

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

Czech Metrology Institute  
CMI Calibration Laboratory  
Okružní 31, 638 00 Brno

**Workplace of the Calibration Laboratory:**

1 Regional Inspectorate Praha Radiová 1163/3, 102 00 Praha 10 - Hostivař

Procedures: procedure no. 1.1, 1.2

**Workplace of the Calibration Laboratory:**

4 Regional Inspectorate Liberec Slunečná 924/23, 460 01 Liberec - Staré Město

Procedures: procedure no. 1.3, 1.4, 1.6, 1.7, 1.8, 1.16

**Workplace of the Calibration Laboratory:**

5 Regional Inspectorate Most Vladislava Vančury 1428/7, 434 01 Most

Procedures: procedure no. 1.6, 1.7

**Workplace of the Calibration Laboratory:**

6 Regional Inspectorate Pardubice Průmyslová 455, 530 03 Pardubice - Pardubičky

Procedures: procedure no. 1.1, 1.2, 1.3, 1.6 ÷ 1.9, 1.11

**Workplace of the Calibration Laboratory:**

7 Regional Inspectorate Brno Okružní 31, 638 00 Brno

Procedures: procedure no. 1.3 ÷ 1.10

**Workplace of the Calibration Laboratory:**

10 Regional Inspectorate Opava Gudrichova 2252/41, 746 01 Opava - Předměstí

Procedures: procedure no. 1.1 ÷ 1.3

**Workplace of the Calibration Laboratory:**

12 Laboratory of Primary Metrology Praha V Botanice 1504/4, 150 00 Praha 5 - Smíchov

Procedures: procedure no. 1.5, 1.12 ÷ 1.15, 1.17 ÷ 1.20

**Field of measured quantity: length**

**Calibration:** Nominal temperature at calibration: as specified in the respective procedures

Ord. no. <sup>1</sup>	Measured quantity	Range of measured quantity	Calibration and Measurement Capability [ ± ] <sup>2)</sup>	Identification of the procedure
1.1*	Extensometers for mechanical testing of materials	(0 up to 10) mm (10 up to 50) mm (50 up to 1000) mm	0.9 µm 1.3 µm 30 µm	151-MP-C003 (ČSN EN ISO 9513)
1.2*	Extensometers for mechanical testing of materials	(0 up to 10) mm (10 up to 50) mm (50 up to 1000) mm	0.9 µm 1.3 µm 30 µm	151-MP-C005 (ASTM E83)



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Ord. no. <sup>1</sup>	Measured quantity	Range of measured quantity	Calibration and Measurement Capability [ $\pm$ ] <sup>2)</sup>	Identification of the procedure
1.3	Gauge blocks	(0.3 up to 1000) mm 2. order 3. order 4. order 5. order	(0.05+0.5·L) $\mu$ m (0.1+1·L) $\mu$ m (0.2+2·L) $\mu$ m (0.5+5·L) $\mu$ m	633-MP-C003 (ČSN ISO 3650)
1.4*	Gauge block comparators	Comparison range $\pm$ 0.01 mm Parameter nominal length (0.3 $\div$ 100) mm	0.032 $\mu$ m	633-MP-C005
1.5*	Calibration by a laser interferometer	to 20 m	(0.01+0.2·L) $\mu$ m	633-MP-C006
1.6	Micrometers up to 500 mm	(0 up to 500) mm	(0.8 + 5.0·L) $\mu$ m	633-MP-C008
1.7	Calipers up to 1000 mm	(0 up to 1000) mm	(10.0 + 0.5·L) $\mu$ m	633-MP-C009
1.8	Calibration by a measuring instrument of length	to 1 m	(0.3+0.4·L) $\mu$ m	633-MP-C029
1.9	Testing sieves	(0.005 up to 150) mm	(1.0 + 4.0·L) $\mu$ m	633-MP-C102
1.10	Calibration by a form measuring instrument	$\pm$ 2 mm Parameter diameter: 355 mm Parameter vertical way: 200 mm	Roundness $\sqrt{(0.025^2 + 0.01R^2)}$ $\mu$ m Straightness and parallelism $\sqrt{(0.7^2 + 0.01P^2)}$ $\mu$ m	633-MP-C103
1.11	Calibration by linear height meter	(0 up to 600) mm	(1.2 + 2.5·L) $\mu$ m	633-MP-C104
1.12 *	Calibration of coordinate measuring machines Calibration using ballplate  Calibration using laser interferometer  Calibration using stepgauge  Calibration using ballbar	(0.4 up to 2.5) m  (0 up to 30) m  (0.3 up to 1) m  (0.5 up to 2.5) m	Q(0.6 + 0.8·L) $\mu$ m  Q(0.01; 0.4·L; 0.1 $\alpha$ L) $\mu$ m  Q(0.3;0.6·L) $\mu$ m  Q(0.8; 1.4·L) $\mu$ m	815-MP-C501  815-MP-C501 (VDI 2617 part 5, ISO 10360-2) 815-MP-C501 (VDI 2617 part 2.1) 815-MP-C501 (VDI 2617 part 5, ISO 10360-2) 815-MP-C501 (VDI 2617 part 2.3, VDI 2617 part 5, ISO 10360-2)





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Ord. no. <sup>1</sup>	Measured quantity	Range of measured quantity	Calibration and Measurement Capability $ \pm $ <sup>2)</sup>	Identification of the procedure
	Calibration using glass scale	(0 up to 1.4) m	Q (0.2; 0.8·L) $\mu\text{m}$	815-MP-C501 (VDI 2617 part 6.1, 6.2)
	Calibration using plate with marks	(0.2 up to 0.2) m	Q(0.5 + 0.8·L) $\mu\text{m}$	815-MP-C501 (VDI 2617 part 6.1, 6.2)
1.13	Measurements and calibrations carried out on CMM SIP CMM5	(0 up to 1020) mm	U1: (0.3 + 0.6·L) $\mu\text{m}$ U3: (0.6 + 0.8·L) $\mu\text{m}$	815-MP-C503
1.14	Tape measures, length and distance measurement instruments	(0.3 up to 30) m (0 up to 300) m	Q(100;3·L) $\mu\text{m}$ Q(20;20·L) $\mu\text{m}$	815-MP-C510
1.15	Measurements and calibrations carried out on CMM WERTH-Video Check HA 800	(0 up to 1020) mm	Q (0.2; 0.8·L) $\mu\text{m}$	815-MP-C511
1.16 *	Calibrations of machines with electronic measuring cubage of beams	length (0 up to 30) m diameter (5 up to 100) cm	length 7 mm diameter 0.2 mm	431-MP-C003
1.17 *	Roughness adjustment standard, Pt characteristics  geometrical standard type C, characteristics: Ra, Rq, Rpm, Rk profiles, seat parts, Rsk, Rp3z, Rku, Rc, Rdq, Rđc Rmax, RzISO, Rp, Rv, Rz, Rt, Rz1, Rz2, Rz3, Rz4, Rz5  geometrical standard type D, characteristics: Ra, Rq, Rpm, Rk profiles, seat parts, Rsk, Rp3z, Rku, Rc, Rdq, Rđc Rmax, RzISO, Rp, Rv, Rz, Rt, Rz1, Rz2, Rz3, Rz4, Rz5	(0.01 up to <1) $\mu\text{m}$  (1 up to 100) $\mu\text{m}$  (0.01 up to 100) $\mu\text{m}$  (0.01 up to 100) $\mu\text{m}$  (0.01 up to 100) $\mu\text{m}$  (0.01 up to 100) $\mu\text{m}$	<sup>3)</sup> in nm: Q[20, 50Pt] Pt in $\mu\text{m}$  in nm: Q[20, 20Pt] Pt in $\mu\text{m}$  in nm: Q[10, 30Ra] Ra in $\mu\text{m}$  in nm: Q[20, 40Rp] Rp in $\mu\text{m}$  in nm: Q[10, 40Ra] Ra in $\mu\text{m}$  in nm: Q[20, 50Rp] Rp in $\mu\text{m}$	813-MP-C306



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Ord. no. <sup>1</sup>	Measured quantity	Range of measured quantity	Calibration and Measurement Capability [ ± ] <sup>2)</sup>	Identification of the procedure
	geometrical standard type C and D horizontal, characteristics	(0 up to 120) mm	in nm: Q[20, 50RSm] RSm in µm	
1.18 *	Roughness instruments			813-MP-C310
	Laboratory roughness instruments for adjustment standards	(0.01 up to <1) µm (1 up to 6000) µm	3.4 % 1.2 %	
	Laboratory roughness instruments for geometrical standards	(1 up to 6000) µm	3.4 %	
	Working roughness instruments for adjustment standards	(0.01 up to <1) µm (1 up to 6000) µm	Q[20,50Pt] Q[20,20Pt]	
	Working roughness instruments for geometrical standards characteristics: Ra, Rq, Rpm, Rk profiles, seat parts, Rsk, Rp3z, Rku, Rc, Rdq, Rđc	(0.01 up to 6000) µm	Q[10,40Ra]	
	Working roughness instruments for geometrical standards characteristics: Rmax, RzISO, Rp, Rv, Rz, Rt, Rz1, Rz2, Rz3, Rz4, Rz5	(0.01 up to 6000) µm	Q[20,50Rp]	
	Working roughness instruments for geometrical standards horizontal, characteristics	(0 up to 120) mm	Q[20,50RSm]	
1.19 *	Profile			813-MP-C311
	Calibration of profile instruments	(0 up to 120) mm	0.62 %	
	horizontal distance	(0 up to 60) mm	0.62 %	
	vertical distance	(0 up to 60) mm	0.62 %	
	radius	(0 up to 360) °	0.62 %	
	angle			
	Calibration of standards and measurement products			
	horizontal distance	(0 up to 120) mm	0.62 %	
	vertical distance	(0 up to 60) mm	0.62 %	





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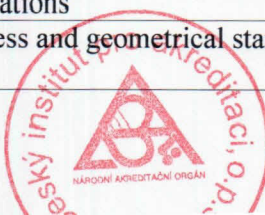
Ord. no. <sup>1</sup>	Measured quantity	Range of measured quantity	Calibration and Measurement Capability [ ± ] <sup>2)</sup>	Identification of the procedure
	radius angle	(0 up to 60) mm (0 up to 360) °	0.62 % 0.62 %	
1.20 *	Measurement and calibrations provided by Coordinate Measuring arm FARO			815-MP-C502
	- by laser probe	(0 up to 1800) mm	15 µm	
	- by touch probe	(0 up to 1800) mm	13 µm	

- 1) Asterisk at the ordinal number identifies the calibrations carried out outside/also outside the laboratory areas.  
2) Expressed like uncertainty in accordance with the requirements of the document EA Document 4/02 at k = 2.  
3) Calibration and Measurement Capability defined by the formula  $Q[A, B]$ ,  $Q[20, 40Rp]$  for k = 2 during calculation  $U = \sqrt{20^2 + (40 \cdot Rp)^2}$  where Rp is the measured value in µm. The whole Calibration and Measurement Capability is in nm. L is in metres, R is roundness in µm, P is Straightness in µm.

#### Instruments or devices to be measured (calibrated):

(In compliance with the above list of measured quantities and their ranges the following types of instruments or devices can be measured – calibrated.)

Ord. no.	Instrument or device to be measured (calibrated)
1	Extensometers for mechanical testing of materials
2	Gauge blocks
3	Gauge block comparators
4	Measuring instruments of length, 2D measuring machines, surface plates, coordinate measuring machines
5	Setting ring gauges, micrometers
6	Micrometers
7	Calipers
8	Testing sieves
9	Gauges measured on 3D CMM SIP CMM5
10	1D, 2D, 3D Coordinate Measuring Machines - calibration by laser interferometers
11	3D Coordinate Measuring Machines - calibration by step gauges
12	3D Coordinate Measuring Machines - calibration by a Ball Plate
13	Tape measures, length and distance measurement instruments
14	Optical calibres and measures, 3D standards and their parts
15	Instruments for measuring machines with electronic measuring cubage of beams
16	Special measurements and preparations
17	Adjustment standards for roughness and geometrical standards of roughness, type C and D and specimen



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Ord. no.	Instrument or device to be measured (calibrated)
18	Laboratory and working roughness instruments
19	Calibration of profile instruments, calibration of standards and measurement profiles surface
20	Coordinate Measuring arm FARO





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**Workplace of the Calibration Laboratory:**

4 Regional Inspectorate Liberec Slunečná 924/23, 460 01 Liberec - Staré Město

**Procedures:** procedure no. 2.1 ÷ 2.10

**Field of measured quantity:** plane angle

**Calibration:** Nominal temperature at calibration: as specified in the respective procedures

Ord. no. <sup>1)</sup>	Measured quantity	Range of measured quantity	Calibration and Measurement Capability [ ± ] <sup>2)</sup>	Identification of the procedure
2.1	Levels	-100' up to +100' -1100'' up to +1100''	1'' 0.2''	431-MP-C004
2.2	Autocollimators	-100' up to +100' -1100'' up to +1100''	0.5'' 0.03''	431-MP-C004
2.3	Angle gauges	0° up to 180°	2''	431-MP-C005
2.4*	Dividing heads and tables	0° up to 360°	0.5''	431-MP-C006
2.5	Goniometers, instruments for control the angular separation	0° up to 360°	0.5''	431-MP-C006
2.6	Angle protractor converters	0° up to 360°	0.5''	431-MP-C006
2.7	Polygons	0° up to 360°	0.6''	431-MP-C006
2.8	Polygons	0° up to 360°	0.08''	431-MP-C006
2.9	Angle protractors	0° up to 360°	1' 20''	431-MP-C006
2.10	Clinometers	-180° up to + 180°	2.4''	431-MP-C007

<sup>1)</sup> Asterisk at the ordinal number identifies the calibrations carried out outside/also outside the laboratory areas.

