	Direct generation with a calibrator	611-MP-C098	1, 7
					35 Hz to 1 kHz	$100 \cdot 10^{-6} \cdot I$			
					1 kHz to 5 kHz	$160 \cdot 10^{-6} \cdot I$			
					5 kHz to 10 kHz	$800 \cdot 10^{-6} \cdot I$			
					10 kHz to 30 kHz	$2{,}000 \cdot 10^{-6} \cdot I$			
		200 µA	to	2 mA	10 Hz to 35 Hz	$120 \cdot 10^{-6} \cdot I$			
					35 Hz to 1 kHz	$90 \cdot 10^{-6} \cdot I$			
					1 kHz to 10 kHz	$140 \cdot 10^{-6} \cdot I$			
					10 kHz to 30 kHz	$700 \cdot 10^{-6} \cdot I$			
		2 mA	to	200 mA	10 Hz to 35 Hz	$120 \cdot 10^{-6} \cdot I$			
					35 Hz to 1 kHz	$75 \cdot 10^{-6} \cdot I$			
					1 kHz to 5 kHz	$130 \cdot 10^{-6} \cdot I$			
					5 kHz to 10 kHz	$140 \cdot 10^{-6} \cdot I$			
					10 kHz to 30 kHz	$700 \cdot 10^{-6} \cdot I$			
		200 mA	to	2 A	10 Hz to 35 Hz	$170 \cdot 10^{-6} \cdot I$			
					35 Hz to 1 kHz	$120 \cdot 10^{-6} \cdot I$			
					1 kHz to 10 kHz	$220 \cdot 10^{-6} \cdot I$			
		2 A	to	20 A	10 Hz to 35 Hz	$310 \cdot 10^{-6} \cdot I$			
					35 Hz to 1 kHz	$200 \cdot 10^{-6} \cdot I$			
					1 kHz to 5 kHz	$300 \cdot 10^{-6} \cdot I$			
					5 kHz to 10 kHz	$690 \cdot 10^{-6} \cdot I$			
		20 A	to	100 A	10 Hz to 35 Hz	$350 \cdot 10^{-6} \cdot I$			
					35 Hz to 1 kHz	$200 \cdot 10^{-6} \cdot I$			
					1 kHz to 5 kHz	$300 \cdot 10^{-6} \cdot I$			
					5 kHz to 10 kHz	$950 \cdot 10^{-6} \cdot I$			

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Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range min. unit	Nominal range max. unit	Parameter(s) of the measurand	Lowest stated expanded mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Location
8	DC resistance / DC resistance standards and electrical resistance meters	100 μΩ			0.72 nΩ	Comparison by the ratio method – measurement of voltage drops at constant measuring current or direct measurement of reference resistance	131-MP-C003, 131-MP-C005, 611-MP-C097, 611-MP-C098	1, 7
		1 mΩ			3.5 nΩ			
		10 mΩ			26 nΩ			
		20 mΩ			44 nΩ			
		100 mΩ			86 nΩ			
		1 Ω			0.76 μΩ			
		10 Ω			7.1 μΩ			
		25 Ω			16 μΩ			
		100 Ω			35 μΩ			
		1 kΩ			0.35 mΩ			
		10 kΩ			3.8 mΩ			
		100 kΩ			59 mΩ			
		1 MΩ			4.0 Ω			
		10 MΩ			70 Ω			
		100 MΩ			160 Ω			
		1 GΩ			100 kΩ			
		10 GΩ			5.0 MΩ			
		100 GΩ			25 MΩ			
		1 TΩ			200 MΩ			

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9*	DC resistance / DC resistance standards and electrical resistance meters	0 μΩ	to	100 μΩ		$3.5 \cdot 10^{-6} \cdot R + 0.5$ nΩ	Comparison by the ratio method – measurement of voltage drops at constant measuring current or direct measurement of reference resistance	131-MP-C003, 131-MP-C005, 611-MP-C097, 611-MP-C098	1,.7
		100 μΩ	to	200 μΩ		$7.2 \cdot 10^{-6} \cdot R$			
		200 μΩ	to	1 mΩ		$6.0 \cdot 10^{-6} \cdot R$			
		1 mΩ	to	2 mΩ		$3.5 \cdot 10^{-6} \cdot R$			
		2 mΩ	to	10 mΩ		$5.6 \cdot 10^{-6} \cdot R$			
		10 mΩ	to	20 mΩ		$2.6 \cdot 10^{-6} \cdot R$			
		20 mΩ	to	100 mΩ		$1.6 \cdot 10^{-6} \cdot R$			
		100 mΩ	to	200 mΩ		$0.86 \cdot 10^{-6} \cdot R$			
		200 mΩ	to	1 Ω		$1.6 \cdot 10^{-6} \cdot R$			
		1 Ω	to	2 Ω		$0.73 \cdot 10^{-6} \cdot R$			
		2 Ω	to	10 Ω		$1.6 \cdot 10^{-6} \cdot R$			
		10 Ω	to	20 Ω		$0.71 \cdot 10^{-6} \cdot R$			
		20 Ω	to	100 Ω		$1.2 \cdot 10^{-6} \cdot R$			
		100 Ω	to	200 Ω		$0.35 \cdot 10^{-6} \cdot R$			
		200 Ω	to	1 kΩ		$0.93 \cdot 10^{-6} \cdot R$			
		1 kΩ	to	2 kΩ		$0.35 \cdot 10^{-6} \cdot R$			
		2 kΩ	to	10 kΩ		$1.2 \cdot 10^{-6} \cdot R$			
		10 kΩ	to	20 kΩ		$0.38 \cdot 10^{-6} \cdot R$			
		20 kΩ	to	100 kΩ		$0.86 \cdot 10^{-6} \cdot R$			
		100 kΩ	to	200 kΩ		$0.59 \cdot 10^{-6} \cdot R$			
		200 kΩ	to	1 MΩ		$4.1 \cdot 10^{-6} \cdot R$			

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Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range				Parameter(s) of the measurand	Lowest stated expanded mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Location
		min.	unit		max. unit					
		1 MΩ	to	2 MΩ			$4.0 \cdot 10^{-6} \cdot R$			
		2 MΩ	to	10 MΩ			$7.4 \cdot 10^{-6} \cdot R$			
		10 MΩ	to	20 MΩ			$7.0 \cdot 10^{-6} \cdot R$			
		20 MΩ	to	200 MΩ			$16 \cdot 10^{-6} \cdot R$			
		200 MΩ	to	1 GΩ			$520 \cdot 10^{-6} \cdot R$			
		1 GΩ	to	2 GΩ			$120 \cdot 10^{-6} \cdot R$			
		2 GΩ	to	10 GΩ			0.52 %			
		10 GΩ	to	20 GΩ			0.12 %			
10	Resistance ratio / Thermometer bridges 0 Hz to 400 Hz	0	to	4			$1.6 \cdot 10^{-8}$	Measurement with a set of reference resistors or a simulated resistance ratio generated by an inductive divider	611-MP-C045	1, 7
11	DC Power / DC Power Meters for 1 V to 1,000 V and 1 mA to 120 A	1 mW	to	120 kW			0.0025%	Measurement by a digital sampling wattmeter	611-MP-C042	7

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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]	Loca-tion
		min. unit	max. unit						
12	Single-phase and three-phase AC active power / Active electrical power meters for voltage 1 V to 1,000 V, current 1 mA to 200 A, power factor 0 to 1, frequency 15 Hz to 1,000 Hz	1 mW	to 600 kW			25 µW/VA	Measurement by a digital sampling wattmeter	611-MP-C042	7
13	Single-phase and three-phase AC reactive power / Reactive electrical power meters for voltage 1 V to 1,000 V, current 1 mA to 200 A, power factor 0 to 1, frequency 15 Hz to 1,000 Hz	1 mvar	to 600 kvar			25 µvar/VA	Measurement by a digital sampling wattmeter	611-MP-C042	7
14	Phase angle / Phase angle meters	0 °	to 360 °	0.1 µV to 1 µV	400 Hz to 1.592 kHz	0.10°	Measurement on a phase calibrator and impedance divider	611-MP-C061	7
				1 µV to 100 µV		0.050°			
				0.1 mV to 1 mV		0.10°			
				1 mV to 10 mV		0.050°			
				10 mV to 560 V	1 Hz to 6 kHz	0.0010°	Digital signal sampling	611-MP-C060	
				10 mV to 560 V	6 kHz to 50 kHz	0.0020°			
				10 mV to 100 V	50 kHz to 100 kHz	0.050°			

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		min. unit	max. unit						
				10 mV to 1 V	100 kHz to 1 MHz	0.050°			
				10 mV to 1 V	1 MHz to 10 MHz	0.10°			
15	Electrical energy single-phase and three-phase / DC and AC power meters for voltage 1 V to 1,000 V, current 1 mA to 120 A, power factor 0 to 1, frequency 0 Hz and 15 Hz to 800 Hz, time 1 s to 3,600 s	1 Ws to	1296 MWs			0.010 %	Comparison with a reference energy meter Measurement by a digital sampling wattmeter	611-MP-C042	7
16	Flicker / Flicker meters	0.5 Pst to	10 Pst		50 Hz	0.003·Pst	Using digital sampling of a signal	611-MP-C043	7
17	pH / pH meters	0 pH to	14 pH			0.001 pH	Comparison with a calibrator (electric method)	611-MP-C129	7
		-1,000 mV to	1,000 mV			0.010 mV			
18	Capacity / Electrical capacity meters		10 pF		1 kHz	5 aF	Comparison with a standard using impedance bridge	611-MP-C030, 611-MP-C041	7
			100 pF		1 kHz	50 aF			
		1 pF to	10 pF		50 Hz to 200 Hz	0.015 %			
					200 Hz to 1 kHz	0.0070 %			
					1 kHz	0.0015 %			
					1 kHz to 10 kHz	0.0050 %			
					10 kHz to 1 MHz	0.010 %			

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		min. unit	max. unit						
					1 MHz to 10 MHz	0.20 %			
		10 pF	to 1 nF		50 Hz to 1 kHz	0.0050 %			
					1 kHz	0.0007 %			
					1 kHz to 10 kHz	0.0050 %			
					10 kHz to 1 MHz	0.010 %			
					1 MHz to 10 MHz	0.20 %			
		1 nF	to 10 nF		50 Hz to 1 kHz	0.0070 %			
					1 kHz	0.0010 %			
					1 kHz to 10 kHz	0.0050 %			
					10 kHz to 1 MHz	0.010 %			
					1 MHz to 10 MHz	0.20 %			
		10 nF	to 100 nF		50 Hz to 200 Hz	0.010 %			
					200 Hz to 1 kHz	0.0030 %			
					1 kHz to 10 kHz	0.0070 %			
					10 kHz to 100 kHz	0.010 %			
					100 kHz to 1 MHz	0.030 %			
		100 nF	to 1 µF		50 Hz to 200 Hz	0.0070 %			
					200 Hz to 10 kHz	0.0050 %			
					10 kHz to 100 kHz	0.015 %			
					100 kHz to 1 MHz	0.050 %			
		1 µF	to 10 µF		20 Hz to 50 Hz	0.010 %			
					50 Hz to 1 kHz	0.0070 %			
					1 kHz	0.0050 %			
					1 kHz to 10 kHz	0.0060 %			
					10 kHz to 20 kHz	0.015 %			
					20 kHz to 100 kHz	0.050 %			
		10 µF	to 100 µF		20 Hz to 50 Hz	0.010 %			

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								50 Hz to 1 kHz	0.0050 %			
								1 kHz to 10 kHz	0.0060 %			
								10 kHz to 20 kHz	0.020 %			
		100 µF		to	1 mF			20 Hz to 200 Hz	0.010 %			
								200 Hz to 1 kHz	0.015 %			
								1 kHz to 5 kHz	0.020 %			
		1 mF		to	3 mF			20 Hz to 200 Hz	0.020 %			
								200 Hz to 1 kHz	0.025 %			
		3 mF		to	10 mF			20 Hz to 200 Hz	0.030 %			
		100 µF		to	1 F			0.1 Hz	0.10 %			
19	Loss factor D / Loss factor meters	-0.001		to	0.001		1 pF to 10 pF	50 Hz to 200 Hz	$57 \cdot 10^{-6}$ (abs.)	Comparison with a standard using impedance bridge	611-MP-C030 611-MP-C041	7
								200 Hz to 1 kHz	$8 \cdot 10^{-6}$ (abs.)			
								1 kHz	$3 \cdot 10^{-6}$ (abs.)			
								1 kHz to 5 kHz	$17 \cdot 10^{-6}$ (abs.)			
								5 kHz to 10 kHz	$42 \cdot 10^{-6}$ (abs.)			
								10 kHz to 20 kHz	$120 \cdot 10^{-6}$ (abs.)			
								20 kHz to 100 kHz	$150 \cdot 10^{-6}$ (abs.)			
								100 kHz to 200 kHz	$300 \cdot 10^{-6}$ (abs.)			
								200 kHz to 500 kHz	$450 \cdot 10^{-6}$ (abs.)			
								500 kHz to 1 MHz	$900 \cdot 10^{-6}$ (abs.)			
							10 pF to 100 pF	50 Hz to 200 Hz	$13 \cdot 10^{-6}$ (abs.)			
								200 Hz to 1 kHz	$4 \cdot 10^{-6}$ (abs.)			
								1 kHz	$3 \cdot 10^{-6}$ (abs.)			
								1 kHz to 5 kHz	$9 \cdot 10^{-6}$ (abs.)			

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		min. unit	max. unit						
					5 kHz to 10 kHz	$18 \cdot 10^{-6}$ (abs.)			
					10 kHz to 20 kHz	$39 \cdot 10^{-6}$ (abs.)			
					20 kHz to 100 kHz	$70 \cdot 10^{-6}$ (abs.)			
					100 kHz to 200 kHz	$150 \cdot 10^{-6}$ (abs.)			
					200 kHz to 500 kHz	$350 \cdot 10^{-6}$ (abs.)			
					500 kHz to 1 MHz	$700 \cdot 10^{-6}$ (abs.)			
				100 pF to 1,000 pF	50 Hz to 200 Hz	$9 \cdot 10^{-6}$ (abs.)			
					200 Hz to 1 kHz	$4 \cdot 10^{-6}$ (abs.)			
					1 kHz	$3 \cdot 10^{-6}$ (abs.)			
					1 kHz to 5 kHz	$7 \cdot 10^{-6}$ (abs.)			
					5 kHz to 10 kHz	$12 \cdot 10^{-6}$ (abs.)			
					10 kHz to 20 kHz	$23 \cdot 10^{-6}$ (abs.)			
					20 kHz to 100 kHz	$70 \cdot 10^{-6}$ (abs.)			
					100 kHz to 200 kHz	$150 \cdot 10^{-6}$ (abs.)			
					200 kHz to 500 kHz	$350 \cdot 10^{-6}$ (abs.)			
					500 kHz to 1 MHz	$700 \cdot 10^{-6}$ (abs.)			
				1 nF to 10 nF	50 Hz to 200 Hz	$79 \cdot 10^{-6}$ (abs.)			
					200 Hz to 1 kHz	$7 \cdot 10^{-6}$ (abs.)			
					1 kHz	$9 \cdot 10^{-6}$ (abs.)			
					1 kHz to 5 kHz	$24 \cdot 10^{-6}$ (abs.)			
					5 kHz to 10 kHz	$41 \cdot 10^{-6}$ (abs.)			
					10 kHz to 20 kHz	$79 \cdot 10^{-6}$ (abs.)			
					20 kHz to 100 kHz	$70 \cdot 10^{-6}$ (abs.)			
					100 kHz to 200 kHz	$150 \cdot 10^{-6}$ (abs.)			
					200 kHz to 500 kHz	$350 \cdot 10^{-6}$ (abs.)			
					500 kHz to 1 MHz	$700 \cdot 10^{-6}$ (abs.)			

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		min.	unit	max.	unit						
		0.001	to	0.01		1 pF to 10 pF	50 Hz to 200 Hz	$61 \cdot 10^{-6}$ (abs.)			
							200 Hz to 1 kHz	$18 \cdot 10^{-6}$ (abs.)			
							1 kHz	$5 \cdot 10^{-6}$ (abs.)			
							1 kHz to 5 kHz	$26 \cdot 10^{-6}$ (abs.)			
							5 kHz to 10 kHz	$50 \cdot 10^{-6}$ (abs.)			
							10 kHz to 20 kHz	$130 \cdot 10^{-6}$ (abs.)			
						10 pF to 100 pF	50 Hz to 200 Hz	$20 \cdot 10^{-6}$ (abs.)			
							200 Hz to 1 kHz	$13 \cdot 10^{-6}$ (abs.)			
							1 kHz	$5 \cdot 10^{-6}$ (abs.)			
							1 kHz to 5 kHz	$15 \cdot 10^{-6}$ (abs.)			
							5 kHz to 10 kHz	$23 \cdot 10^{-6}$ (abs.)			
							10 kHz to 20 kHz	$43 \cdot 10^{-6}$ (abs.)			
						100 pF to 1,000 pF	50 Hz to 200 Hz	$12 \cdot 10^{-6}$ (abs.)			
							200 Hz to 1 kHz	$7 \cdot 10^{-6}$ (abs.)			
							1 kHz	$5 \cdot 10^{-6}$ (abs.)			
							1 kHz to 5 kHz	$9 \cdot 10^{-6}$ (abs.)			
							5 kHz to 10 kHz	$14 \cdot 10^{-6}$ (abs.)			
							10 kHz to 20 kHz	$25 \cdot 10^{-6}$ (abs.)			
						1 nF to 10 nF	50 Hz to 200 Hz	$82 \cdot 10^{-6}$ (abs.)			
							200 Hz to 1 kHz	$7 \cdot 10^{-6}$ (abs.)			
							1 kHz	$9 \cdot 10^{-6}$ (abs.)			
							1 kHz to 5 kHz	$24 \cdot 10^{-6}$ (abs.)			
							5 kHz to 10 kHz	$41 \cdot 10^{-6}$ (abs.)			
							10 kHz to 20 kHz	$79 \cdot 10^{-6}$ (abs.)			
		0.01	to	0.1		1 pF to 10 pF	50 Hz to 200 Hz	$150 \cdot 10^{-6}$ (abs.)			
							200 Hz to 1 kHz	$120 \cdot 10^{-6}$ (abs.)			
							1 kHz	$30 \cdot 10^{-6}$ (abs.)			