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

**Instruments or devices to be measured (calibrated):**

(In compliance with the above list of measured quantities and their ranges the following types of instruments or devices can be measured – calibrated.)

Ord. no.	Instrument or device to be measured (calibrated)
1	All kinds of levels including electronic coincidence
2	Autocollimators visual and electronic
3	Angle gauges
4	Dividing heads and tables
5	Goniometers and instruments for control the angular separation
6	Polygons
7	Angle protractors and clinometers





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**Workplace of the Calibration Laboratory:**

6 Regional Inspectorate Pardubice Průmyslová 455, 530 03 Pardubice - Pardubičky and laboratory in Skuteč, Husova 10, 539 73 Skuteč

**Procedures:** procedure no. 3.1 ÷ 3.7

**Workplace of the Calibration Laboratory:**

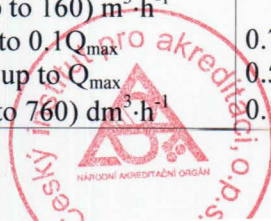
7 Regional Inspectorate Brno Okružní 31, 638 00 Brno

**Procedures:** procedure no. 3.1, 3.3, 3.8, 3.9 ÷ 3.12

**Field of measured quantity: volume, flow**

**Calibration:** Nominal temperature at calibration: as specified in the respective procedures

Ord. no. <sup>1)</sup>	Measured quantity	Range of measured quantity	Calibration and Measurement Capability [ ± ] <sup>2)</sup>	Identification of the procedure
3.1	Volumetric glassware	0.2 cm <sup>3</sup> up to 100 dm <sup>3</sup>	0.01 % of measured volume	532-MP-C301
3.2	Metal provers	(2 up to 100) dm <sup>3</sup>	0.01 % of measured volume	532-MP-C302
3.3	Piston – operated volumetric apparatus	(0.5 up to <10) µl 10 up to 50000 µl (>50000 up to 100000) µl (>100000 up to 150000) µl (>150000 up to 200000) µl	0.08 µl 0.1 µl 0.12 µl 0.16 µl 0.18 µl	532-MP-C303 (ČSN EN ISO 8655-6)
3.4*	Static containers and tanks a) volumetric method (by provers) b) flow method (by a flowmeter)	(20 up to 500) dm <sup>3</sup> 200 dm <sup>3</sup> up to 100 m <sup>3</sup>	0.3 % of MV 0.3 % of MV	551-MP-C401
3.5	Volumetric and velocity gas meters and gas flow meters P1 (SONICAL SN1000) P2 P3 P4 (JUSTUR)  Spektrum test rigs  Water EZEM	(0.06 up to 1200) m <sup>3</sup> ·h <sup>-1</sup>  (20 up to 10000) m <sup>3</sup> ·h <sup>-1</sup> (0.3 up to 1600) m <sup>3</sup> ·h <sup>-1</sup> (0.02 up to 16) m <sup>3</sup> ·h <sup>-1</sup> Q <sub>min</sub> up to 0,1Q <sub>max</sub> 0,1Q <sub>max</sub> up to Q <sub>max</sub> (0.02 up to 160) m <sup>3</sup> ·h <sup>-1</sup> Q <sub>min</sub> up to 0,1Q <sub>max</sub> 0,1Q <sub>max</sub> up to Q <sub>max</sub> (9.5 up to 760) dm <sup>3</sup> ·h <sup>-1</sup>	0.25 % of MV  0.19 % of MV 0.20 % of MV  0.65 % of MV 0.28 % of MV  0.70 % of MV 0.50 % of MV 0.16 % of MV	512-MP-C103  chapter 5.1. chapter 5.2. chapter 5.3. chapter 5.4.  chapter 5.5.  chapter 5.6.





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Ord. no. <sup>1)</sup>	Measured quantity	Range of measured quantity	Calibration and Measurement Capability [ ± ] <sup>2)</sup>	Identification of the procedure
3.6	Rotameters	(0.01 up to 0.75) m <sup>3</sup> ·h <sup>-1</sup> (0.75 up to 1.3) m <sup>3</sup> ·h <sup>-1</sup> (1.3 up to 25) m <sup>3</sup> ·h <sup>-1</sup>	1 % of MV 1.3 % of MV 1 % of MV	512-MP-C104
3.7	Gas conversion devices	(-30 up to +80) °C (0.8 up to 135) bar <sup>3)</sup>	0.06 % of MV of conversion factor Z	512-MP-C105
3.8	Meters of air content in fresh concrete	(0 up to 3) % of air (3 up to 8) % of air (8 up to 12) % of air	0.03 % of air 0.06 % of air 0.12 % of air	615-MP-C146
3.9	Anemometers, flowmeters for air-conditioning a) anemometers with LDA standard b) anemometers with Prandtl tube standard c) flowmeters with LDA standard d) flowmeters with Prandtl tube standard	(0.5 up to 5) m/s (5 up to 50) m/s (0.5 up to 5) m/s (5 up to 50) m/s (0 up to 28 600) m <sup>3</sup> /h (0 up to 28 600) m <sup>3</sup> /h	0.01m/s+0.3%MV 0.5% MV 0.01m/s+0.5%MV 0.7% MV (0.6/MV + 0.5) % MV ... velocity in m/s (0.7/MV + 0.76) % MV ... velocity in m/s	615-MP-C147 chapter 5.4.1 chapter 5.4.2 chapter 5.4.3 chapter 5.4.4
3.10	Meters for delivered amount of liquid, flow part of heat meters and flow meters tested by water volume method  mass method	(0.05 up to 150) m <sup>3</sup> /h  (0.005 up to 10) m <sup>3</sup> /h	0.10 %  0.16 % (5-12)L/h; 0.09 % (12-25)L/h; 0.07 % (25-50)L/h; 0.05 % (50-10000) L/h 0.15 % (0.005 up to 0.012) t/h 0.08 % (0.012 up to 0.025) t/h 0.05 % (0.025 up to 10,0) t/h	615-MP-C142



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Ord. no. <sup>1)</sup>	Measured quantity	Range of measured quantity	Calibration and Measurement Capability [ ± ] <sup>2)</sup>	Identification of the procedure
3.11	Flowmeters for liquids other than water	(0.16 up to 16) L/s	0.10 %	615-MP-C143
3.12	Meters and measuring systems for cryogenic liquids on road trucks and trailers	(85 up to 460) dm <sup>3</sup> /min	0.50 %	615-MP-C148

<sup>1)</sup> Asterisk at the ordinal number identifies the calibrations carried out outside/also outside the laboratory areas.

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

<sup>3)</sup> absolute pressure

#### Instruments or devices to be measured (calibrated):

(In compliance with the above list of measured quantities and their ranges the following types of instruments or devices can be measured – calibrated.)

Ordinal number	Instrument or device to be measured (calibrated)
1	Volumetric glassware
2	Metal provers
3	Piston – operated volumetric apparatus
4	Cooling and storage tanks for milk
5	Wooden barrels and tanks
6	Storage tanks (made of cement or masonry)
7	Barrels and tanks made of other materials
8	Transport barrels
9	Transport tanks for liquids without flowmeters
10	Velocity and volumetric gas meters
11	Rota meters
12	Gas conversion devices
13	Meters of air content in fresh concrete
14	Anemometers, flowmeters for air-conditioning
15	Meters for delivered amount of liquid, flow part of heat meters and flow meters tested by water
16	Flowmeters for liquids other than water
17	Meters and measuring systems for cryogenic liquids on road trucks and trailers





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**Workplace of the Calibration Laboratory:**

1 **Regional Inspectorate Praha** Radiová 1136/3, 102 00 Praha 10 - Hostivař  
**Procedures:** procedure no. 4.1, 4.2

**Workplace of the Calibration Laboratory:**

2 **Regional Inspectorate Č. Budějovice** U Sirkárny 33/5, 370 01 České Budějovice  
**Procedures:** procedure no. 4.1, 4.2

**Workplace of the Calibration Laboratory:**

3 **Regional Inspectorate Plzeň** Bendova 539/11, 301 00 Plzeň - Jižní Předměstí  
**Procedures:** procedure no. 4.1, 4.2

**Workplace of the Calibration Laboratory:**

4 **Regional Inspectorate Liberec** Slunečná 924/23, 460 01 Liberec - Staré Město  
**Procedures:** procedure no. 4.1, 4.2

**Workplace of the Calibration Laboratory:**

5 **Regional Inspectorate Most** Vladislava Vančury 1428/7, 434 01 Most  
**Procedures:** procedure no. 4.1, 4.2

**Workplace of the Calibration Laboratory:**

6 **Regional Inspectorate Pardubice** Průmyslová 455, 530 03 Pardubice - Pardubičky  
**Procedures:** procedure no. 4.1, 4.2

**Workplace of the Calibration Laboratory:**

7 **Regional Inspectorate Brno** Okružní 31, 638 00 Brno  
**Procedures:** procedure no. 4.1, 4.2

**Workplace of the Calibration Laboratory:**

8 **Regional Inspectorate Jihlava** R. Havelky 294/17, 586 01 Jihlava - Staré Hory  
**Procedures:** procedure no. 4.1, 4.2

**Workplace of the Calibration Laboratory:**

9 **Regional Inspectorate Kroměříž** Kotojedy 73, 767 01 Kroměříž - Kotojedy  
**Procedures:** procedure no. 4.1, 4.2

**Workplace of the Calibration Laboratory:**

10 **Regional Inspectorate Opava** Gudrichova 2252/41, 746 01 Opava - Předměstí  
**Procedures:** procedure no. 4.1, 4.2

**Workplace of the Calibration Laboratory:**

11 **Regional Inspectorate Olomouc** Pekařská 491/9, 772 00 Olomouc  
**Procedures:** procedure no. 4.1, 4.2



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**Field of measured quantity:** mass

**Calibration:** Nominal temperature at calibration: as specified in the respective procedures

Ord. no. <sup>1)</sup>	Measured quantity	Range of measured quantity	Calibration and Measurement Capability [±] <sup>2)</sup>	Identification of the procedure
4.1	Conventional mass of weights	(1 up to 20) mg 50 mg 100 mg 200 mg 500 mg 1 g 2 g 5 g 10 g 20 g 50 g 100 g 200 g 500 g 1 kg 2 kg 5 kg 10 kg 20 kg 50 kg 100 kg 200 kg 500 kg 1000 kg	0.001 0 mg 0.001 3 0.001 6 mg 0.002 0 mg 0.002 6 mg 0.003 mg 0.004 mg 0.005 mg 0.006 mg 0.008 mg 0.010 mg 0.016 mg 0.030 mg 0.080 mg 0.15 mg 0.30 mg 0.80 mg 1.5 mg 3.3 mg 8 mg 50 mg 100 mg 250 mg 500 mg	612-MP-C131
4.2*	Non-automatic and automatic weighing instruments	$m \leq 20$ kg $20 \text{ kg} < m \leq 50$ kg $50 \text{ kg} < m \leq 600$ kg $600 \text{ kg} < m \leq 200\,000$ kg	$5 \cdot 10^{-7}$ MH $1.6 \cdot 10^{-6}$ MH $5 \cdot 10^{-6}$ MH $1.6 \cdot 10^{-5}$ MH	612-MP-C132

<sup>1)</sup> Asterisk at the ordinal number identifies the calibrations carried out outside/also outside the laboratory areas.

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





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**Instruments or devices to be measured (calibrated):**

(In compliance with the above list of measured quantities and their ranges the following types of instruments or devices can be measured – calibrated.)