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		min.	unit	max.	unit						
							1 kHz to 5 kHz	$110 \cdot 10^{-6}$ (abs.)			
							5 kHz to 10 kHz	$130 \cdot 10^{-6}$ (abs.)			
						10 pF to 100 pF	50 Hz to 200 Hz	$61 \cdot 10^{-6}$ (abs.)			
							200 Hz to 1 kHz	$52 \cdot 10^{-6}$ (abs.)			
							1 kHz	$30 \cdot 10^{-6}$ (abs.)			
							1 kHz to 5 kHz	$48 \cdot 10^{-6}$ (abs.)			
							5 kHz to 10 kHz	$58 \cdot 10^{-6}$ (abs.)			
						100 pF to 1,000 pF	50 Hz to 200 Hz	$140 \cdot 10^{-6}$ (abs.)			
							200 Hz to 1 kHz	$74 \cdot 10^{-6}$ (abs.)			
							1 kHz	$30 \cdot 10^{-6}$ (abs.)			
							1 kHz to 5 kHz	$70 \cdot 10^{-6}$ (abs.)			
							5 kHz to 10 kHz	$61 \cdot 10^{-6}$ (abs.)			
						1 nF to 10 nF	50 Hz to 200 Hz	$100 \cdot 10^{-6}$ (abs.)			
							200 Hz to 1 kHz	$7 \cdot 10^{-6}$ (abs.)			
							1 kHz	$9 \cdot 10^{-6}$ (abs.)			
							1 kHz to 5 kHz	$24 \cdot 10^{-6}$ (abs.)			
							5 kHz to 10 kHz	$41 \cdot 10^{-6}$ (abs.)			
							10 kHz to 20 kHz	$79 \cdot 10^{-6}$ (abs.)			
		0.1	to	1		1 pF to 1,000 pF	1 kHz	$300 \cdot 10^{-6}$ (abs.)			
						1 nF to 10 nF	50 Hz to 200 Hz	$100 \cdot 10^{-6}$ (abs.)			
							200 Hz to 1 kHz	$7 \cdot 10^{-6}$ (abs.)			
							1 kHz	$9 \cdot 10^{-6}$ (abs.)			
							1 kHz to 5 kHz	$24 \cdot 10^{-6}$ (abs.)			
							5 kHz to 10 kHz	$41 \cdot 10^{-6}$ (abs.)			
							10 kHz to 20 kHz	$79 \cdot 10^{-6}$ (abs.)			

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		min.	unit	max.	unit						
		-1	to	1		10 nF to 100 nF	50 Hz to 200 Hz	$30 \cdot 10^{-6}$ (abs.)			
							200 Hz to 1 kHz	$15 \cdot 10^{-6}$ (abs.)			
							1 kHz	$15 \cdot 10^{-6}$ (abs.)			
							1 kHz to 5 kHz	$21 \cdot 10^{-6}$ (abs.)			
							5 kHz to 10 kHz	$30 \cdot 10^{-6}$ (abs.)			
							10 kHz to 20 kHz	$67 \cdot 10^{-6}$ (abs.)			
							20 kHz to 100 kHz	$70 \cdot 10^{-6}$ (abs.)			
							100 kHz to 200 kHz	$150 \cdot 10^{-6}$ (abs.)			
							200 kHz to 500 kHz	$350 \cdot 10^{-6}$ (abs.)			
							500 kHz to 1 MHz	$700 \cdot 10^{-6}$ (abs.)			
						100 nF to 1,000 nF	20 Hz to 50 Hz	$100 \cdot 10^{-6}$ (abs.)			
							50 Hz to 5 kHz	$30 \cdot 10^{-6}$ (abs.)			
							5 kHz to 10 kHz	$60 \cdot 10^{-6}$ (abs.)			
							10 kHz to 20 kHz	$80 \cdot 10^{-6}$ (abs.)			
							20 kHz to 100 kHz	$90 \cdot 10^{-6}$ (abs.)			
							100 kHz to 200 kHz	$200 \cdot 10^{-6}$ (abs.)			
							200 kHz to 500 kHz	$450 \cdot 10^{-6}$ (abs.)			
							500 kHz to 1 MHz	$900 \cdot 10^{-6}$ (abs.)			
						1 µF to 10 µF	20 Hz to 50 Hz	$100 \cdot 10^{-6}$ (abs.)			
							50 Hz to 5 kHz	$30 \cdot 10^{-6}$ (abs.)			
							5 kHz to 10 kHz	$60 \cdot 10^{-6}$ (abs.)			
							10 kHz to 20 kHz	$80 \cdot 10^{-6}$ (abs.)			
							20 kHz to 100 kHz	$120 \cdot 10^{-6}$ (abs.)			
						10 µF to 100 µF	20 Hz to 50 Hz	$100 \cdot 10^{-6}$ (abs.)			
							50 Hz to 200 Hz	$30 \cdot 10^{-6}$ (abs.)			
							200 Hz to 5 kHz	$50 \cdot 10^{-6}$ (abs.)			
							5 kHz to 10 kHz	$100 \cdot 10^{-6}$ (abs.)			

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								10 kHz to 20 kHz	$220 \cdot 10^{-6}$ (abs.)			
								20 kHz to 100 kHz	$500 \cdot 10^{-6}$ (abs.)			
							100 µF to 1,000 µF	20 Hz to 50 Hz	$100 \cdot 10^{-6}$ (abs.)			
								50 Hz to 1 kHz	$50 \cdot 10^{-6}$ (abs.)			
								1 kHz to 5 kHz	$100 \cdot 10^{-6}$ (abs.)			
								5 kHz to 10 kHz	$160 \cdot 10^{-6}$ (abs.)			
								10 kHz to 20 kHz	$350 \cdot 10^{-6}$ (abs.)			
							1 mF to 3 mF	20 Hz to 50 Hz	$100 \cdot 10^{-6}$ (abs.)			
								50 Hz to 200 Hz	$50 \cdot 10^{-6}$ (abs.)			
								200 Hz to 5 kHz	$100 \cdot 10^{-6}$ (abs.)			
							3 mF to 10 mF	20 Hz to 1 kHz	$100 \cdot 10^{-6}$ (abs.)			
20	AC resistance / AC resistance meters	1 mΩ	to		10 mΩ		1 mΩ to 10 mΩ	20 Hz to 50 Hz	0.015 %	Comparison with a standard using impedance bridge	611-MP-C040, 611-MP-C041	7
								50 Hz to 20 kHz	0.010 %			
								20 kHz to 100 kHz	0,015 %			
		10 mΩ	to		100 mΩ			20 Hz to 50 Hz	0.010 %			
								50 Hz to 100 kHz	0.0070 %			
								100 kHz to 1 MHz	0.10 %			
		100 mΩ	to		1 Ω			20 Hz to 50 Hz	0.0070 %			
								50 Hz to 100 kHz	0.0050 %			
								100 kHz to 200 kHz	0,0070 %			
								200 kHz to 500 kHz	0,015 %			
								500 kHz to 1 MHz	0.025 %			
		1 Ω	to		10 kΩ			20 Hz to 20 kHz	0.0020 %			
								20 kHz to 200 kHz	0,0050 %			

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		min. unit	max. unit						
					200 kHz to 500 kHz	0,010 %			
					500 kHz to 1 MHz	0,015 %			
					1 MHz to 10 MHz	0.20 %			
		10 kΩ	100 kΩ		20 Hz to 50 Hz	0.0070 %			
					50 Hz to 20 kHz	0.0050 %			
					20 kHz to 100 kHz	0,0070 %			
					100 kHz to 200 kHz	0,010 %			
					200 kHz to 500 kHz	0,015 %			
					500 kHz to 1 MHz	0.025 %			
					1 MHz to 10 MHz	5.0 %			
		100 kΩ	1 MΩ		20 Hz to 50 Hz	0.015 %			
					50 Hz to 20 kHz	0.0080 %			
					20 kHz to 100 kHz	0,020 %			
					100 kHz to 1 MHz	0.10 %			
					1 MHz to 10 MHz	5.0 %			
		1 MΩ	10 MΩ		20 Hz to 50 Hz	0.030 %			
					50 Hz to 20 kHz	0.015 %			
					20 kHz to 1 MHz	0.30 %			
		10 MΩ	100 MΩ		20 Hz to 50 Hz	0.070 %			
					50 Hz to 5 kHz	0.030 %			
					5 kHz to 10 kHz	0.050 %			
					10 kHz to 100 kHz	0.30 %			
21	Secondary component of impedance Z expressed as phase angle φ / AC resistance meters	-π	+π	1 mΩ to 10 mΩ	20 Hz to 200 Hz	3.5 µrad	Comparison with a standard using impedance bridge	611-MP-C040 611-MP-C041 611-MP-C099	7

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		min. unit	max. unit						
					200 Hz to 1 kHz	17·f[4] µrad			
					1 kHz to 100 kHz	17·f µrad			
				10 mΩ to 100 mΩ	20 Hz to 1 kHz	2,5 µrad			
					1 kHz to 100 kHz	4·f µrad			
				100 mΩ to 500 mΩ	20 Hz to 1 kHz	1,5 µrad			
					1 kHz to 1 MHz	1,5·f µrad			
				500 mΩ to 1 Ω	20 Hz to 1 kHz	1,0 µrad			
					1 kHz to 1 MHz	0,9·f µrad			
				1 Ω to 1 kΩ	20 Hz to 1 kHz	0,7 µrad			
					1 kHz to 1MHz	0,7·f µrad			
				1 kΩ to 10 kΩ	20 Hz to 1 kHz	0,9 µrad			
					1 kHz to 1 MHz	0,9·f µrad			
				10 kΩ to 100 kΩ	20 Hz to 1 kHz	1,2 µrad			
					1 kHz to 1 MHz	1,2·f µrad			
				100 kΩ to 10 MΩ	50 Hz to 200 Hz	50 µrad			
					200 Hz to 5 kHz	8.0 µrad			
					5 kHz to 10 kHz	20 µrad			
					10 kHz to 20 kHz	30 µrad			
					20 kHz to 100 kHz	1,2·f µrad			
22	Inductance / Inductance meters						Comparison with a standard using impedance bridge	611-MP-C099 611-MP-C041	7
			10 mH		1 kHz	0.15 µH			
			100 mH		1 kHz	1.5 µH			
		1 µH to	10 µH		1 kHz to 10 kHz	0.10 %			
					10 kHz to 20 kHz	0.050 %			
					20 kHz to 100 kHz	0.020 %			

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								100 kHz to 1 MHz	0.050 %			
		10	µH	to	100	µH		50 Hz to 200 Hz	0.10 %			
								200 Hz to 1 kHz	0.015 %			
								1 kHz to 20 kHz	0.020 %			
								20 kHz to 100 kHz	0.015 %			
								100 kHz to 1 MHz	0.050 %			
		100	µH	to	1	mH		20 Hz to 50 Hz	0.30 %			
								50 Hz to 1 kHz	0.015 %			
								1 kHz to 100 kHz	0.010 %			
								100 kHz to 1 MHz	0.050 %			
		1	mH	to	10	mH		20 Hz to 50 Hz	0.30 %			
								50 Hz to 200 Hz	0.015 %			
								200 Hz to 1 kHz	0.0080 %			
								1 kHz	0.0050 %			
								1 kHz to 20 kHz	0.0080 %			
								20 kHz to 100 kHz	0.015 %			
								100 kHz to 1 MHz	0.050 %			
		10	mH	to	100	mH		20 Hz to 50 Hz	0.30 %			
								50 Hz to 1 kHz	0.0080 %			
								1 kHz	0.0050 %			
								1 kHz to 20 kHz	0.015 %			
								20 kHz to 100 kHz	0.030 %			
								100 kHz to 1 MHz	0.050 %			
		100	mH	to	1	H		50 Hz to 1 kHz	0.0080 %			
								1 kHz	0.0050 %			
								1 kHz to 10 kHz	0.020 %			
								10 kHz to 100 kHz	0.050 %			

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		min.	unit	max. unit						
		1 H	to	10 H		20 Hz to 50 Hz	0.30 %			
						50 Hz to 1 kHz	0.020 %			
						1 kHz to 1 MHz	0.050 %			
		10 H	to	100 H		20 Hz to 50 Hz	0.30 %			
						50 Hz to 1 kHz	0.030 %			
						1 kHz to 100 kHz	0.050 %			
		100 H	to	1 kH		20 Hz to 50 Hz	0.30 %			
						50 Hz to 10 kHz	0.10 %			
23	Digital electrical inspection equipment and associated standards / insulation resistance	10 kΩ	to	10 MΩ			0.0012 %	Indirect measurement using a voltage calibrator, reference resistor and voltmeter	131-MP-C006	1.7
		10 MΩ	to	100 MΩ			0.0020 %			
		100 MΩ	to	1 GΩ			0.010 %			
		1 GΩ	to	10 GΩ			0.025 %			
		10 GΩ	to	100 GΩ			0.050 %			
		100 GΩ	to	1 TΩ			$0.002 \cdot R^2 + 0.001 \cdot R$ [Note 5]			
				100 MΩ			0.0017 %			
				1 GΩ			0.0030 %			
				10 GΩ			0.010 %			
		10 kΩ	to	1 GΩ			0.020 %	Direct generation of resistance with a calibrator of inspection		

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		min.	unit	max.	unit						
									instruments, resistance decade or resistance reference standards		
		1 GΩ	to	10 GΩ				1.0 %			
		10 GΩ	to	100 GΩ				1.5 %			
		100 GΩ	to	1 TΩ				2.5 %			
		1 TΩ	to	10 TΩ				4.0 %			
				100 MΩ				0.0030 %			
				1 GΩ				0.0050 %			
				10 GΩ				0.020 %			
				100 GΩ				0.10 %			
				1 TΩ				0.50 %			
	Digital electrical inspection equipment and associated standards / protective loop, network impedance and ground loop								Direct generation of resistance with a calibrator of inspection instruments, resistance decade or resistance reference standards		
				25 mΩ				5.0 mΩ			
				50 mΩ				5.0 mΩ			
				100 mΩ				5.0 mΩ			
				330 mΩ				7.0 mΩ			

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		min. unit	max. unit						
			500 mΩ			8.0 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			1.0 Ω			
			500 Ω			2.5 Ω			
			1 kΩ			5.0 Ω			
			1.8 kΩ			10 Ω			
	Digital electrical inspection equipment and associated standards / RCD tripping current	3 mA to	3 A		50 Hz	0.20 %	Simulation of a residual current device and direct measurement of tripping current by a calibrator of inspection instruments		
		3 mA to	3 A		50 Hz	1.0 %			
	Digital electrical inspection equipment and associated standards / RCD tripping time	10 ms to	5 s		50 Hz	0.05 ms	Simulation of a residual current device and direct measurement of tripping time by a calibrator of inspection instruments		

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		min.	unit	max.	unit						
		10 ms	to	5 s			50 Hz	0.020 % + 0.25 ms			
	Digital electrical inspection equipment and associated standards / passive leak current	0.1 mA	to	30 mA			50 Hz	0.30 % + 2 µA	Direct comparison with a calibrator of inspection instruments		
	Digital electrical inspection equipment and associated standards / differential leak current	0.1 mA	to	30 mA			50 Hz	0.30 % + 2 µA			
	Digital electrical inspection equipment and associated standards / differential leak current	0.1 mA	to	30 mA			50 Hz	0.30 % + 2 µA			
	Digital electrical inspection equipment and associated standards / active leak current	0.1 mA	to	30 mA			50 Hz	0.30 % + 1 µA			
		0.1 mA	to	300 mA			DC + 20 Hz to 400 Hz	0.20 %			
	Digital electrical inspection equipment and associated standards / DC voltage	0 V	to	10 kV				0.30 % + 5 V	Direct measurement of high voltage with a calibrator of inspection instruments or a voltmeter and voltage probe		

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		min.	unit	max.	unit						
	Digital electrical inspection equipment and associated standards / AC voltage	0 V	to	10 kV			50 Hz	0.50 % + 5 V			
	Digital electrical inspection equipment and associated standards / DC current	1 A	to	1 kA		Current clamp		0.80 %	Current simulation with a calibrator and current coil		
	Digital electrical inspection equipment and associated standards / AC current	1 A	to	1 kA		Current clamp	50 Hz	0.50 %			