Ord. no.	Instrument or device to be measured (calibrated)
1	Weights of classes E <sub>2</sub> , F <sub>1</sub> , F <sub>2</sub> , M <sub>1</sub> , M <sub>1-2</sub> , M <sub>2</sub> , M <sub>2-3</sub> , M <sub>3</sub> (according to OIML R111), standard weights, special weights, other tangible bodies
2	Analytical, laboratory and industrial weighing instruments



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

Czech Metrology Institute  
CMI Calibration Laboratory  
Okružní 31, 638 00 Brno

**Workplace of the Calibration Laboratory:**

12 Laboratory of Primary Metrology Praha V Botanice 1504/4, 150 00 Praha 5 - Smíchov

**Procedures:**

procedure no. 5.1 ÷ 5.9

**Field of measured quantity: mechanical shock, vibration**

**Calibration:**

Nominal temperature at calibration: as specified in the respective procedures

Ord. no. <sup>1)</sup>	Measured quantity	Range of measured quantity	Calibration and Measurement Capability [ ± ] <sup>2)</sup>	Identification of the procedure
5.1*	Acceleration, velocity and displacement of rectilinear mechanical vibration of sinusoidal wave	Mean square value of acceleration (0,01 up to 400) m·s <sup>-2</sup> (frequency dependent) Calibration and Measurement Capability of the mean square value of acceleration in the frequency range: (0.1 up to 5000) Hz (5.1 up to 10) kHz	1.0 % MV 1.5 % MV	812-MP-C207 (ČSN ISO 16063-11)
5.2*	Vibration transducer sensitivity <sub>4)</sub>	(0.01 up to 1000) pC/m·s <sup>-2</sup> (0.01 up to 10000) mV/m·s <sup>-2</sup> Calibration and measurement capability of vibration transducer sensitivity in the frequency range: (0.1 up to 5000) Hz (5.1 up to 10) kHz	1.0 % MV 1.5 % MV	812-MP-C207
5.3*	Transfer function of amplifier and filter by simulator	(10 <sup>-7</sup> up to 10 <sup>7</sup> ) V/V (0.001 up to 1000) mV/pC Calibration and measurement capability of amplifier and filter in the frequency range: (0.1 up to 100000) Hz	0.5% MV, resp. 0.1dB	812-MP-C207
5.4*	Calibration of vibrometers without transducer by simulator	Acceleration (0.01 up to 10000) m·s <sup>-2</sup> in the frequency range (0.1 up to 100000) Hz	0.5% MV	812-MP-C207
5.5	Acceleration of mechanical shock of half-sine form	Peak value of acceleration (1 up to 10000) m·s <sup>-2</sup>	1.2 % MV	812-MP-C208
5.6*	Speed of road vehicles	(5 up to 250) km·h <sup>-1</sup> simulated laboratory test	0.2 km·h <sup>-1</sup> 0.01 % MV	812-MP-C209
5.7*	Vibration frequency	(0.1 up to 10000) Hz	0.01 % MV	812-MP-C207 812-MP-C210



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Ord. no. <sup>1)</sup>	Measured quantity	Range of measured quantity	Calibration and Measurement Capability [ ± ] <sup>2)</sup>	Identification of the procedure
5.8	Revolution and pulse counting - calibration: contact method non-contact method <sup>5)</sup>	(0.1 up to 50000) min <sup>-1</sup> (0.1 up to 1500000) min <sup>-1</sup>	10 <sup>-2</sup> MV 10 <sup>-10</sup> MV	812-MP-C212
5.9*	Revolution and pulse counting - calibration: contact method non-contact method <sup>5)</sup>	(0.1 up to 50000) min <sup>-1</sup> (0.1 up to 1500000) min <sup>-1</sup>	10 <sup>-2</sup> MV 10 <sup>-3</sup> MV	812-MP-C212

<sup>1)</sup> Asterisk at the ordinal number identifies the calibrations carried out outside/also outside the laboratory areas.

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

<sup>3)</sup> ambient temperature in laboratory; for cal. of measuring instruments of speed in the field the temperature range is -20 °C up to +45 °C

<sup>4)</sup> it is possible to specify in pC/g, or mV/g, where 1 g = 9,81 m·s<sup>-2</sup>

<sup>5)</sup> it is possible to specify in Hz

#### Instruments or devices to be measured (calibrated):

(In compliance with the above list of measured quantities and their ranges the following types of instruments or devices can be measured – calibrated.)

Ord. no.	Instrument or device to be measured (calibrated)
1	Vibration transducers, vibrometers
2	Shock transducers, shock meters
3	Working measuring instruments of speed (speedometers), Sonic belt tension meters
4	Revolution counter, mechanical, optical and electronic pulse counter



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**Workplace of the Calibration Laboratory:**

1 **Regional Inspectorate Praha** Radiová 1163/3, 102 00 Praha 10 - Hostivař  
**Procedures:** procedure no. 6.5, 6.6, 6.8, 6.9

**Workplace of the Calibration Laboratory:**

4 **Regional Inspectorate Liberec** Slunečná 924/23, 460 01 Liberec - Staré Město  
**Procedures:** procedure no. 6.2 a, b, 6.3, 6.5 a, b, 6.6, 6.8, 6.10

**Workplace of the Calibration Laboratory:**

6 **Regional Inspectorate Pardubice** Průmyslová 455, 530 03 Pardubice - Pardubičky  
**Procedures:** procedure no. 6.5 a, b, c, d ÷ 6.10

**Workplace of the Calibration Laboratory:**

7 **Regional Inspectorate Brno** Okružní 31, 638 00 Brno  
**Procedures:** procedure no. 6.6, 6.8, 6.9, 6.17

**Workplace of the Calibration Laboratory:**

9 **Regional Inspectorate Kroměříž** Kotojedy 73, 767 01 Kroměříž - Kotojedy  
**Procedures:** procedure no. 6.2 ÷ 6.5 a, b, c

**Workplace of the Calibration Laboratory:**

10 **Regional Inspectorate Opava** Gudrichova 2252/41, 746 01 Opava - Předměstí  
**Procedures:** procedure no. 6.5 b, 6.6, 6.8, 6.9, 6.17

**Workplace of the Calibration Laboratory:**

12 **Laboratory of primary metrology Praha V** Botanice 1504/4, 150 00 Praha 5 -Smíchov  
Radiová 1163/3, 102 00 Praha 10 - Hostivař  
**Procedures:** procedure no. 6.1, 6.2 b, 6.3, 6.4b, 6.11 ÷ 6.18

**Field of measured quantity:** force, torque, mechanical testing of materials,  
hardness testers

**Calibration:** Nominal temperature at calibration: as specified in the respective procedures

Ord. no. <sup>1)</sup>	Measured quantity	Range of measured quantity	Calibration and Measurement Capability [ ± ] <sup>2)</sup>	Identification of the procedure
6.1	Force (force transducers)	(0.2 up to 100) N 30 N up to 3 kN 150 N up to 20 kN 500 N up to 1000 kN	0.000 2 MV 0.000 05 MV 0.000 04 MV 0.000 2 MV	811-MP-C101
6.2*	Torque (devices for measurement of torque)			811-MP-C102
a		0.1 N·m up to 2 N·m	0.0024 MV	
b		2 N·m up to 1 kN·m	0.000 4 MV	
c		1 kN·m up to 3 kN·m	0.0025 MV	
6.3*	Torque (torque wrenches)	0.02 N·m up to 0.06 N·m	0.01 MV 0.005 MV	811-MP-C103





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Ord. no. <sup>1)</sup>	Measured quantity	Range of measured quantity	Calibration and Measurement Capability [ ± ] <sup>2)</sup>	Identification of the procedure
		0.06 N·m up to 2 kN·m 2 kN·m up to 3 kN·m	0.005 MV	
6.4*	Torque (devices for calibration of torque wrenches)			811-MP-C104
a		0.1 N·m up to 0.2 N·m	0.0024 MV	
b		0.2 N·m up to 2 kN·m	0.002 MV	
c		2 kN·m up to 3 kN·m	0.002 MV	
6.5*	Force (working force transducers)			811-MP-C111
a		0.02 N up to 5 N	0.002 MV	
b		5 N up to 100 kN	0.001 MV	
c		100 kN up to 200 kN	0.001 MV	
d		200 kN up to 1000 kN	0.001 MV	
e	1000 kN up to 2000 kN	0.001 MV		
6.6*	machines for mechanical testing of materials: pressure tension	(0 up to 5000) kN	0.28 % MV	151-MP-C001 (Part A) (ČSN EN ISO 7500)
		(0 up to 2000) kN	0.28 % MV	
6.7*	machines for mechanical testing of materials: self adjustment of upper pressing board	(0 up to 2000) kN	0.34 % MV	151-MP-C001 (Part B) (ČSN EN 12390-4, Annex A)
6.8*	machines for mechanical testing of materials: pressure tension	(0 up to 5000) kN	0.3 % MV	151-MP-C004 (ASTM E4)
		(0 up to 2000) kN	0.3 % MV	
6.9*	pendulum hammers for testing of indent resistance of materials	up to 2500 J	0.42 % MV	151-MP-C002 (ČSN EN ISO 148-2, ČSN EN ISO 13802, ASTM E23, BS 131-4)
6.10	* Force increase analysis	(0 up to 150) kN/s: programme AED PANEL32 digital stopwatch	0.7 % 1.5 %	151-MP-C006
6.11	Hardness (hardness measurements) Rockwell - A Rockwell - B Rockwell - C Rockwell - D Rockwell - E	(10 up to 100) HRA	0.10 HR	813-MP-C301 (ČSN EN ISO 6508-1; ČSN EN ISO 6508-2; ČSN EN ISO 6508-3)
		(10 up to 110) HRB	(15 indentations)	
		(10 up to 80) HRC	0.14 HR	
		(10 up to 90) HRD	(10 indentations)	
		(10 up to 110) HRE	0.16 HR	

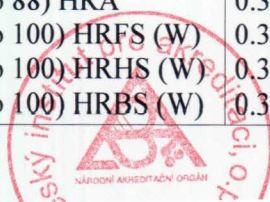




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Ord. no. <sup>1)</sup>	Measured quantity	Range of measured quantity	Calibration and Measurement Capability [ ± ] <sup>2)</sup>	Identification of the procedure
	Rockwell - F Rockwell - G Rockwell - H Rockwell - K	(10 up to 110) HRF (10 up to 100) HRG (10 up to 110) HRH (10 up to 110) HRK	(5 indentations)	
6.12	Hardness (hardness measurements) Rockwell - 15N Rockwell - 30N Rockwell - 45N Rockwell - 15T Rockwell - 30T Rockwell - 45T	(10 up to 100) HR 15N (10 up to 100) HR 30N (10 up to 90) HR 45N (10 up to 100) HR 15T (10 up to 90) HR 30T (10 up to 80) HR 45T	0.18 HR (15 indentations) 0.20 HR (10 indentations) 0.22 HR (5 indentations)	813-MP-C301 (ČSN EN ISO 6508-1; ČSN EN ISO 6508-2; ČSN EN ISO 6508-3)
6.13	Hardness (hardness measurements) Vickers	(20 up to 3000) HV	0.32 % MV (15 indentations) 0.36 % MV (10 indentations) 0.38 % MV (5 indentations)	813-MP-C302 (ČSN EN ISO 6507-1, ČSN EN ISO 6507-2, ČSN EN ISO 6507-3)
6.14	Hardness (hardness measurements) Brinell	(20 up to 650) HBW	0.15 % MV (15 indentations) 0.16 % MV (10 indentations) 0.18 % MV (5 indentations)	813-MP-C303 (ČSN EN ISO 6506-1, ČSN EN ISO 6506-2, ČSN EN ISO 6506-3)
6.15	Hardness (indenters Rockwell)	conical angle: (118 up to 122) ° radius of rounding: (100 up to 300) μm	0.04 °  0.08 μm	813-MP-C304 (ČSN EN ISO 6508-1, ČSN EN ISO 6508-2, ČSN EN ISO 6508-3)
6.16	Hardness (indenters Vickers)	angle of opposite sides: (134 up to 138) °	0.04 °	813-MP-C305 (ČSN EN ISO 6507-1, ČSN EN ISO 6507-2, ČSN EN ISO 6507-3)
6.17	* Hardness - hardness testers Rockwell	(20 up to 70) HRC (30 up to 94) HRGS (W) (40 up to 100) HRKS (W) (20 up to 88) HRA (60 up to 100) HRFS (W) (80 up to 100) HRHS (W) (20 up to 100) HRBS (W)	0.38 HR 0.38 HR 0.38 HR 0.38 HR 0.38 HR 0.38 HR	813-MP-C307





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Ord. no. <sup>1)</sup>	Measured quantity	Range of measured quantity	Calibration and Measurement Capability [ ± ] <sup>2)</sup>	Identification of the procedure
	Vickers	(40 up to 70) HRD (70 up to 100) HRES (W) (70 up to 94) HR15N (42 up to 86) HR30N (20 up to 77) HR45N (67 up to 93) HR15TS (W) (29 up to 82) HR30TS (W) (1 up to 72) HR45TS (W)	0.38 HR 0.38 HR 0.57 HR 0.57 HR 0.57 HR 0.57 HR 0.57 HR	
	Brinell	up to 225 HV (over 225 up to 700) HV over 700 HV	0.32 % HV 0.32 % HV 0.32 % HV	
6.18	Hardness Hardness testers Shore A	(1.0 up to 110.0) Shore A	0.22 Shore A	813-MP-C308 (chapter no. 5.1.)
	Hardness testers Shore B	(1.0 up to 110.0) Shore B	0.22 Shore B	
	Hardness testers Shore C	(1.0 up to 110.0) Shore C	0.22 Shore C	
	Hardness testers Shore D	(1.0 up to 110.0) Shore D	0.22 Shore D	
	Hardness testers Shore DO	(1.0 up to 110.0) Shore DO	0.22 Shore DO	
	Hardness testers IRHD M	(1.0 up to 110.0) °IRHD M	0.42 °IRHD	813-MP-C308 (chapter no. 5.2.)
	Hardness testers IRHD N	(1.0 up to 110.0) °IRHD N	0.22 °IRHD	
	Hardness testers IRHD H	(1.0 up to 110.0) °IRHD H	0.22 °IRHD	
	Hardness testers IRHD L	(1.0 up to 110.0) °IRHD L	0.22 °IRHD	
	Hardness Hardness measurement Shore	(0 up to 110) Shore	0.26 Shore	813-MP-C308 (chapter no. 5.3.)
	Hardness measurement IRHD N, H, L	(0 up to 110) °IRHD	0.44 °IRHD	
	Hardness measurement IRHD M	(0 up to 110) °IRHD	0.70 °IRHD	

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- 1) Asterisk at the ordinal number identifies the calibrations carried out outside/also outside the laboratory areas.
- 2) Expressed like uncertainty in accordance with the requirements of the document EA Document 4/02 at  $k = 2$ .