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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 mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Location
24	Oscilloscope vertical deflection coefficient	-222 V 1 mV 21 mV 556 mV	to to to		222 V 21 mV 556 mV 210 V		0 Hz 10 Hz to 10 kHz		0.025 % + 25 µV 0.1 % + 15 µV 0.1 % + 1 µV 0.05 % + 1 µV	Direct voltage generation with an oscilloscope calibrator	113-MP-C008	1
25	Oscilloscope time base	1 ns	to		50 s				$0.25 \cdot 10^{-6}$	Direct generation by an oscilloscope calibrator	113-MP-C008	1
26	Oscilloscope bandwidth	0.1 Hz 300 MHz 550 MHz 1.1 GHz	to to to to		300 MHz 550 MHz 1.1 GHz 3.2 GHz		drop -3 dB		4 % 5 % 7 % 8 %	Measurement using oscilloscope calibrator	113-MP-C008	1
	Relative decrease of oscilloscope frequency response	-6 dB	to		6 dB		0.1 Hz to 300 MHz 300 MHz to 550 MHz 550 MHz to 1.1 GHz 1.1 GHz to 3.2 GHz		0.18 dB 0.22 dB 0.31 dB 0.35 dB			
27	Oscilloscope rise time	300 ps	to		1 s				12 ps	Calibrator signal measurement with an oscilloscope and correction	113-MP-C008	1

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28	Input resistance / oscilloscopes, counters, etc.	800 kΩ 40 Ω	to to	1.2 MΩ 90 Ω			0.1 % 0.1 %	Measurement using an oscilloscope calibrator	113-MP-C008	1
29	Voltage/oscilloscopic probe split ratio	0.9 : 1	to	1,100 : 1	To 222 V	0 Hz to 10 kHz	0.5 %	Direct voltage generation with an oscilloscope calibrator	113-MP-C008	1
30*	RF power calibration factor / power sensors	0.05	to	1.1		0 GHz to 1 GHz 1 GHz to 18 GHz 18 GHz to 40 GHz 40 GHz to 50 GHz	0.9 % 1.5 % 2.0 % 3.0 %	Direct comparison of reference and calibrated meter reading	113-MP-C014	1
	RF power level *L*/level meters,	44 dB(mW) 20 dB(mW) 10 dB(mW) -10 dB(mW) 	to to to to 	55 dB(mW) 44 dB(mW) 20 dB(mW) 10 dB(mW) 		9 kHz to 2.5 GHz 9 kHz to 6 GHz 6 GHz to 18 GHz 9 kHz to 1 GHz 1 GHz to 10 GHz 10 GHz to 18 GHz 18 GHz to 40 GHz 40 GHz to 50 GHz 9 kHz to 10 GHz 10 GHz to 18 GHz 18 GHz to 40 GHz 40 GHz to 50 GHz	0.12 dB 0.09 dB 0.14 dB 0.06 dB 0.07 dB 0.1 dB 0.13 dB 0,15 dB 0.05 dB 0.09 dB 0.13 dB 0,15 dB			

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		-30 dB(mW)	to		-10 dB(mW)		9 kHz to 1 GHz	0.06 dB			
							1 GHz to 10 GHz	0.07 dB			
							10 GHz to 18 GHz	0.1 dB			
							18 GHz to 40 GHz	0.13 dB			
							40 GHz to 50 GHz	0.15 dB			
		-60 dB(mW)	to		-30 dB(mW)		9 kHz to 1 GHz	0.07 dB			
							1 GHz to 10 GHz	0.09 dB			
							10 GHz to 18 GHz	0.1 dB			
							18 GHz to 40 GHz	-0,001·(*L*+30) + 0.13 dB			
							40 GHz to 50 GHz	-0,001·(*L*+30) + 0.15 dB			
		-100 dB(mW)	to		-60 dB(mW)		0.1 MHz to 1 GHz	-0,001·(*L*+60) + 0.07 dB			
							1 GHz to 10 GHz	-0,001·(*L*+60) + 0.07 dB			
							10 GHz to 18 GHz	-0,0015·(*L*+60) + 0.11 dB			
							18 GHz to 26.5 GHz	-0,002·(*L*+60) + 0.15 dB			
	RF voltage at a defined location on the coaxial line/probes, transducers	1 mV	to		2 V		0 GHz to 2 GHz	1 %	Power measurements and recalculations with vector corrections		
		2 V	to		100 V			1.7 %			
	RF current at a defined location on the coaxial line/probes, transducers	20 µA	to		40 mA		0 GHz to 2 GHz	1 %			
		40 mA	to		2 A			1.7 %			
	ΔL level difference of power, voltage and current/amplifiers, attenuators, level meters, signal sources	0 dB	to		65 dB		9 kHz to 1 MHz	0,0006*ΔL* + 0.02 dB	Power ratio measurement		

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	and other test equipment								
		65 dB	to	75 dB		0.14 dB			
		75 dB	to	85 dB		0.21 dB			
		0 dB	to	85 dB	1 MHz to 13.2 GHz	0,0006ΔL + 0.02 dB			
		85 dB	to	95 dB		0.14 dB			
		95 dB	to	105 dB		0.21 dB			
		105 dB	to	110 dB		0.56 dB			
		0 dB	to	75 dB	13.2 GHz to 26.5 GHz	0,0006ΔL + 0,02 dB			
		75 dB	to	85 dB		0.14 dB			
		85 dB	to	95 dB		0.21 dB			
		95 dB	to	100 dB		0.56 dB			
		0 dB	to	40 dB	26.5 GHz to 50 GHz	0.1 dB			
31	Voltages / equipment used mainly in testing (EMC)	0.5 mV	to	1,000 V	0 Hz	0.1 %	Measurement by a reference standard multimeter	113-MP-C014	1
		1 mV	to	100 V	10 Hz to 100 kHz	0.15 % +3 µV			
		100 V	to	500 V	10 Hz to 100 kHz	0.32 %			
	Voltage/ESD simulators						Direct measurement by a standard HV voltmeter	113-MP-C017	
		500 V	to	35 kV	0 Hz	2 % +5 V			
32	Current / equipment for testing (EMC)	0.1 mA	to	1 A	0 Hz	0.1 %	Measurement by a reference standard multimeter	113-MP-C014	1
	Current / excitation of frame antenna	1 A	to	40 A	40 Hz to 60 Hz	1.5 %	Measurement using a shunt	113-MP-C017	
		40 A	to	400 A	40 Hz to 60 Hz	1.8 %			

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	Current / current probes, shunts	50 mA	to		1.9999 A		10 Hz to 5 kHz		0.5 %			
33	Transfer impedance / current probes	-65 dB (Ω)	to		+35 dB (Ω)		10 Hz to 100 MHz 100 MHz to 300 MHz 300 MHz to 400 MHz		0.2 dB 0.35 dB 0.5 dB	Input current generation and output voltage measurement	113-MP-C017	1
34	Amplitude modulation depth *m* / signal sources, modulation meters	5 %	to		99 %		fc: 100 kHz to 10 MHz	fmod: 50 Hz to 10 kHz	0.0075·*m*	Measurement by ref. modulation analyzer, direct comparison with a reference standard	113-MP-C014	1
		5 % 20 %	to to		20 % 99 %		fc: 10 MHz to 3 GHz	fmod: 50 Hz to 100 kHz	0.025·*m* 0.005·*m*			
35	Impedance/ coupling networks	3 Ω	to		200 Ω		9 kHz to 400 MHz	module phase	6 % 4°	Measurement by a vector circuit analyzer and recalculations	113-MP-C017	1
36	Reflection coefficient modulus *r* / equipment used mainly in testing (EMC)	0	to		1		BNC connector	9 kHz to 1 GHz	$0.015r^2 + 0.01$	Measurement by a vector circuit analyzer	113-MP-C017	1
								1 GHz to 2 GHz	$0.025r^2 + 0.02$			
								2 GHz to 3 GHz	$0.035r^2 + 0.03$			

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							N connector 5 kHz to 2 GHz	$0.07r^2 + 0.015$	Measurements with directional bridges or taps		
							2 GHz to 8 GHz	$0.08r^2 + 0.02$			
							8 GHz to 18 GHz	$0.12r^2 + 0.03$			
37	Current/pulse generators, ESD simulators	1 A		to	130 A			4 %	Measurement using an oscilloscope with an ESD target	113-MP-C017	1
38	Short circuit current, peak value / pulse generators	1 A		to	3 kA		Rise time > 0.2 µs	4 %	Measurement with an oscilloscope with shunt or current transformer	113-MP-C017	1
39	No-load voltage, peak value / pulse generators	20 V		to	8 kV		Rise time > 0.2 µs	3.5 %	Measurement using an oscilloscope with a HV probe	113-MP-C017	1
40	Voltage to the load 2 Ω, 10 Ω , 20 Ω, 50 Ω, peak value / pulse generators	10 V		to	1 kV		Rise time > 0.2 µs	3.8 %	Measurement using an oscilloscope with a HV differential probe	113-MP-C017	1
41	Voltage, peak value/pulse generators EFT/burst, US defectoscopes,	10 V		to	4 kV		To 50 Ω load	3 %	Measurement with an oscilloscope with a HV divider or with attenuation cells	113-MP-C017	1
		200 V		to	6 kV		To 1 kΩ load	4 %			

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Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range min. unit		Nominal range max. unit	Parameter(s) of the measurand	Lowest stated expanded mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Location
42	Pulse area/pulse generators for EMI receiver calibration, ČSN EN 55016-1-1 ed.4	0.1 µVs	to	30 µVs	9 kHz to 150 kHz	2.8 %	Measurement with an oscilloscope with attenuation cells and subsequent calculations and corrections	113-MP-C017	1
		0.01 µVs	to	1 µVs	150 kHz to 30 MHz	2.8 %			
		1 nVs	to	100 nVs	30 MHz to 1 GHz	3 %			

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Ord. num-ber[1]	Calibrated quantity / Subject of calibration	Nominal range				Parameter(s) of the measurand		Lowest stated expanded mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Loca-tion
		min.	unit	max.	unit						
43	AC current ratio / Measuring current transformers	0.1	to	5,000		05 A to 5,000 A/ 5 A and 1 A	50 Hz	0.002%	Comparison with a measuring transformer	817-MP-C701	1, 12
	Current phase shift / Measuring current transformers	-600 ′	to	600 ′		0 5 A to 5,000 A/ 5 A and 1 A	50 Hz	0.07′	Comparison with a measuring transformer		
44*	AC voltage ratio / Measuring current transformers			50		5 kV /100 V	50 Hz	0.006 %	Comparison with a measuring transformer	817-MP-C701	1, 12
				100		10 kV /100 V		0.006 %			
				220		22 kV/100 V		0.006 %			
		0.4	to	80,000		100 V to 400 kV/5 V to 250 V	50 Hz	0.007 %	Comparison with a HV divider		
	Measuring voltage transformers / Voltage phase shift	-600 ′	to	600 ′		5 kV; 10 kV and 22 kV/100 V	50 Hz	0.21′	Comparison with a measuring transformer	817-MP-C701	1, 12
						100 V to 400 kV/5 V to 250 V	50 HZ	0.24′	Comparison with a HV divider		
45*	Rogowski coils / AC current	0 A	to	10 kA		1 thread		021 %	Comparison with a measuring current transformer	817-MP-C705	12

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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]	Location
		min.	unit	max. unit						
46	Antenna factor / antennas	-10 dB/m	to	+60 dB/m	3 m distance	30 MHz to 100 MHz	2.8 dB	Three antenna method	851-MP-C004, chap. 5.1 (ANSI C63.5 chap. 5)	13
						100 MHz to 300 MHz	2.8 dB			
						300 MHz to 1 GHz	3.0 dB			
						1 GHz to 18,000 MHz	2.0 dB			
					10 m distance	30 MHz to 100 MHz	2.2 dB			
						100 MHz to 300 MHz	1.5 dB			
						300 MHz to 1 GHz	1.4 dB			
						1 GHz to 18 GHz	2.0 dB			
47	Antenna factor / antennas	-10 dB/m	to	+60 dB/m	3 m distance	30 MHz to 100 MHz	3.3 dB	Substitution method	851-MP-C004, chap. 5.2 (ANSI C63.5 chap. 6)	13
						100 MHz to 300 MHz	3.3 dB			
						300 MHz to 1 GHz	3.5 dB			
						1 GHz to 18 GHz	2.2 dB			
					10 m distance	30 MHz to 100 MHz	2.5 dB			
						100 MHz to 300 MHz	1.7 dB			
						300 MHz to 1 GHz	1.7 dB			
						1 GHz to 18 GHz	2.2 dB			
48	Antenna factor / antennas	-10 dB/m	to	+60 dB/m	1 m distance	30 MHz to 1 GHz	3.5 dB	Measurement of transmission of two identical antennas	851-MP-C004, chap. 5.4 (SAE ARP 958, Rev.D, chap 3 and 4)	13
						1 GHz to 18 GHz	3.1 dB			

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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]	Location
		min. unit	max. unit						
49	Antenna factor / frame antennas	-10 dBS/m to	+60 dBS/m	1 m distance	10 kHz to 30 MHz	2.2 dB	Measurement of the magnetic field intensity of a standard antenna	851-MP-C004, chap. 5.5 (SAE ARP 958, Rev.D, chap. 6 and 7)	13
50	Antenna factor / rod antennas	-10 dB/m to	+60 dB/m		9 kHz to 30 MHz	2.1 dB	Adaptive circuit measurement	851-MP-C004, chap. 5.3 (ČSN EN 55016-1-4)	13

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[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).

[4] **f** is the frequency value in kHz

[5] R is the resistance value in TΩ

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CMC for the field of measured quantity: Magnetic quantities

Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range				Parameter(s) of the measurand	Lowest stated expanded mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Location
		min.	unit	max.	unit					
1	Magnetic induction / Reference magnets	0.3	mT	to 2	T		(0.21 to 1) %	Comparison with a standard teslameter	817-MP-C607	12

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CMC for the field of measured quantity: Optical quantities

Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range			Parameter(s) of the measurand	Lowest stated expanded mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Location
		min. unit		max. unit					
1	Spectral reflection coefficient R Spectrophotometers	0 %	to	100 %	8°/t, 8°/d 380 nm to 460 nm 465 nm to 780 nm 0°/45° 380 nm to 780 nm	(0.1 + 0.010·R) % (abs.) (0.12 + 0.008·R) % (abs.) (0.17 + 0.014·R) % (abs.)	Comparison with a colorimetric standard	818-MP-C802	12
	Colorimetric standard	0 %	to	100 %	8°/t, 8°/d 380 nm to 460 nm 465 nm to 780 nm 0°/45° 380 nm to 780 nm	(0.1 + 0.010·R) % (abs.) (0.12 + 0.008·R) % (abs.) (0.17 + 0.014·R) % (abs.)	Measurement by a reference spectrophotometer		
2	Surface colour, colorimetric coordinates Spectrophotometers, colorimeters						Comparison with a colorimetric standard	818-MP-C802	12
	L*	2	to	99	8°/t, 8°/d, 0°/45°	0.35 (abs.)			
	a*	-110	to	110		0.25 (abs.)			
	b*	-110	to	110		0.25 (abs.)			
	Colorimetric standard						Measurement by a reference spectrophotometer		
	L*	2	to	99	8°/t, 8°/d, 0°/45°	0.40 (abs.)			
	a*	-110	to	110		0.30 (abs.)			
	b*	-110	to	110		0.30 (abs.)			

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Ord. num-ber[1]	Calibrated quantity / Subject of calibration	Nominal range min. unit		max. unit	Parameter(s) of the measurand	Lowest stated expanded mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Loca-tion
3	Surface colour, colorimetric coordinates							818-MP-C802	12
	Spectrophotometers, colorimeters						Comparison with a colorimetric standard		
	Y	0.3	to	100	8°/t, 8°/d, 0°/45	0.25 (abs.)			
	x	0.002	to	0.7		0.0005 (abs.)			
	y	0.002	to	0.8		0.0005 (abs.)			
	Colorimetric standard						Measurement by a reference spectrophotometer		
	Y	0.3	to	100	8°/t, 8°/d, 0°/45	0.35 (abs.)			
	x	0.002	to	0.7		0.0007 (abs.)			
	y	0.002	to	0.8		0.0007 (abs.)			
4	Surface colour, colorimetric coordinates							818-MP-C802	12
	Spectrophotometers, colorimeters						Comparison with a colorimetric standard		
	L	2	to	99	8°/t, 8°/d, 0°/45	0.35 (abs.)			
	u´	0.002	to	0.6		0.0005 (abs.)			
	v´	0.002	to	0.6		0.0005 (abs.)			
	Colorimetric standard						Measurement by a reference spectrophotometer		
	L	2	to	99	8°/t, 8°/d, 0°/45	0.40 (abs.)			
	u´	0.002	to	0.6		0.0008 (abs.)			