**Instruments or devices to be measured (calibrated):**

(In compliance with the above list of measured quantities and their ranges the following types of instruments or devices can be measured – calibrated.)

Ord. no.	Instrument or device to be measured (calibrated)
1	Torque wrenches
2	Force transducers
3	Devices for measurement of torque
4	Devices for calibration of torque wrenches
5	Working force transducers
6	Mechanical testing machines – self adjustment of upper pressing board and particular parts of testing machines
7	Pendulum hammers (impact devices)
8	Hardness testers
9	Hardness blocks and specimen Rockwell, Brinell, Vickers
10	Indenters Rockwell, Vickers
11	Hardness blocks and specimen Shore a IRHD and calibration of hardness testers Shore and IRHD





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**Workplace of the Calibration Laboratory:**

1 **Regional Inspectorate Praha** Radiová 1136/3, 102 00 Praha 10 - Hostivař

**Procedures:** procedure no. 7.1a, 7.2, 7.3

**Pracoviště kalibrační laboratoře:**

6 **Regional Inspectorate Pardubice** Průmyslová 455, 530 03 Pardubice - Pardubičky

**Procedures:** procedure no. 7.1b

**Field of measured quantity:** **pressure**

**Calibration:** Nominal temperature at calibration: as specified in the respective procedures

Ord. no. <sup>1)</sup>	Measured quantity	Range of measured quantity	Calibration and Measurement Capability [±] <sup>2)</sup>	Identification of the procedure
7.1a	Deformation type pressure gauges; digital pressure gauges and pressure measuring transducers: gas medium: - absolute pressure  - under pressure  - gauge pressure  liquid media: - overpressure	(0 up to 34.5) kPa (34.5 up to 300) kPa  (-100 up to 0) kPa (0 up to 34.5) kPa (0 up to 300) kPa (0 up to 2) MPa (0 up to 8) MPa  (0.02 up to 6) MPa (0.1 up to 25) MPa (0.2 up to 60) MPa (0.2 up to 100) MPa (0.2 up to 120) MPa	3.2 Pa 0.008 % MV + 7 Pa  0.006 % MV + 3 Pa 0.010 % MV 0.003 % MV + 6 Pa 0.0013 % MV + 25Pa 0.001 % MV + 50 Pa  0.0085 % MV 0.0085 % MV 0.0087 % MV 0.0087 % MV 0.015 % MV	134-MP-C002 134-MP-C003 134-MP-C004
7.1b	Liquid medium: - gauge pressure	(0.1 up to 0.5) MPa (0.5 up to 50) MPa	0.25 kPa 0.05 % MV	134-MP-C002
7.2*	Pressure measuring chains inclusive calibration of working pressure gauges - medium gas	-2 kPa up to +2 kPa -2 kPa up to -10 kPa -10 kPa up to -60 kPa -60 kPa up to -100 kPa 2 kPa up to 10 kPa 10 kPa up to 60 kPa 60 kPa up to 300 kPa 0.3 MPa up to 1.0 MPa	3.0 Pa 7.5 Pa 45 Pa 50 Pa 7.5 Pa 45 Pa 0.15 kPa 0.75 kPa	134-MP-C002 134-MP-C003 134-MP-C004



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Ord. no. <sup>1)</sup>	Measured quantity	Range of measured quantity	Calibration and Measurement Capability [±] <sup>2)</sup>	Identification of the procedure
	Pressure measuring chains inclusive calibration of working pressure gauge - liquid medium	1 MPa up to 3 MPa 0 kPa up to 300 kPa 0.3 MPa up to 3.0 MPa 3.0 MPa up to 30 MPa 30 MPa up to 100 MPa	1.5 kPa 0.15 kPa 1.5 kPa 0.05 % MH 0.05 MPa	
	Pressure measuring chains inclusive calibration of working pressure gauge - gas medium, absolute pressure	0.1 Pa up to 1.0 Pa 1.0 Pa up to 10 Pa 10 Pa up to 100 Pa 0.1 kPa up to 120 kPa	0.2 Pa 1.5 Pa 12 Pa 15 Pa	
7.3	Piston gauges and deadweight testers:  gas medium - gauge pressure  - under pressure  oil medium - gauge pressure	(15 up to 34.5) kPa  (30 up to 300) kPa (35 up to 345) kPa (0.4 up to 2) MPa (1 up to 10) MPa (-15 up to -100) kPa  (1 up to 6) MPa (3 up to 25) MPa (10 up to 100) MPa (10 up to 120) MPa	0.0094 % MV  7 Pa + 0.0030 % MV 0.0089 % MV 25 Pa + 0.0013 % MV 90 Pa + 0.0015 % MV 3 Pa + 0.0060 % MV  0.0080 % MV 0.0080 % MV 0.0084 % MV 0.0090 % MV	134-MP-C001

<sup>1)</sup> Asterisk at the ordinal number identifies the calibrations carried out outside/also outside the laboratory areas.

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

**Instruments or devices to be measured (calibrated):**

(In compliance with the above list of measured quantities and their ranges the following types of instruments or devices can be measured – calibrated.)

Ord. no.	Instrument or device to be measured (calibrated)
1	Deformation type pressure gauges
2	Digital pressure gauges
3	Pressure measuring transducers with the unified output signal
4	Analog and digital pressure measuring chains
5	Piston gauges and deadweight testers





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Okružní 31, 638 00 Brno

**Workplace of the Calibration Laboratory:**

1 **Regional Inspectorate Praha** Radiová 1136/3, 102 00 Praha 10 - Hostivař

**Procedures:** procedure no. 8.1 ÷ 8.10, 8.20 ÷ 8.25

**Workplace of the Calibration Laboratory:**

7 **Regional Inspectorate Brno** Okružní 31, 638 00 Brno

**Procedures:** procedure no. 8.1 ÷ 8.8, 8.20 ÷ 8.22

**Field of measured quantities: temperature and humidity**

**Calibration:** Nominal temperature at calibration: as specified in the respective procedures

Ord. no. <sup>1)</sup>	Measured quantity	Range of measured quantity	Calibration and Measurement Capability [ ± ] <sup>2)</sup>	Identification of the procedure
8.1	Liquid-in-glass thermometers (division < 0.1 °C)	(-80 ÷ 100) °C (>100 ÷ 150) °C (>150 ÷ 210) °C (>210 ÷ 360) °C	0.015 °C 0.020 °C 0.040 °C 0.050 °C	133-MP-C001 <sup>3)</sup>
	Liquid-in-glass thermometers (division = 0.1 °C)	(-80 ÷ 150) °C (>150 ÷ 210) °C (>210 ÷ 360) °C (>360 ÷ 420) °C (>420 ÷ 550) °C	0.03 °C 0.05 °C 0.06 °C 0.15 °C 0.20 °C	
	Liquid-in-glass thermometers (division = 1 °C)	(-80 ÷ 210) °C (>210 ÷ 360) °C (>360 ÷ 550) °C	0.40 °C 0.50 °C 0.60 °C	
8.2	Resistance thermometers (standards)	-196 °C 0.01 °C (-80 ÷ 160) °C (>160 ÷ 300) °C (>300 ÷ 420) °C (>420 ÷ 550) °C (>550 ÷ 660) °C	0.03 °C 0.002 °C 0.01 °C 0.02 °C 0.03 °C 0.05 °C 0.09 °C	133-MP-C002
	Resistance thermometers (industrial)	-196 °C 0.01 °C (-80 ÷ 160) °C (>160 ÷ 300) °C (>300 ÷ 420) °C (>420 ÷ 550) °C (>550 ÷ 660) °C	0.035 °C 0.004 °C 0.020 °C 0.025 °C 0.035 °C 0.055 °C 0.090 °C	



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Ord. no. <sup>1)</sup>	Measured quantity	Range of measured quantity	Calibration and Measurement Capability [ ± ] <sup>2)</sup>	Identification of the procedure
8.3		Thermocouples		133-MP-C003
	Noble metals (standards)	(0 ÷ 220) °C (>220 ÷ 550) °C (>550 ÷ 1100) °C (>1100 ÷ 1200) °C (>1200 ÷ 1600) °C	0.4 °C 0.5 °C 0.8 °C 1.0 °C 1.7 °C	
	Base metals (standards)	-196 °C (-80 ÷ 220) °C (>220 ÷ 550) °C (>550 ÷ 1100) °C (>1100 ÷ 1300) °C	0.3 °C 0.2 °C 0.4 °C 1.0 °C 1.4 °C	
	Noble metals (industrial)	(0 ÷ 220) °C (>220 ÷ 550) °C (>550 ÷ 1100) °C (>1100 ÷ 1200) °C (>1200 ÷ 1600) °C	0.5 °C 0.6 °C 0.9 °C 1.1 °C 1.7 °C	
	Base metals (industrial)	-196 °C (-80 ÷ 220) °C (>220 ÷ 550) °C (>550 ÷ 1100) °C (>1100 ÷ 1300) °C	0.7 °C 0.6 °C 0.8 °C 1.2 °C 1.5 °C	
8.4	Gauged thermometers	-196 °C 0.01 °C (-80 ÷ 160) °C (>160 ÷ 300) °C (>300 ÷ 420) °C (>420 ÷ 550) °C (>550 ÷ 660) °C (>660 ÷ 1100) °C (>1100 ÷ 1200) °C (>1200 ÷ 1600) °C	0.03 °C 0.002 °C 0.01 °C 0.02 °C 0.03 °C 0.05 °C 0.09 °C 0.8 °C 1.0 °C 1.7 °C	133-MP-C004
8.5*	Gauged thermometers Temperature measuring chains inclusive temperature sensors, The performance of temperature chambers	(-80 ÷ -20) °C (>-20 ÷ 50) °C (>50 ÷ 100) °C (>100 ÷ 650) °C (>650 ÷ 1100) °C (>1100 ÷ 1600) °C	0.20 °C 0.10 °C 0.15 °C 0.15 % MV (°C) 0.20 % MV (°C) 0.25 % MV (°C)	133-MP-C004
8.6*	Radiation thermometers  Measuring chains with noncontact	(-30 ÷ -15) °C (>-15 ÷ 0) °C (>0 ÷ 20) °C (>20 ÷ 100) °C (>100 ÷ 200) °C	2.2 °C 1.6 °C 1.1 °C 0.8 °C 1.1 °C	133-MP-C005





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Ord. no. <sup>1)</sup>	Measured quantity	Range of measured quantity	Calibration and Measurement Capability [ ± ] <sup>2)</sup>	Identification of the procedure
	temperature sensors, range (30 up to 500 °C)	(>200 ÷ 300) °C (>300 ÷ 400) °C (>400 ÷ 500) °C (>500 ÷ 600) °C (>600 ÷ 700) °C	1.4 °C 1.7 °C 2.2 °C 2.6 °C 2.9 °C	
8.7	Radiation thermometers	(>700 ÷ 800) °C (>800 ÷ 900) °C (>900 ÷ 1000) °C (>1000 ÷ 1100) °C (>1100 ÷ 1240) °C	3.3 °C 3.6 °C 4.2 °C 4.9 °C 6.3 °C	133-MP-C005
8.8*	Simulation of signal output – thermocouples			133-MP-C006
	Type K <sup>4)</sup>	(-100 ≤ t < -50) °C (-50 ≤ t < 1200) °C (1200 ≤ t < 1300) °C	0.2 °C 0.03 % MV + 0.1 °C 1.3 °C	
	Type J <sup>4)</sup>	(-150 ≤ t < 870) °C (870 ≤ t < 1000) °C	0.4 °C 1.3 °C	
	Type N <sup>4)</sup>	(-100 ≤ t < 900) °C (900 ≤ t < 1300) °C	0.3 °C 0.4 °C	
	Type S <sup>4)</sup>	(300 ≤ t < 550) °C (550 ≤ t < 1300) °C	0.7 °C 0.8 °C	
	Platinum resistance thermometers	(-100 ≤ t < 800) °C	0.04 % MV + 0.1 °C	
	Voltage output of transmitters	(-10 ÷ 50) mV (-100 ÷ 500) mV (-1 ÷ 5) V (-1 ÷ 50) V	0.04 % MV + 7 μV 0.04 % MV + 50 μV 0.04 % MV + 0.5 mV 0.04 % MV + 5 mV	
	Current output of transmitters	(0 ÷ 24) mA	0.04 % MV + 5 μA	
8.9	Pt thermocouples at the fixed points of ITS-90	-189.3442 °C (Ar) 660.323 °C (Al) 961.7800 °C (Ag)	0.7 mK 2 mK 5 mK	112-MP-C001
8.10	Noble metal thermocouples at the fixed points of ITS-90	419.527 °C (Zn) 660.323 °C (Al) 961.78 °C (Ag) 1084.62 °C (Cu)	1.0 μV 1.2 μV 1.9 μV 1.9 μV	112-MP-C002
8.20	Hygrometers Relative humidity	(10 ÷ 35) % (>35 ÷ 55) % (>55 ÷ 75) % (>75 ÷ 85) %	0.6 % 0.7 % 0.8 % 0.9 %	636-MP-C119



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Ord. no. <sup>1)</sup>	Measured quantity	Range of measured quantity	Calibration and Measurement Capability [ ± ] <sup>2)</sup>	Identification of the procedure
		(>85 ÷ 90) % (>90 ÷ 95) %	1.0 % 1.5 %	
8.21	Hygrometers Temperature of dew/frost point	(-75 ÷ -60) °C (>-60 ÷ -40) °C (>-40 ÷ -20) °C (>-20 ÷ 20) °C	0.30 °C 0.20 °C 0.16 °C 0.14 °C	636-MP-C119
8.22	Hygrometers Relative humidity Humidity measuring chains inclusive humidity sensors, the performance of climatic chambers	(10 ÷ 20) % (>20 ÷ 40) % (>40 ÷ 65) % (>65 ÷ 80) % (>80 ÷ 90) % (>90 ÷ 95) %	0.7 % 0.8 % 0.9 % 1.0 % 1.2 % 1.5 %	636-MP-C119
8.23	Infrared thermometers	Calibration in fixed points (In, Sn, Al, Cu) Calibration with black bodies: (-50 ≤ t ≤ 100) °C (100 < t ≤ 1000) °C (1000 < t ≤ 1300) °C (1300 < t ≤ 1700) °C	0.10 °C  0.30 °C 0.33 °C 1.0 °C 1.5 °C	112-MP-C003
8.24	Black bodies	(-30 ≤ t ≤ 1000) °C (1000 < t ≤ 1350) °C	0.40 °C 2.0 °C	112-MP-C004
8.25	Thermo imagery	(-50 ≤ t ≤ 1350) °C	0.50 °C	112-MP-C005

<sup>1)</sup> Asterisk at the ordinal number identifies the calibrations carried out outside/also outside the laboratory areas.

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

<sup>3)</sup> For intermediate values of the division size apply to CMC as a division 0.1 °C, whilst respecting the actual readability thermometer

<sup>4)</sup> Valid for CJC temperature = 0 °C; additional uncertainty in the internal CJC mode is ± 0.4 °C

### Instruments or devices to be measured (calibrated):

(In compliance with the above list of measured quantities and their ranges the following types of instruments or devices can be measured – calibrated.)

Ord. no.	Instrument or device to be measured (calibrated)
1	Liquid-in-glass, resistance and gauged thermometers
2	Thermocouples
3	Radiation thermometers and measuring chains with noncontact temperature sensors





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Ord. no.	Instrument or device to be measured (calibrated)
4	Analog and digital temperature measuring chains, the performance of temperature chambers
5	Hygrometers of gases, humidity measuring chains, the performance of climatic chambers
6	Infrared thermometers
7	Black bodies
8	Thermo imagery



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**Workplace of the Calibration Laboratory:**

1 **Regional Inspectorate Praha** Radiová 1136/3, 102 00 Praha 10 - Hostivař

**Procedures:** procedure no. 9.1 ÷ 9.6, 9.10, 9.15, 9.16, 9.21 ÷ 9.28

**Workplace of the Calibration Laboratory:**

7 **Regional Inspectorate Brno** Okružní 31, 638 00 Brno

**Procedures:** procedure no. 9.1 ÷ 9.14, 9.21

**Workplace of the Calibration Laboratory:**

12 **Laboratory of Primary Metrology Praha** V Botanice 1504/4, 150 00 Praha 5 - Smíchov

**Procedures:** procedure no. 9.17 ÷ 9.20

**Workplace of the Calibration Laboratory:**

13 **TESTCOM Praha** Hvožd'anská 2053/3, 148 00 Praha 4 - Chodov

**Procedures:** procedure no. 9.29

**Field of measured quantities: electrical quantities**

**Calibration:** Nominal temperature at calibration: as specified in the respective procedures

Ord. no. <sup>1)</sup>	Measured quantity and Range of measured quantity	Frequency	Calibration and Measurement Capability [ $\pm$ ] <sup>2)</sup>	Identification of the procedure
9.1*	DC voltage (0 up to 20) mV (20 up to 200) mV 200 mV up to 2 V (2 up to 20) V 10V (20 up to 1100) V		15 $\mu$ V/V+0.050 $\mu$ V 5.0 $\mu$ V/V 2.6 $\mu$ V/V 2.1 $\mu$ V/V 0.15 $\mu$ V/V 2.9 $\mu$ V/V	611-MP-C097 611-MP-C098
9.2*	AC voltage (0.9 up to 2) mV:	10 Hz up to 75 kHz 75 kHz up to 400 kHz 400 kHz up to 750 kHz 750 kHz up to 1 MHz	2000 $\mu$ V/V 3100 $\mu$ V/V 3300 $\mu$ V/V 3500 $\mu$ V/V	611-MP-C097 611-MP-C098
	AC voltage (2.0 up to 20) mV:	10 Hz up to 25 kHz 25 kHz up to 75 kHz 75 kHz up to 200 kHz 200 kHz up to 400 kHz 400 kHz up to 750 kHz 750 kHz up to 1 MHz	360 $\mu$ V/V 330 $\mu$ V/V 530 $\mu$ V/V 710 $\mu$ V/V 790 $\mu$ V/V 1100 $\mu$ V/V	611-MP-C097 611-MP-C098
	AC voltage (20 up to 200) mV:	10 Hz up to 25 kHz 25 kHz up to 75 kHz 75 kHz up to 200 kHz	98 $\mu$ V/V 190 $\mu$ V/V 370 $\mu$ V/V	611-MP-C097 611-MP-C098





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Ord. no. <sup>1)</sup>	Measured quantity and Range of measured quantity	Frequency	Calibration and Measurement Capability [ ± ] <sup>2)</sup>	Identification of the procedure
		200 kHz up to 400 kHz 400 kHz up to 750 kHz 750 kHz up to 1 MHz	590 μV/V 650 μV/V 1000 μV/V	
	AC voltage 200 mV up to 2 V	10 Hz up to 35 Hz 35 Hz up to 40 kHz 40 kHz up to 75 kHz 75 kHz up to 200 kHz 200 kHz up to 400 kHz 400 kHz up to 750 kHz 750 kHz up to 1 MHz	37 μV/V 26 μV/V 37 μV/V 48 μV/V 120 μV/V 230 μV/V 590 μV/V	611-MP-C097 611-MP-C098
	AC voltage (2 up to 20) V	10 Hz to 35 Hz 35 Hz up to 40 kHz 40 kHz up to 75 kHz 75 kHz up to 200 kHz 200 kHz up to 400 kHz 400 kHz up to 750 kHz 750 kHz up to 1 MHz	37 μV/V 26 μV/V 33 μV/V 40 μV/V 110 μV/V 210 μV/V 560 μV/V	611-MP-C097 611-MP-C098
	AC voltage (20 up to 200) V	10 Hz up to 35 Hz 35 Hz up to 175 Hz 175 Hz up to 40 kHz 40 kHz up to 75 kHz 75 kHz up to 150 kHz 150 kHz up to 200 kHz	42 μV/V 37 μV/V 28 μV/V 40 μV/V 71 μV/V 240 μV/V	611-MP-C097 611-MP-C098
	AC voltage (200 up to 1100) V:	10 Hz up to 5 kHz 5 kHz up to 25 kHz 25 kHz up to 40 kHz 40 kHz up to 75 kHz 75 kHz up to 100 kHz (generation only up to 750 V)	40 μV/V 45 μV/V 76 μV/V 120 μV/V 350 μV/V	611-MP-C097 611-MP-C098
9.3*	DC current (0 up to 1) μA (1 up to 200) μA 200 μA up to 2 mA (2 up to 20) mA (20 up to 200) mA 200 mA up to 2 A		0.10 nA 21 μA/A 6.0 μA/A 6.0 μA/A 8,0 μA/A 15 μA/A	611-MP-C097 611-MP-C098



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Ord. no. <sup>1)</sup>	Measured quantity and Range of measured quantity	Frequency	Calibration and Measurement Capability [ ± ] <sup>2)</sup>	Identification of the procedure
	(2 up to 20) A (20 up to 100) A		30 μA/A 8,8 μA/A	
9.4*	DC current (9 up to 200) μA	10 Hz up to 25 Hz 25 Hz up to 35 Hz 35 Hz up to 1 kHz 1 kHz up to 10 kHz	130 μA/A 120 μA/A 99 μA/A 160 μA/A	611-MP-C097 611-MP-C098
	DC current 200 μA up to 2mA	10 Hz up to 25 Hz 25 Hz up to 35 Hz 35 Hz up to 1 kHz 1 kHz up to 10 kHz	120 μA/A 110 μA/A 89 μA/A 140 μA/A	611-MP-C097 611-MP-C098
	DC current (2 up to 20) mA	10 Hz up to 25 Hz 25 Hz up to 35 Hz 35 Hz up to 1 kHz 1 kHz up to 10 kHz	120 μA/A 100 μA/A 85 μA/A 140 μA/A	611-MP-C097 611-MP-C098
	DC current (20 up to 200) mA	10 Hz up to 25 Hz 25 Hz up to 35 Hz 35 Hz up to 1 kHz 1 kHz up to 10 kHz	120 μA/A 100 μA/A 85 μA/A 140 μA/A	611-MP-C097 611-MP-C098
	DC current 200 mA up to 2 A	10 Hz up to 25 Hz 25 Hz up to 35 Hz 35 Hz up to 1 kHz 1 kHz up to 10 kHz	170 μA/A 160 μA/A 120 μA/A 220 μA/A	611-MP-C097 611-MP-C098
	DC current (2 up to 20) A	10 Hz up to 35 Hz 35 Hz up to 2 kHz 2 kHz up to 7,5 kHz 7,5 kHz up to 15 kHz 15 kHz up to 20 kHz	310 μA/A 280 μA/A 400 μA/A 690 μA/A 1600 μA/A	611-MP-C097 611-MP-C098
	9.5	DC resistance 0.000 1 Ω 0.001 Ω 0.01 Ω 0.02 Ω 0.1 Ω 1 Ω 10 Ω 25 Ω 100 Ω		7.2 μΩ/Ω 3.5 μΩ/Ω 2.6 μΩ/Ω 2.2 μΩ/Ω 0.86 μΩ/Ω 0.73 μΩ/Ω 0.71 μΩ/Ω 0.63 μΩ/Ω 0.35 μΩ/Ω
DC resistance 1 kΩ 10 kΩ 100 kΩ 1 MΩ 10 MΩ			0.35 μΩ/Ω 0.38 μΩ/Ω 0.59 μΩ/Ω 4.0 μΩ/Ω 7.0 μΩ/Ω	131-MP-C003 131-MP-C005 611-MP-C097 611-MP-C098





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Ord. no. <sup>1)</sup>	Measured quantity and Range of measured quantity	Frequency	Calibration and Measurement Capability [ ± ] <sup>2)</sup>	Identification of the procedure
	100 MΩ 1 GΩ 10 GΩ		16 μΩ/Ω 100 μΩ/Ω 500 μΩ/Ω	
9.6*	DC resistance (0 up to 0.1) mΩ (0.1 up to 0.2) mΩ (0.000 2 up to 0.001) Ω (0.001 up to 0.002) Ω (0.002 up to 0.01) Ω (0.01 up to 0.02) Ω (0.02 up to 0.1) Ω (0.1 up to 0.2) Ω (0.2 up to 1) Ω (1 up to 2) Ω (2 up to 10) Ω (10 up to 20) Ω (20 up to 100) Ω (100 up to 200) Ω (200 up to 1000) Ω (1 up to 2) kΩ		3.5 μΩ/Ω + 0.5 nΩ 7.2 μΩ/Ω 6 μΩ/Ω 3.5 μΩ/Ω 5.6 μΩ/Ω 2.6 μΩ/Ω 1.6 μΩ/Ω 0.86 μΩ/Ω 1.6 μΩ/Ω 0.73 μΩ/Ω 1.6 μΩ/Ω 0.71 μΩ/Ω 1.2 μΩ/Ω 0.35 μΩ/Ω 0.93 μΩ/Ω 0.35 μΩ/Ω	611-MP-C097 611-MP-C098 131-MP-C003 131-MP-C005
	DC resistance (2 up to 10) kΩ (10 up to 20) kΩ (20 up to 100) kΩ (100 up to 200) kΩ (200 up to 1000) kΩ (1 up to 2) MΩ (2 up to 10) MΩ (10 up to 20) MΩ (20 up to 200) MΩ (200 up to 1000) MΩ (1 up to 2) GΩ (2 up to 10) GΩ (10 up to 20) GΩ		1.2 μΩ/Ω 0.38 μΩ/Ω 0.86 μΩ/Ω 0.59 μΩ/Ω 4.1 μΩ/Ω 4.0 μΩ/Ω 7.4 μΩ/Ω 7.0 μΩ/Ω 16 μΩ/Ω 520 μΩ/Ω 120 μΩ/Ω 0.52 % 0.12 %	611-MP-C097 611-MP-C098 131-MP-C003 131-MP-C005
9.7	AC power 0.5 W up to 30 kW at: voltage (10 up to 300) V current (0.05 up to 100) A cos φ (0.5 up to 1)	45 up to 65 Hz	0.01 %	611-MP-C042
9.8	Flicker (0.5 up to 5) Pst	50 Hz	0.003 · Pst	611-MP-C043
9.9	pH (electrical simulation)			611-MP-C129