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Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range min. unit		Nominal range max. unit	Parameter(s) of the measurand	Lowest stated expanded mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Location
	v´	0.002	to	0.6		0.0008 (abs.)			
5	Gloss / Gloss meters, gloss standards	0.1 GU	to	150 GU	20°, 60°, 85°	1.8 GU	ISO 2813	818-MP-C808	12
6*	Illumination / Light sources	5 lx	to	50,000 lx		2.2 %	Measurement by a reference photometer	818-MP-C801	12
	Illumination / Luxmeters	1 lx	to	50,000 lx		0.8 %	Comparison with a reference photometer	818-MP-C811	12
7*	Irradiance / colorimetric boxes	0.1 $\mu W \cdot cm^{-2}$	to	1,000 $mW \cdot cm^{-2}$	230 nm to 470 nm	5 %	Comparison with a reference photometer	818-MP-C801	12
8*	Replacement colour temperature / colorimetric (light) boxes	2,000 K	to	10,000 K		30 K	Measurement by a reference spectrophotometer	818-MP-C801	12
9*	Perpendicular spectral transmission / Transmission spectrophotometers, standard filters	0.1	to	1	$(200 \leq \lambda < 380)$ nm	0.0012 (abs.)	Comparison with a reference photometer	818-MP-C810	12
		0.001	to	0.1	$(200 \leq \lambda < 380)$ nm	0.0001 (abs.)			
		0.6	to	1	$(380 \leq \lambda < 1{,}000)$ nm	0.0008 (abs.)			
		0.3	to	0.6	$(380 \leq \lambda < 400)$ nm	0.0041 (abs.)			
		0.3	to	0.6	$(400 \leq \lambda < 700)$ nm	0.00056 (abs.)			
		0.3	to	0.6	$(700 \leq \lambda \leq 1{,}000)$ nm	0.0017 (abs.)			
		0.02	to	0.3	$(380 \leq \lambda < 400)$ nm	0.0015 (abs.)			
		0.02	to	0.3	$(400 \leq \lambda \leq 1{,}000)$ nm	0.00022 (abs.)			
		0.001	to	0.02	$(380 \leq \lambda < 400)$ nm	0.0002 (abs.)			

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Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range min. unit		Nominal range max. unit	Parameter(s) of the measurand	Lowest stated expanded mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Location
		0.001	to	0.02	(400 ≤ λ ≤ 1,000) nm	0.00008 (abs.)			
10*	Perpendicular spectral absorbance / Transmission spectrophotometers, standard filters	0.00	to	1.00 -	(200 ≤ λ < 380) nm	0.0005 to 0.0052 (abs.)	Comparison with a reference photometer	818-MP-C810	12
		1.00	to	3.00	(200 ≤ λ < 380) nm	0.0004 to 0.046 (abs.)			
		0.00	to	0.22	(380 ≤ λ < 1,000) nm	0.0003 to 0.0006 (abs.)			
		0.22	to	0.52	(380 ≤ λ < 400) nm	0.0030 to 0.0060 (abs.)			
		0.22	to	0.52	(400 ≤ λ < 700) nm	0.0004 to 0.0008 (abs.)			
		0.22	to	0.52	(700 ≤ λ ≤ 1,000) nm	0.0012 to 0.0025 (abs.)			
		0.52	to	1.70	(380 ≤ λ < 400) nm	0.0022 to 0.034 (abs.)			
		0.52	to	1.70	(400 ≤ λ ≤ 1,000) nm	0.0003 to 0.0048 (abs.)			
		1.70	to	3.00	(380 ≤ λ < 400) nm	0.0044 to 0.097 (abs.)			
		1.70	to	3.00	(400 ≤ λ ≤ 1,000) nm	0.0017 to 0.036 (abs.)			
11*	Wavelength λ / Transmission spectrophotometers	200 nm	to	1,700 nm		0.2 nm	Comparison with a standard filter	818-MP-C810	12
	Wavelength λ / Standard filters	200 nm	to	1,700 nm		0.2 nm	Measurement by a reference spectrophotometer	818-MP-C810	12
12	Transmission optical density / Optical densitometers	0	to	4.5		0.0038 (abs.)	Comparison with an optical density standard	818-MP-C812	12
	Transmission optical density D / Optical density standards	0	to	4.5		0.0038 (abs.)	Measurement by a reference densitometer	818-MP-C812	12

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Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range			Parameter(s) of the measurand	Lowest stated expanded mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Location
		min. unit		max. unit					
13	Optical power / Optical radiometers, fiber power meters	$1 \cdot 10^{-9}$ W	to	10 W	800 nm to 920 nm 920 nm to 960 nm 960 nm to 1,000 nm 1,000 nm to 1,580 nm 1,580 nm to 1,650 nm	0.40 % 0.50 % 0.45 % 0.47 % 0.60 %	Comparison with a reference detector[4]	818-MP-C813	12
14	Optical attenuation / Attenuators	0 dB	to	65 dB	800 nm to 1,650 nm	0.052 dB (abs.)	Comparison with a reference attenuators	818-MP-C813	12
15	Linearity / Fiber power meters	0 dB	to	0.5 dB	Power level 0 dBm to -65 dBm 800 nm to 1,650 nm	0.004 dB	Comparison with a reference detector[4]	818-MP-C813	12
16	Wavelength / Fiber spectrum analyzers	800 nm	to	1,650 nm		$4 \cdot 10^{-9}$ nm	Comparison with a reference radiation source, spectrometer / wavemeter	818-MP-C813	12
17	Luminous intensity / Standard light sources	1 cd	to	20,000 cd		0.8 %	Measurement by a reference photometer	818-MP-C811	12
18	Brightness / Brightness meters	1 cd m^{-2}	to	30,000 cd m^{-2}		0.94 %	Primary realization of brightness / Comparison with a reference brightness meter	818-MP-C805	12
19	Luminous flux / Standard light sources	10 lm	to	20,000 lm		1.0 %	Comparison with a standard light source in the integration sphere or on a reference goniophotometer	818-MP-C807	12

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Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range min. unit		Nominal range max. unit	Parameter(s) of the measurand	Lowest stated expanded mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Location
20	Spectral irradiance / Spectroradiometers	0.65 mW m^{-2} nm^{-1}	to	300 mW m^{-2} nm^{-1}	300 nm to 400 nm 400 nm to 1,700 nm 1,700 nm to 2,500 nm	3.4 % 3.0 % 4.5 %	Comparison with a standard source of optical radiation	818-MP-C806	12
21	Spectral radiance / Spectroradiometers	1.12 mW $sr^{-1}m^{-2}$ nm^{-1} 1.50 mW $sr^{-1}m^{-2}$ nm^{-1}	to to	10.00 mW $sr^{-1}m^{-2}$ nm^{-1} 95.00 mW $sr^{-1}m^{-2}$ nm^{-1}	370 nm to 800 nm 800 nm to 1,000 nm 1,000 nm to 1,700 nm	3.2 % 3.6 % 3.0 %	Comparison with a standard source and standard of spectral reflectance	818-MP-C806	12
22	Wavelength λ / spectroradiometer	365 nm	to	923 nm		0.4 nm	Comparison with a standard source	818-MP-C806	12
23	Spectral integral parameters / Sources of optical radiation						Measurement by a reference spectrophotometer	818-MP-C806	12
	Replacement colour temperature T_c	2,000 K		10,000 K		20 K			
	Colour rendering index R_a	1	to	100		1.2 (abs.)			
	Light colour, colorimetric coordinates x	0.002	to	0.7		0.0025 (abs.)			
	y	0.002	to	0.8		0.0020 (abs.)			
	Light colour, colorimetric coordinates u´	0.002	to	0.6		0.0017 (abs.)			
	v´	0.002	to	0.6		0.0015 (abs.)			

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Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range min. unit		Nominal range max. unit	Parameter(s) of the measurand	Lowest stated expanded mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Location
	Spectral integral parameters / Spectrophotometers						Comparison with a standard source of optical radiation or a reference spectroradiometer	818-MP-C806	12
	Replacement colour temperature T_c	2,000 K		10,000 K		20 K			
	Colour rendering index R_a	1	to	100		0.7 (abs.)			
	Light colour, colorimetric coordinates								
	x	0.002	to	0.7		0.0014 (abs.)			
	y	0.002	to	0.8		0.0010 (abs.)			
	Light colour, colorimetric coordinates								
	u´	0.002	to	0.6		0.0009 (abs.)			
	v´	0.002	to	0.6		0.0006 (abs.)			

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[4] Expressed in dBm: P[dBm]=10.log(P[W]/0,001); uncertainty U[dB]=10.log(1/(1-U[-])).