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Ord. no. <sup>1)</sup>	Measured quantity and Range of measured quantity	Frequency	Calibration and Measurement Capability [ ± ] <sup>2)</sup>	Identification of the procedure
	(0 up to 14) pH (-1000 up to 1000) mV		0.001 pH 0.01 mV	
9.10	Temperature Temperature calibrators (electrical simulation) Thermocouples R / (-50 up to 1760) °C S / (-50 up to 1760) °C B / (0 up to 1820) °C J / (-210 up to 1200) °C T / (-270 up to 400) °C E / (-270 up to 1000) °C K / (-270 up to 1370) °C N / (-270 up to 1300) °C M / (-200 up to 100) °C Fe-ko / (-200 up to 900) °C L / (-200 up to 800) °C A / (0 up to 2500) °C		0.12 °C 0.16 °C 0.14 °C 0.04 °C 0.04 °C 0.04 °C 0.05 °C 0.05 °C 0.03 °C 0.04 °C 0.03 °C 0.24 °C	611-MP-C130
	Temperature Temperature calibrators (electrical simulation) Resistance thermometers Pt100/(-200 up to 850) °C Pt200/(-200 up to 850) °C Pt500/(-200 up to 850) °C Pt1000/(-200 up to 850) °C Ni 100/(-60 up to 250) °C Ni 1000/(-60 up to 250) °C		0.02 °C 0.02 °C 0.03 °C 0.02 °C 0.01 °C 0.01 °C	611-MP-C130
9.11	Capacity: (10 and 100) pF (1 up to 10) pF (0,01 up to 10) nF (10 up to 1000) nF (1 up to 10) µF 1 pF up to 1 nF  10 nF up to 1 µF  1 µF up to 1000 µF	1 kHz   20 Hz up to 1 MHz 1 MHz up to 10 MHz 20 Hz up to 100 kHz 100 kHz up to 1 MHz 20 Hz up to 50 Hz 50 Hz up to 100 kHz	0.5 µF/F 20 µF/F 10 µF/F 50 µF/F 150 µF/F 100 µF/F 0.20 % 100 µF/F 500 µF/F 0.10 % 150 µF/F	611-MP-C030 611-MP-C041

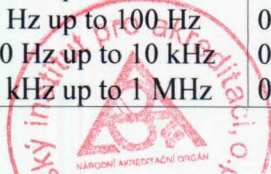




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Ord. no. 1)	Measured quantity and Range of measured quantity	Frequency	Calibration and Measurement Capability [ ± ] 2)	Identification of the procedure
9.12	Dissipation factor: D = (0,000 001 up to 0,001) for C = (1 up to 1000) pF D = (0,000 001 up to 0,01) for C = (1 up to 10) nF D = (0,000 001 up to 0,01) for C = (10 up to 100) nF D = (0,000 010 up to 0,01) for C = (100 up to 1000 ) nF D = (0,001 up to 0,01) for C = (1 up to 1000) pF D = (0,01 up to 0,1) for C = (10 up to 100) nF D = (0,1 up to 1) for C = (1 up to 10 000) pF	1 kHz 1 kHz 1 kHz 1 kHz 1 kHz 1 kHz	0.000 003 0.000 010 0.000 040 0.000 400 0.000 005 0.000 050 0.000 300	611-MP-C030 611-MP-C041
9.13	AC Resistance: 10 mΩ up to 100 mΩ  100 mΩ up to 100 MΩ 100 mΩ up to 1 Ω 1 Ω up to 10 kΩ  10 kΩ up to 10 MΩ  10 MΩ up to 100 MΩ	20 Hz up to 1000 Hz 1 kHz up to 1 MHz 20 Hz up to 50 Hz 50 Hz up to 1 MHz 50 Hz up to 10 kHz 10 kHz up to 1 MHz 1 MHz up to 10 MHz 50 Hz up to 1 MHz 1 MHz up to 10 MHz 50 Hz up to 1 kHz 1 kHz up to 1 MHz	0.30 % 0.10 % 0.30 % 0.10 % 20 μΩ/Ω 0.02 % 0.20 % 0.10 % 5.0 % 0.30 % 0.10 %	611-MP-C040 611-MP-C041
9.14	Inductance: 10 μH 0.1 mH 1 mH 10 mH 100 mH 1 H 1 μH up to 10 μH 10 μH up to 100 μH  100 μH up to 1 mH	1 kHz  1 kHz up to 1 MHz 50 Hz up to 1 kHz 1 kHz up to 1 MHz 20 Hz up to 100 Hz 100 Hz up to 10 kHz 10 kHz up to 1 MHz	0.05 % 0.01 % 0.01 % 0.01 % 0.01 % 0.005 % 0.10 % 0.30 % 0.10 % 0.30 % 0.10 % 0.05 %	611-MP-C099 611-MP-C041



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Ord. no. 1)	Measured quantity and Range of measured quantity	Frequency	Calibration and Measurement Capability [ ± ] 2)	Identification of the procedure
	1 mH up to 10 H  10 H up to 100 H  100 H up to 1000 H	20 Hz up to 50 Hz 50 Hz up to 1 kHz 1 kHz up to 1 MHz 20 Hz up to 50 Hz 50 Hz up to 1 kHz 1 kHz up to 100 kHz 20 Hz up to 50 Hz 50 Hz up to 1 kHz 1 kHz up to 10 kHz	0.30 % 0.10 % 0.05 % 0.30 % 0.10 % 0.05 % 0.30 % 0.10 % 0.10 %	
9.15	Instrument current transformers 0.1 A up to 5 A/1 A and 5 A 5 A up to 5000 A/1 A and 5 A		0.007 %, 0.6 min. 0.005 %, 0.2 min.	132-MP-C001
9.16	Instrument voltage transformers 100 V up to 200 kV / 50 V up to 200 V		0.007 %, 0.3 min.	132-MP-C001
9.17	Instrument current transformers 0.5 A up to 5 000 A/ 5 A and 1 A 5 kA up to 30 kA/5 A and 1 A		20 ppm; 20 µrad (0.07') 30 ppm; 30 µrad (0.10')	817-MP-C701
9.18	* Instrument voltage transformers 5 kV; 10 kV and 22 kV/100 V  1 kV up to 400 kV/5 V up to 250		60 ppm; 60 µrad (0.21') 70 ppm; 70 µrad (0.24')	817-MP-C701
9.19	* Instrument voltage transformers 1 kV up to 100 kV/5 V up to 250 V		70 ppm; 70 µrad (0.24')	817-MP-C701
9.20	* Rogowski coils AC current - up to 10 kA direct method with 1 conductor - up to 30 kA by means of a current loop with 10 turns		(0.021 up to 0.100) % (5 up to 20) '	817-MP-C705





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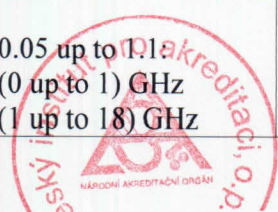
Ord. no. <sup>1)</sup>	Measured quantity and Range of measured quantity	Frequency	Calibration and Measurement Capability [ ± ] <sup>2)</sup>	Identification of the procedure
9.21	Digital electrical testers and related standards			131-MP-C006
	insulation resistance - measurement			
	10 kΩ up to 100 MΩ		0.0012 %	
	100 MΩ up to 1 GΩ		0.0017 %	
	1 GΩ up to 10 GΩ		0.0017 % up to 0.0086%	
	10 GΩ up to 100 GΩ		0.0086 % up to 0.034 %	
	100 GΩ up to 1 TΩ		0.034% up to 0.27 %	
	insulation resistance - generation			
	10 kΩ up to 1 GΩ		0.020 %	
	1 GΩ up to 10 GΩ		1.0 %	
	350 MΩ up to 100 GΩ		1.2 % up to 1.5 %	
	100 GΩ up to 1 TΩ		2.5 %	
	1 TΩ up to 10 TΩ		4.0 %	
	100 MΩ		0.0020 %	
	1 GΩ		0.0030 %	
	Line/Loop impedance source, ground bond resistance source generating using Fluke 5320			
	25 mΩ		5 mΩ	
	50 mΩ		5 mΩ	
	100 mΩ		5 mΩ	
	330 mΩ		7 mΩ	
	500 mΩ		8 mΩ	
	1 Ω		10 mΩ	
	1.8 Ω		18 mΩ	
	5 Ω		30 mΩ	
	10 Ω		60 mΩ	
	18 Ω		100 mΩ	
	50 Ω		300 mΩ	
	100 Ω		500 mΩ	
	180 Ω		1 Ω	
	500 Ω		2.5 Ω	
	1 kΩ		5 Ω	
	1.8 kΩ		10 Ω	
	RCD trip current measurement			
	3 mA up to 3000 mA		0.020%	
	RCD trip current generating			



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Ord. no. <sup>1)</sup>	Measured quantity and Range of measured quantity	Frequency	Calibration and Measurement Capability [ ± ] <sup>2)</sup>	Identification of the procedure
	3 mA up to 3000 mA		1.0%	
	RCD trip time generating 10 ms up to 5000 ms		0.020 % + 0.25 ms	
	RCD trip time measurement 10 ms up to 5000 ms		0.050 ms	
	leakage current passive generating 0.1 mA up to 30 mA		0.3 % + 2 μA	
	leakage current differential generating 0.1 mA up to 30 mA		0.3 % + 2 μA	
	leakage current substitute generating 0.1 up to 30 mA		0.3 % + 2 μA	
	leakage current active measurement 0.1 mA up to 30 mA		0.3 % + 1 μA	
	leakage current active measurement 0.1 mA up to 30 mA		0.055%	
	high voltage measurement 0 up to 10 kV	0 Hz	0.3 % + 5 V	
	0 up to 10 kV	50 Hz	0.5 % + 5 V	
	current clamp measurement 1A up to 1000 A	0 Hz	0.80%	
	1A up to 1000 A	50 Hz	0.50%	
9.22	Oscilloscopes vertical deflection factor	10 Hz up to 10 kHz: (1 up to 21) mV (21 up to 556) mV 556 mV up to 210 V	0.1 % MV + 15 μV 0.1 % MV + 1 μV 0.05 % MV + 1 μV	113-MP-C008
9.23	Oscilloscopes time base	1 ns up to 50 s	0.25·10 <sup>-6</sup> (1)	113-MP-C008
9.24	Oscilloscopes bandwidth	(0 up to 100) MHz (0 up to 550) MHz (0 up to 1.1) GHz	3 % MV 6 % MV 8 % MV	113-MP-C008
9.25	Oscilloscopes rise time	≥ 300 ps	12 ps	113-MP-C008
9.26	hf power: power sensor calibration factor	0.05 up to 1.1 (0 up to 1) GHz (1 up to 18) GHz	0.9 % MV 1.5 % MV	113-MP-C014





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		(18 up to 40) GHz	2.0 % MV	
	hf power	(-100 up to -50) dBm: 0.1 MHz up to 4.2 GHz	[0.19 – 0.0012 (MH+50)] dB  0.1 dB	
		(-50 up to 20) dBm: 0.1 MHz up to 4.2 GHz	[0.29 – 0.005 (MH+50)] dB	
		(-100 up to -50) dBm: (4.2 up to 18) GHz (-50 up to 20) dBm: (4.2 up to 18) GHz	0.15 dB	
		(-90 up to -50) dBm: (18 up to 26.5) GHz	[0.44 – 0.0027 (MH+50)] dB	
		(-50 up to 20) dBm: (18 up to 40) GHz	0.15 dB	
		(20 up to 43) dBm: (0.01 up to 18) GHz	0.17 dB	
	hf power ratio (attenuation, gain)	(43 up to 53) dBm: (0,01 up to 1) GHz (0 up to 55) dB: 0.1 MHz up to 26.5 GHz	0.17 dB (0.015 + 0.0005 MH) dB	
		(55 up to 75) dB: 0.1 MHz up to 26.5 GHz	(0.046 + 0.0005 MH) dB	
		(75 up to 90) dB: 0.1 MHz up to 18 GHz	[0.12 + 0.0047 (MH- 75)] dB	
		(75 up to 90) dB: 18 GHz up to 26.5 GHz	[0.12 + 0.019 (MH- 75)] dB	
		(90 up to 100) dB: 0.1 MHz up to 13.2 GHz	[0.12 + 0.012 (MH- 90)] dB	



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CMI Calibration Laboratory  
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Ord. no. <sup>1)</sup>	Measured quantity and Range of measured quantity	Frequency	Calibration and Measurement Capability [ ± ] <sup>2)</sup>	Identification of the procedure
		(0 up to 40) dB: (26.5 up to 40) GHz	0.1 dB	
9.27	voltage	(0.01 up to 10)V: 0.1 MHz up to 2 GHz	1.5 % MH	113-MP-C014
9.28	* hf power	0.1 MHz up to 6 GHz (20 up to -20) dBm (-20 up to -60) dBm	0.17 dB 0.22 dB	113-MP-C014
9.29	* Calibration of Antennas:			
	Antenna factors, Standard Site Method (3 m distance)	(-10 up to +60) dB/m: (30 up to 100) MHz (-10 up to +60) dB/m: (100 up to 300) MHz (-10 up to +60) dB/m: (300 up to 1000) MHz (-10 up to +60) dB/m: (1000 up to 18000) MHz	2.8 (dB) 2.8 (dB) 3 (dB) 2 (dB)	851-MP-C004 chapter 5.1. (ANSI C63.5, chapter 5)
	Antenna factors, Standard Site Method (10 m distance)	(-10 up to +60) dB/m: (30 up to 100) MHz (-10 up to +60) dB/m: (100 up to 300) MHz (-10 up to +60) dB/m: (300 up to 1000) MHz (-10 up to +60) dB/m: (1000 up to 18000) MHz	2.2 (dB) 1.5 (dB) 1.4 (dB) 2.0 (dB)	
	Antenna factors, Equivalent Capacitance Substitution Method (3 m distance)	(-10 up to +60) dB/m: (30 up to 100) MHz (-10 up to +60) dB/m: (100 up to 300) MHz (-10 up to +60) dB/m: (300 up to 1000) MHz (-10 up to +60) dB/m: (1000 up to 18000) MHz	3.3 (dB) 3.3 (dB) 3.5 (dB) 2.2 (dB)	851-MP-C004 chapter 5.2. (ANSI C63.5, chapter 6)
	Antenna factors, Equivalent Capacitance Substitution Method (10 m distance)	(-10 up to +60) dB/m: (30 up to 100) MHz (-10 up to +60) dB/m: (100 up to 300) MHz (-10 up to +60) dB/m: (300 up to 1000) MHz (-10 up to +60) dB/m: (1000 up to 18000) MHz	2.5 (dB) 1.7 (dB) 1.7 (dB) 2.2 (dB)	





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Ord. no. <sup>1)</sup>	Measured quantity and Range of measured quantity	Frequency	Calibration and Measurement Capability [ ± ] <sup>2)</sup>	Identification of the procedure
	Monopole (ROD) antenna – Matching network characterization method antenna factor	(-10 up to +60) dB/m: (0.009 up to 30) MHz	2.1 (dB)	851-MP-C004 chapter 5.3. (ČSN EN 55016-1-4)
	Antenna factors in distance of 1m	(-10 up to +60) dB/m: (30 up to 1000) MHz	3.5 (dB)	851-MP-C004 chapter 5.4. (SAE ARP 958, Rev. D)
	Antenna factors	(-10 up to +60) dB/m: (1000 up to 18000) MHz	3.1 (dB)	851-MP-C004 chapter 5.5 (SAE ARP 958, Rev. D)
	loop antenna factors in distance 1 m	(-10 up to +60) dB(S/m) (0.01 up to 30) MHz	2.2 (dB)	851-MP-C004 chapter 5.5 (SAE ARP 958, Rev. D)

<sup>1)</sup> Asterisk at the ordinal number identifies the calibrations carried out outside/also outside the laboratory areas.

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

### Instruments or devices to be measured (calibrated):

(In compliance with the above list of measured quantities and their ranges the following types of instruments or devices can be measured – calibrated.)

Ord. no.	Instrument or device to be measured (calibrated)
1	Calibrators
2	Multimeters
3	Direct current (DC) and alternating current (AC) voltmeters
4	DC and AC ammeters
5	DC resistance decades
6	DC electrical resistors
7	Electricity meters (electrical power meters)
8	Wattmeters
9	Wattmeter calibrators
10	Flickermeters
11	Capacitance and Dissipation Factor Standards
12	Inductance Standards
13	AC Resistance Standards
14	RLC Meters
15	Temperature calibrators (electrical simulation)
16	pH-meters and pH-simulators (electrical simulation)
17	Voltage and current measuring transformers
18	Rogowski coils



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Ord. no.	Instrument or device to be measured (calibrated)
19	Digital electrical testers - resistance, insulation resistance, ground impedance, protective loop network impedance, ground loops, RCD, leakage currents, high voltage and current using current clamp meters. Related standards - Fluke 5320 calibrator, standards of resistance and resistance decade
20	Analog oscilloscopes
21	Digital oscilloscopes
22	Probes to oscilloscopes
23	Electronic counters
24	Generators
25	Other devices where time parameters form an important of the output signal specification
26	Calibrators of mobile phones 6103, 6103A, 6103G
27	Calibrators of base stations 6113, 6113A, 6113G
28	Power sensors
29	HF voltage meters
30	Selective HF level meters
31	Attenuators, amplifiers
32	Antennas in frequency range 0.009 MHz – 18 000 MHz





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Czech Metrology Institute  
CMI Calibration Laboratory  
Okružní 31, 638 00 Brno

**Workplace of the Calibration Laboratory:**

12 Laboratory of Primary Metrology Praha V Botanice 1504/4, 150 00 Praha 5 - Smíchov

**Procedures:** procedure no. 10.1

**Field of measured quantities:** magnetic quantities

**Calibration:** Nominal temperature at calibration: as specified in the respective procedures

Ord. no. 1)	Measured quantity and Range of measured quantity	Frequency	Calibration and Measurement Capability [ ± ] <sup>2)</sup>	Identification of the procedure
10.1	Reference magnets	1 mT up to 2 T	0.21 %	817-MP-C607

1) Asterisk at the ordinal number identifies the calibrations carried out outside/also outside the laboratory areas.

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

**Instruments or devices to be measured (calibrated):**

(In compliance with the above list of measured quantities and their ranges the following types of instruments or devices can be measured – calibrated.)

Ord. no.	Instrument or device to be measured (calibrated)
1	Reference magnets



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

Czech Metrology Institute  
CMI Calibration Laboratory  
Okružní 31, 638 00 Brno

**Workplace of the Calibration Laboratory:**

12 Laboratory of Primary Metrology Praha V Botanice 1504/4, 150 00 Praha 5 - Smíchov

**Procedures:**

procedure no. 11.1 ÷ 11.13

**Field of measured quantities: optical quantities**

**Calibration:**

Nominal temperature at calibration: as specified in the respective procedures

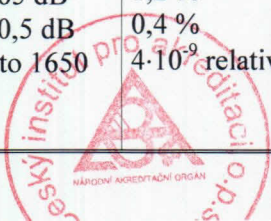
Ord. no. <sup>1)</sup>	Measured quantity	Range of measured quantity	Calibration and Measurement Capability [ $\pm$ ] <sup>2)</sup>	Identification of the procedure																														
11.1	Spectral reflectance factor R	(0 up to 100) % for geometry: 8° / t and 8° / d: (380 up to 460) nm (465 up to 780) nm For geometry 0° / 45°: (380 up to 780) nm	(0.1 + 0.010·R) % (0.12 + 0.008·R) %  (0.17 + 0.014·R) %	818-MP-C802																														
11.2	Colorimetric coordinates L*, a*, b*	<table border="1"> <thead> <tr> <th>L*</th> <th>a*</th> <th>b*</th> </tr> </thead> <tbody> <tr> <td>2 up to 99</td> <td>-40 up to 65</td> <td>-45 up to 95</td> </tr> </tbody> </table>	L*	a*	b*	2 up to 99	-40 up to 65	-45 up to 95	<table border="1"> <thead> <tr> <th>U etalon</th> <th>L*</th> <th>a*</th> <th>b*</th> </tr> </thead> <tbody> <tr> <td>GH06 1 up to GH06 5</td> <td>0.47</td> <td>0.25</td> <td>0.25</td> </tr> <tr> <td>GH06 6 up to GH06 7</td> <td>0.45</td> <td>0.35</td> <td>0.94</td> </tr> <tr> <td>GH06 11 up to GH06 12</td> <td>0.35</td> <td>0.30</td> <td>0.65</td> </tr> <tr> <td></td> <td>1.30</td> <td>1.55</td> <td>1.45</td> </tr> </tbody> </table>	U etalon	L*	a*	b*	GH06 1 up to GH06 5	0.47	0.25	0.25	GH06 6 up to GH06 7	0.45	0.35	0.94	GH06 11 up to GH06 12	0.35	0.30	0.65		1.30	1.55	1.45	818-MP-C802				
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11.3	Colorimetric coordinates Y, x, y	<table border="1"> <thead> <tr> <th>Y [%]</th> <th>x</th> <th>y</th> </tr> </thead> <tbody> <tr> <td>0.3 up to 90</td> <td>0.18 up to 0.70</td> <td>0.1 up to 0.5</td> </tr> </tbody> </table>	Y [%]	x	y	0.3 up to 90	0.18 up to 0.70	0.1 up to 0.5	<table border="1"> <thead> <tr> <th>U etalon</th> <th>Y [%]</th> <th>x</th> <th>y</th> </tr> </thead> <tbody> <tr> <td>GH06 1 up to GH06 2</td> <td>0.55</td> <td>0.0005</td> <td>0.0005</td> </tr> <tr> <td>GH06 5 up to GH06 6</td> <td>0.30</td> <td>0.0010</td> <td>0.0005</td> </tr> <tr> <td>GH06 7 up to GH06 11</td> <td>0.30</td> <td>0.0050</td> <td>0.0008</td> </tr> <tr> <td>GH06 12</td> <td>0.60</td> <td>0.0016</td> <td>0.0010</td> </tr> <tr> <td></td> <td>0.25</td> <td>0.0136</td> <td>0.0143</td> </tr> </tbody> </table>	U etalon	Y [%]	x	y	GH06 1 up to GH06 2	0.55	0.0005	0.0005	GH06 5 up to GH06 6	0.30	0.0010	0.0005	GH06 7 up to GH06 11	0.30	0.0050	0.0008	GH06 12	0.60	0.0016	0.0010		0.25	0.0136	0.0143	818-MP-C802
Y [%]	x	y																																
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	0.25	0.0136	0.0143																															
11.4	Colorimetric coordinates L, u', v'	<table border="1"> <thead> <tr> <th>L</th> <th>u'</th> <th>v'</th> </tr> </thead> <tbody> <tr> <td>2 up to 99</td> <td>0.13 up to 0.90</td> <td>0.24 up to 0.60</td> </tr> </tbody> </table>	L	u'	v'	2 up to 99	0.13 up to 0.90	0.24 up to 0.60	<table border="1"> <thead> <tr> <th>U etalon</th> <th>L</th> <th>u'</th> <th>v'</th> </tr> </thead> <tbody> <tr> <td>GH06 1 up to GH06 5</td> <td>0.47</td> <td>0.0010</td> <td>0.0005</td> </tr> <tr> <td>GH06 6</td> <td>0.45</td> <td>0.0040</td> <td>0.0015</td> </tr> </tbody> </table>	U etalon	L	u'	v'	GH06 1 up to GH06 5	0.47	0.0010	0.0005	GH06 6	0.45	0.0040	0.0015	818-MP-C802												
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Ord. no. <sup>1)</sup>	Measured quantity	Range of measured quantity	Calibration and Measurement Capability [ ± ] <sup>2)</sup>				Identification of the procedure
			GH06 7 up to GH06 11 GH06 12	0.35 1.30	0.0008 0.0045	0.0006 0.0149	
11.5	Gloss	(0 up to 150) GU	1.8 GU				818-MP-C808
11.6 *	Illuminance E <sub>v</sub>	(0.1 up to 50 000) lx	2.2 %				818-MP-C801
11.7 *	Irradiance E <sub>e</sub> (230 up to 470) nm	(1E-13 up to 1 000) mW/cm <sup>2</sup>	5 %				818-MP-C801
11.8 *	Correlated colour temperature T <sub>cp</sub>	(100 up to 10000) K	(10 up to 85) K varies with spectral distribution of the optical source				818-MP-C801
11.9 *	Transmittance regular spectral τ <sub>r</sub>	τ <sub>r</sub> [-] 1·10 <sup>-1</sup> up to 1·10 <sup>0</sup> 1·10 <sup>-3</sup> up to 1·10 <sup>-1</sup> 6·10 <sup>-1</sup> up to 1·10 <sup>0</sup>	wavelength [nm] 200 up to 380 200 up to 380 380 up to 1000	U[-] 1,2·10 <sup>-3</sup> 1,0·10 <sup>-4</sup> 8,0·10 <sup>-4</sup>		818-MP-C810	
11.10 *	Transmittance regular spectral τ <sub>r</sub> expression in absorbance A	τ <sub>r</sub> [-] 3·10 <sup>-1</sup> up to 6·10 <sup>-1</sup> 3·10 <sup>-1</sup> up to 6·10 <sup>-1</sup> 3·10 <sup>-1</sup> up to 6·10 <sup>-1</sup> 2·10 <sup>-2</sup> up to 3·10 <sup>-1</sup> 2·10 <sup>-2</sup> up to 3·10 <sup>-1</sup> 1·10 <sup>-3</sup> up to 2·10 <sup>-2</sup> 1·10 <sup>-3</sup> up to 2·10 <sup>-2</sup> A[-] A = -log(τ <sub>r</sub> )	wavelength [nm] 380 up to 400 400 up to 700 700 up to 1000 380 up to 400 400 up to 1000 380 up to 400 400 up to 1000 U <sub>A</sub> [-] U <sub>A</sub> = -log(1-U[-]/τ <sub>r</sub> )	U[-] 4.1·10 <sup>-3</sup> 5.6·10 <sup>-4</sup> 1.7·10 <sup>-3</sup> 1.5·10 <sup>-3</sup> 2.2·10 <sup>-4</sup> 2.0·10 <sup>-4</sup> 8.0·10 <sup>-5</sup>		818-MP-C810	
11.11 *	Wavelength λ	200 nm up to 1000 nm	0.2 nm				818-MP-C810
11.12	Optical density D	0 up to 4,5	0.0038				818-MP-C812
11.13	Optical power	Optical power -90 dBm up to +40 dBm (1 pW up to 10 W), Wavelength 800 nm up to 1650 nm	wavelength [nm]	U[%]			818-MP-C813
			800 up to 920	0,40			
			920 up to 960	0,50			
			960 up to 1000	0,45			
			1000 up to 1650	0,47			
	Optical attenuation Linearity Wavelength	0 dB up to 65 dB 0 dB up to 0,5 dB 800 nm up to 1650 nm	1,2 % 0,4 % 4·10 <sup>-9</sup> relative				



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Ord. no. <sup>1)</sup>	Measured quantity	Range of measured quantity	Calibration and Measurement Capability [ ± ] <sup>2)</sup>	Identification of the procedure
	evaluated in dBm	$P[\text{dBm}] = 10 \cdot \log(P[W]/0,001)$	$U[\text{dBm}] = 10 \cdot \log(1/(1-U[-]))$	

<sup>1)</sup> Asterisk at the ordinal number identifies the calibrations carried out outside/also outside the laboratory areas.