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

Ord. num-ber[1]	Calibrated quantity / Subject of calibration	Nominal range				Parameter(s) of the measurand	Lowest stated expanded mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Loca-tion
		min.	unit	max.	unit					
1*	Frequency / signal sources, frequency meters	0.01 Hz	to	3 GHz			$1 \cdot 10^{-11}$	Measurement by ref. counter, direct comparison with a reference standard alternatively using frequency dividers	113-MP-C007	1, 7
		3 GHz	to	18 GHz			$1 \cdot 10^{-11}$			1
		18 GHz	to	46 GHz			3 Hz			
2*	Period / signal sources, time interval meters	5 ns	to	10^5 s			$1 \cdot 10^{-11}$	Measurement by ref. counter, direct comparison with a reference standard	113-MP-C007	1, 7
3*	Time interval / signal sources, time interval meters	0 s	to	10^5 s			$(1.1 \cdot 10^{-9} + 1 \cdot 10^{-11}\, t)$s	Measurement using a counter	113-MP-C007	1, 7
		0 s	to	10 s			$(10 \cdot 10^{-12} + 2 \cdot 10^{-3}\, t)$ s	Measurement by an oscilloscope		
4*	Simple pulse counting / pulse sources, pulse counters	0	to	$1 \cdot 10^7$		f_{max}= 50 MHz	0	Measurement by ref. counter, direct comparison with a reference standard	113-MP-C007	1, 7

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Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range min. unit	Nominal range max. unit	Parameter(s) of the measurand	Lowest stated expanded mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Location
5	FM frequency deviation / signal sources, modulation meters	0.2 kHz to	40 kHz	f_c=250 kHz to 10 MHz f_{mod}=20 Hz to 10 kHz $\Delta f/ f_{mod}$>0.2	1.5 %	Measurement by ref. modulation meter, direct comparison with a reference standard	113-MP-C007	1
				$\Delta f/ f_{mod}$>1.2	1%			
		0.25 kHz to	400 kHz	f_c=10 MHz to 6.6 GHz f_{mod}=50 Hz to 200 kHz $\Delta f/ f_{mod}$>0.2	1.5 %			
				$\Delta f/ f_{mod}$>0.45	1%			
6	Time interval / mechanically operated stopwatch	0.1 s to	35,999.99 s		16 ms	Direct comparison with a reference standard	113-MP-C013	1, 2, 7
7	Relative frequency error of time base / stopwatch with LCD	$-1\cdot10^{-3}$ to	$1\cdot10^{-3}$		$3\cdot10^{-7}$	Frequency measurement – capacitive coupling to LCD	113-MP-C013	1, 2, 7

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CMC for the field of measured quantity: Acoustic quantities and mechanical vibration

Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range				Parameter(s) of the measurand	Lowest stated expanded mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Location
		min.	unit	max.	unit					
1	Sound pressure level / Acoustic calibrators	60	dB	134	dB	re $20 \cdot 10^{-6}$ Pa	0.09 dB	Comparison with a standard microphone in relation to frequency and total distortion (ČSN EN 60942)	812-MP-C211	12
2	Microphone sensitivity / Laboratory standard microphones	-40	dB	-24	dB	re $1 V \cdot Pa^{-1}$	0.05 dB	Reciprocal calibration method according to nominal sensitivity of 1“ standard microphone (ČSN EN 61094-1, ČSN EN 61094-2)	812-MP-C216	12

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Okružní 772/31, 638 00 Brno

CMC for the field of measured quantity: Physicochemical quantities

Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range min.	unit	to	max.	unit	Parameter(s) of the measurand	Lowest stated expanded mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Location
1*	Moisture of solids / relative moisture meters	4	%	to	50	%	Cereals, and oil seeds	0.25 %	Comparison with reference determination	511-MP-C001	6
		0.001	%	to	20	%	Plastics	0.005 %	Comparison with reference determination	511-MP-C009	6
2*	Moisture / Absolute / relative moisture meters	4	%	to	110	%	Solids	0.31 %	Comparison with reference determination	511-MP-C003	6
3*	Multi-parameter analyzers – relative moisture	4	%	to	50	%		0.27 %	Comparison with reference determination	511-MP-C001	6
	content of N-substances	5	%	to	40	%		0.30 %			
	oil content	10	%	to	80	%		0.29 %			
	Zeleny test	10	ml	to	75	ml		1.3 ml			
4	Refractive index / refractometers	1.3		to	1.7			$9 \cdot 10^{-5}$	Comparison with reference determination	512-MP-C003	6
5	Kinematic viscosity / efflux time	30	s	to	100	s	Efflux cup with a nozzle D4	0.91 s	Comparison with a calibration liquid	616-MP-C001	7
							C3	0.83 s			
							C4	0.72 s			
							C5	0.56 s			
							C6	0.84 s			
							A4	0.47 s			

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

Český metrologický institut
CAB number 2202, CMI Calibration Laboratory
Okružní 772/31, 638 00 Brno

Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range min.	unit		Nominal range max.	unit	Parameter(s) of the measurand	Lowest stated expanded mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Location
6	Kinematic viscosity / capillary viscometer constant				0.001	$mm^2 \cdot s^{-2}$		$1.8 \cdot 10^{-6}$ $mm^2 \cdot s^{-1}$	Comparison with a standard viscometer	616-MP-C002	7
					0.003	$mm^2 \cdot s^{-2}$		$7.6 \cdot 10^{-6}$ $mm^2 \cdot s^{-1}$			
					0.01	$mm^2 \cdot s^{-2}$		$2.9 \cdot 10^{-5}$ $mm^2 \cdot s^{-1}$			
					0.03	$mm^2 \cdot s^{-2}$		$9.7 \cdot 10^{-5}$ $mm^2 \cdot s^{-1}$			
					0.1	$mm^2 \cdot s^{-2}$		$3.5 \cdot 10^{-4}$ $mm^2 \cdot s^{-1}$			
					0.3	$mm^2 \cdot s^{-2}$		$1.1 \cdot 10^{-3}$ $mm^2 \cdot s^{-1}$			
					1	$mm^2 \cdot s^{-2}$		$3.9 \cdot 10^{-3}$ $mm^2 \cdot s^{-1}$			
					3	$mm^2 \cdot s^{-2}$		$1.7 \cdot 10^{-2}$ $mm^2 \cdot s^{-1}$			
					10	$mm^2 \cdot s^{-2}$		$5.0 \cdot 10^{-2}$ $mm^2 \cdot s^{-1}$			
					30	$mm^2 \cdot s^{-2}$		$1.6 \cdot 10^{-1}$ $mm^2 \cdot s^{-1}$			
7	Kinematic viscosity / calibration liquids	0.6	$mm^2 \cdot s^{-1}$	to	6	$mm^2 \cdot s^{-1}$		0.21 %	Direct measurement using a standard viscometer	616-MP-C002	7
		6	$mm^2 \cdot s^{-1}$	to	60	$mm^2 \cdot s^{-1}$		0.32 %			
		60	$mm^2 \cdot s^{-1}$	to	600	$mm^2 \cdot s^{-1}$		0.35 %			
		600	$mm^2 \cdot s^{-1}$	to	6,000	$mm^2 \cdot s^{-1}$		0.42 %			
		6,000	$mm^2 \cdot s^{-1}$	to	30,000	$mm^2 \cdot s^{-1}$		0.52 %			
8	Dynamic viscosity / calibration liquids	0.6	mPa·s	to	6	mPa·s		0.21 %	Direct measurement with standard viscometer and standard densimeter	616-MP-C002	7
		6	mPa·s	to	60	mPa·s		0.32 %			
		60	mPa·s	to	600	mPa·s		0.35 %			
		600	mPa·s	to	6,000	mPa·s		0.42 %			
		6,000	mPa·s	to	30,000	mPa·s		0.52 %			

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Ord. number[1]	Calibrated quantity / Subject of calibration	Nominal range min.	unit		Nominal range max.	unit	Parameter(s) of the measurand	Lowest stated expanded mesurement uncertainty[2]	Calibration principle	Calibration procedure identification[3]	Location
9	Dynamic viscosity / rotary viscometers	10	mPa·s	to	150	mPa·s		0.91 %	Comparison with a calibration liquid	616-MP-C003	7
		150	mPa·s	to	400	mPa·s		0.92 %			
		400	mPa·s	to	1,300	mPa·s		1.1 %			
		1,300	mPa·s	to	30,000	mPa·s		1.4 %			
10	Liquid density / glass density meters	620	$kg \cdot m^{-3}$	to	1,850	$kg \cdot m^{-3}$		0.022 $kg \cdot m^{-3}$	Comparison with a standard density meter	616-MP-C004	7
		0	% vol.	to	100	% vol.		0.019 % vol.			
		0	% wt.	to	90	% wt.		0.019 % wt.			
		10	$kg \cdot hl^{-1}$	to	30	$kg \cdot hl^{-1}$		0.019 $kg \cdot hl^{-1}$			
11	Conductometers	0.005	$S \cdot m^{-1}$	to	0.015	$S \cdot m^{-1}$		from 5.6 % to 0.64 %	Comparison with a standard conductometer	616-MP-C005	7
		0.015	$S \cdot m^{-1}$	to	0.15	$S \cdot m^{-1}$		from 0.64 % to 0.19 %			
		0.15	$S \cdot m^{-1}$	to	1.5	$S \cdot m^{-1}$		from 0.19 % to 1.5 %			
		1.5	$S \cdot m^{-1}$	to	10	$S \cdot m^{-1}$		1.5 %			
12	Ethanol concentration / breath alcohol analyzers	0	mg/l	to	1,400	mg/l	Gas phase	from 0.006 mg/l to 0.028 mg/l	By dry gas	114-MP-C004, chap no. 5.3.1	1, 10
13	Ethanol concentration / breath alcohol analyzers	0	mg/l	to	0.480	mg/l	Gas phase	from 0.008 mg/l from 0.013 mg/l	Simulation method	114-MP-C004, chap no. 5.3.2	1, 10

[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).

"This document is an appendix to the certificate of accreditation. In case of any discrepancies between the English and Czech versions, the Czech version shall prevail, both for the certificate appendix and the certificate itself. "