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

### Instruments or devices to be measured (calibrated):

(In compliance with the above list of measured quantities and their ranges the following types of instruments or devices can be measured – calibrated.)

Ord. no.	Instrument or device to be measured (calibrated)
1	Colorimetric measuring instruments
2	Glossmeters, standards of mirror gloss
3	Optical sources
4	Optical filters
5	Standards of Optical Density
6	Optical Radiometers and Fiber Optic Radiometers
7	Spectral Analyzers
8	Optical Attenuators
9	Fiber Optic Couplers
10	Laser Based Radiation Sources





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CMI Calibration Laboratory  
Okružní 31, 638 00 Brno

**Workplace of the Calibration Laboratory:**

1 **Regional Inspectorate Praha** Radiová 1136/3, 102 00 Praha 10 - Hostivař

**Procedures:** procedure no. 12.1 ÷ 12.8

**Workplace of the Calibration Laboratory:**

2 **Regional Inspectorate Č. Budějovice** U Sirkárny 33/5, 370 01 České Budějovice

**Procedures:** procedure no. 12.7, 12.8

**Workplace of the Calibration Laboratory:**

7 **Regional Inspectorate Brno** Okružní 31, 638 00 Brno

**Procedures:** procedure no. 12.1 ÷ 12.8

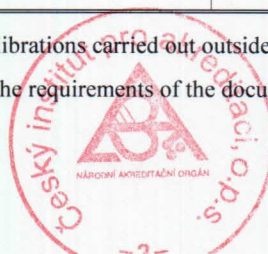
**Field of measured quantity: time, frequency**

**Calibration:** Nominal temperature at calibration: as specified in the respective procedures

Ord. no. 1)	Measured quantity	Range of measured quantity	Calibration and Measurement Capability [ ± ] <sup>2)</sup>	Identification of the procedure
12.1	Frequency	0.01 Hz up to 3 GHz (3 up to 18) GHz (18 up to 46) GHz	$1 \cdot 10^{-11}$ (1) $1/f$ (1;Hz) $3/f$ (1;Hz)	113-MP-C007
12.2 *	Frequency	0.01 Hz up to 3 GHz	$1 \cdot 10^{-10}$ (1)	113-MP-C007
12.3	Period	5 ns up to $10^5$ s	$1 \cdot 10^{-11}$ (1)	113-MP-C007
12.4 *	Period	5 ns up to $10^4$ s	$1 \cdot 10^{-10}$ (1)	113-MP-C007
12.5	Time interval (measurement by counter) (measurement by oscilloscope)	(0 up to $10^5$ ) s  (0 up to 10) s	$1.1 \cdot 10^{-9} + 1 \cdot 10^{-11} t$ (s)  $10 \cdot 10^{-12} + 2 \cdot 10^{-3} t$ (s)	113-MP-C007
12.6 *	Time interval (measurement by counter)	(0 up to $10^4$ ) s	$1.1 \cdot 10^{-9} + 1 \cdot 10^{-10} t$ (s)	113-MP-C007
12.7	Time interval Mechanical stopwatches	0.1 s up to 35999.99 s	16 ms	113-MP-C013
12.8	Relative error of frequency of time base of LCD stopwatches	Measuring pulses (20 up to 40) ms	$3 \cdot 10^{-7}$	113-MP-C013

1) Asterisk at the ordinal number identifies the calibrations carried out outside/also outside the laboratory areas.

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



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**Instruments or devices to be measured (calibrated):**

(In compliance with the above list of measured quantities and their ranges the following types of instruments or devices can be measured – calibrated.)

Ord. no.	Instrument or device to be measured (calibrated)
1	Electronic stopwatches
2	Mechanical stopwatches
3	Analog oscilloscopes
4	Digital oscilloscopes
5	Probes to oscilloscopes
6	Other devices where time parameters form an important of the output signal specification
7	Time interval standards





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Czech Metrology Institute  
CMI Calibration Laboratory  
Okružní 31, 638 00 Brno

Workplace of the Calibration Laboratory:

12 Laboratory of primary Metrology Praha V Botanice 1504/4, 150 00 Praha 5 - Smíchov

Procedures: procedure no. 13.1, 13.2

Field of measured quantity: acoustics

Calibration: Nominal temperature at calibration: as specified in the respective procedures

Ord. no. 1)	Measured quantity	Range of measured quantity	Calibration and Measurement Capability [±] 2)	Identification of the procedure
13.1	Level of acoustic pressure (in relation to frequency and total distortion)	According to nominal calibrator pressure value in range (59.91 up to 134.09) dB (re $20 \cdot 10^{-6}$ Pa)	0.09 dB	812-MP-C211 (ČSN EN 60942)
13.2	sensitivity of microphone	According to nominal microphone sensitivity value in range -40.08 dB up to -23.92 dB (re $1V \cdot Pa^{-1}$ )	0.05 dB	812-MP-C216 (ČSN EN 61094-1, ČSN EN 61094-2)

1) Asterisk at the ordinal number identifies the calibrations carried out outside/also outside the laboratory areas.

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

Instruments or devices to be measured (calibrated):

(In compliance with the above list of measured quantities and their ranges the following types of instruments or devices can be measured – calibrated.)

Ord. no.	Instrument or device to be measured (calibrated)
1	Acoustical calibrators, e.g.: Brüel&Kjaer, types: 4220, 4228, 4230, 4231
2	Laboratory standard microphones



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

**Czech Metrology Institute**  
CMI Calibration Laboratory  
Okružní 31, 638 00 Brno

**Workplace of the Calibration Laboratory:**

1 **Regional Inspectorate Praha** Radiová 1136/3, 102 00 Praha 10 - Hostivař

**Procedures:** procedure no. 14.11, 14.12

**Workplace of the Calibration Laboratory:**

6 **Regional Inspectorate Pardubice** Průmyslová 455, 530 03 Pardubice - Pardubičky a  
SILO CEREAL, 503 25 Dobřenice

**Procedures:** procedure no. 14.1 ÷ 14.4

**Workplace of the Calibration Laboratory:**

7 **Regional Inspectorate Brno** Okružní 31, 638 00 Brno

**Procedures:** procedure no. 14.5 ÷ 14.10

**Workplace of the Calibration Laboratory:**

10 **Regional Inspectorate Opava** Gudrichova 2251/41, 746 01 Opava - Předměstí

**Procedures:** procedure no. 14.11, 14.12

**Field of measured quantity:** physical chemistry

**Calibration:** Nominal temperature at calibration: as specified in the respective procedures

Ord. no. 1)	Measured quantity	Range of measured quantity	Calibration and Measurement Capability [ ± ] <sup>2)</sup>	Identification of the procedure
14.1 *	Moisture - cereals and oil seeds Relative moisture	(4 up to 50) %	0.25 %	511-MP-C001
14.2 *	Moisture - cereals and oil seeds - multi-parameter analyzers  Relative moisture Content of nitrogen substances Oil content Zeleny test	(4 up to 50) % (5 up to 40) % (10 up to 80) % (10 up to 75) ml	0.27 % 0.30 % 0.29 % 1.3 ml	511-MP-C001
14.3 *	Moisture - wood Absolute moisture	(4 up to 110) %	0.31 %	511-MP-C003
14.4	Index of refraction	1.3 up to 1,7	9.10 <sup>-5</sup>	512-MP-C003
14.5	Kinematic viscosity - time of outflow for flow cups Orifice No.D4 Orifice No.C3 Orifice No.C4	(30 up to 100) s	0.18 s 0.10 s 0.56 s	616-MP-C001





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

Czech Metrology Institute  
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Ord. no. 1)	Measured quantity	Range of measured quantity	Calibration and Measurement Capability [ ± ] <sup>2)</sup>	Identification of the procedure
	Orifice No.C5 Orifice No.C6 Orifice No.A4		0.11 s 0.26 s 0.10 s	
14.6	Kinematic viscosity (capillary viscometers)	0.001 mm <sup>2</sup> ·s <sup>-2</sup> 0.003 mm <sup>2</sup> ·s <sup>-2</sup> 0.01 mm <sup>2</sup> ·s <sup>-2</sup> 0.03 mm <sup>2</sup> ·s <sup>-2</sup> 0.1 mm <sup>2</sup> ·s <sup>-2</sup> 0.3 mm <sup>2</sup> ·s <sup>-2</sup> 1 mm <sup>2</sup> ·s <sup>-2</sup> 3 mm <sup>2</sup> ·s <sup>-2</sup> 10 mm <sup>2</sup> ·s <sup>-2</sup> 30 mm <sup>2</sup> ·s <sup>-2</sup>	1.1·10 <sup>-7</sup> mm <sup>2</sup> ·s <sup>-2</sup> 3.8·10 <sup>-6</sup> mm <sup>2</sup> ·s <sup>-2</sup> 2·10 <sup>-5</sup> mm <sup>2</sup> ·s <sup>-2</sup> 6·10 <sup>-5</sup> mm <sup>2</sup> ·s <sup>-2</sup> 2.9·10 <sup>-4</sup> mm <sup>2</sup> ·s <sup>-2</sup> 9.7·10 <sup>-4</sup> mm <sup>2</sup> ·s <sup>-2</sup> 3.4·10 <sup>-3</sup> mm <sup>2</sup> ·s <sup>-2</sup> 1.1·10 <sup>-2</sup> mm <sup>2</sup> ·s <sup>-2</sup> 9.3·10 <sup>-2</sup> mm <sup>2</sup> ·s <sup>-2</sup> 3.0·10 <sup>-1</sup> mm <sup>2</sup> ·s <sup>-2</sup>	616-MP-C002
14.7	Kinematic viscosity (reference liquids)  Dynamic viscosity (reference liquids)	(0.6 up to 6) mm <sup>2</sup> ·s <sup>-1</sup> (6 up to 60) mm <sup>2</sup> ·s <sup>-1</sup> (60 up to 600) mm <sup>2</sup> ·s <sup>-1</sup> (600 up to 6000) mm <sup>2</sup> ·s <sup>-1</sup> (6000 up to 10000) mm <sup>2</sup> ·s <sup>-1</sup> (0.6 up to 6) mPa.s (6 up to 60) mPa.s (60 up to 600) mPa.s (600 up to 6000) mPa.s (6000 up to 10000) mPa.s	0.13 % 0.2 % 0.3 % 0.37 % 0.46 % 0.13 % 0.2 % 0.3 % 0.37 % 0.46 %	616-MP-C002
14.8	Dynamic viscosity (rotary viscometers)	(10 up to 150) mPa.s (150 up to 400) mPa.s (400 up to 1300) mPa.s (1300 up to 10000) mPa.s	0.32 % 0.41 % 0.65 % 0.53 %	616-MP-C003
14.9	Liquid density (glass hydrometers)	(620 up to 2000) kg·m <sup>-3</sup> (0 up to 100) % vol. (0 up to 90) % hm. (10 up to 30) kg·hl <sup>-1</sup>	0.022 kg·m <sup>-3</sup> 0.019 % vol. 0.019 % hm. 0.019 kg·hl <sup>-1</sup>	616-MP-C004
14.10	Conductivity meters	(0.005 up to <0.015) S·m <sup>-1</sup>  (0.015 up to 10) S·m <sup>-1</sup>	0.8 % 0.3 %	616-MP-C005
14.11	Concentration of ethanol in the gas phase (breath analyzers) - dry gas method (chapter no. 5.3.1)	0.140 mg/l 0.480 mg/l 0.900 mg/l 1.400 mg/l	0.006 mg/l 0.011 mg/l 0.019 mg/l 0.028 mg/l	114-MP-C004



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

**Czech Metrology Institute**  
CMI Calibration Laboratory  
Okružní 31, 638 00 Brno

Ord. no. 1)	Measured quantity	Range of measured quantity	Calibration and Measurement Capability [ ± ] <sup>2)</sup>	Identification of the procedure
14.12	Concentration of ethanol in the gas phase (breath analyzers) - simulation method (chapter no.5.3.2 )	0.140 mg/l 0.480 mg/l	0.008 mg/l 0.013 mg/l	114-MP-C004

- 1) Asterisk at the ordinal number identifies the calibrations carried out outside/also outside the laboratory areas.  
2) Expressed like uncertainty in accordance with the requirements of the document EA Document 4/02 at k = 2.  
3) Expressed like uncertainty in accordance with the requirements of the document EA Document 4/02 at k = 2. in % from the value of reference material

**Instruments or devices to be measured (calibrated):**

(In compliance with the above list of measured quantities and their ranges the following types of instruments or devices can be measured – calibrated.)

Ord. no.	Instrument or device to be measured (calibrated)
1	Moisture meters of cereals and oil seeds
2	Moisture meters of wood
3	Flow caps to measure rheological properties of liquids
4	Breath analyzers
5	Conductivity meters
6	Capillary viscometers
7	Rotary viscometers
8	Hydrometers

**Explanations and abbreviations:**

CMI	Czech Metrology Institute
ČSN	Czech technical standard
EN	European standard
ISO	International organisation for standardisation
LPM	Laboratory of Primary Metrology
MV	from measured value
RI	Regional Inspectorate
XXX-MP-AYYY	Internal procedure

