Annex (1)

To the Accreditation Certificate No. JAS Cal. - 001 Dated 24-03-2026

For Jordan National Metrology Institute at Royal Scientific Society/ Amman

Scope of Accreditation

Calibration of Electrical Metrology: DC Voltage (Source & Measure), DC Current (Source & Measure), AC Voltage (Source & Measure), AC Current (Source & Measure), Resistance (Source & Measure), Power & Energy (Power, Energy Meters, Power Factor), & Other Electrical; Current Transformers, Earth Testers, Insulation Testers, & Oscilloscope.

And calibration of Physical & Mechanical Metrology: Mass, Dimensional, Temperature, Humidity Hygrometers/Sensors, Pressure, Force & Torque, Volume & Flow, Time & Frequency, Acoustics, Photometry & Radiometry, Irradiance, & Chemical & Others, & Medical Devices. (Permanent and Onsite)

Measurand	*Measuring Range*	*Calibration and measurement Capability (CMC) [a]*	*Calibration Methods/ Standards/ Remarks*
DC Voltage (Calibration Location: JNMI/Permanent)			
Sources, Fixed Values	100 mV 1 V 1.018 V 10 V 100 V 1000 V	$6.4 * 10^{-6} * U$ $2.5 * 10^{-6} * U$ $2.5 * 10^{-6} * U$ $2.4 * 10^{-6} * U$ $2.4 * 10^{-6} * U$ $2.6 * 10^{-6} * U$	JNMISMP48, Issue No.:(2), Date: (15/7/2020) Calibration of DC Voltage Source U= measured voltage Calibration using 732 B DC Reference Standard
Measuring Instruments	1 mV to 2.2 mV > 2.2 mV to 10 mV > 10 mV to 220 mV > 220 mV to 2.2 V > 2.2 V to 11 V > 11 V to 22 V > 22 V to 220 V > 220 V to 1000 V	2 µV 2 µV $2.4 * 10^{-6} * U + 5.8$ µV $4.0 * 10^{-6} * U + 5.2$ µV $4.2 * 10^{-6} * U + 3.8$ µV $4.3 * 10^{-6} * U + 4.0$ µV $5.6 * 10^{-6} * U + 38$ µV $7.0 * 10^{-6} * U + 0.38$ mV	• JNMISMP02, Issue No.:(2), Date: (15/07/2020) Calibration of DC Voltage Meter • Euramet cg-15 (V 3.0) Using Multi-function Calibrator
	1 mV to < 10 mV	2.5 µV	JNMISMP(49), Issue No. (2), Date: (15/72020) Using DMM Agilent 34420A
Sources	10 mV to < 0.2 V 0.2 V to < 2 V 2 V to < 20 V 20 V to < 200 V	9 µV $4.1 * 10^{-6} * U + 7.6$ µV $5.0 * 10^{-6} * U + 7.7$ µV $7.2 * 10^{-6} * U + 55$ µV	JNMISMP01, Issue No.:(2), Date: (15/07/2020)

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Measurand	*Measuring Range*	*Calibration and measurement Capability (CMC) [a]*	*Calibration Methods/ Standards/ Remarks*
	200 V to 1000 V	$8.4 * 10^{-6} * U + 0.6$ mV	Calibration of DC Voltage Source Using DMM
DC Voltage Source	1 kV to 40 kV	0.2 % * U	JNMISMP82, Issue No.(2), Date: (15/7/2020) Where U is the Measured Voltage
DC Voltage Meter (Probe)	1 kV to 25 kV	0.4 % * U	
DC Current (Calibration Location: JNMI/Permanent)			
Measuring Instruments	10 µA to < 0.22 mA 0.22 mA to 2.2 mA > 2.2 mA to 22 mA > 22 mA to 220 mA > 220 mA to 2.2 A > 2.2 A to 11 A	$42 * 10^{-6} * I + 6$ nA $38 * 10^{-6} * I + 7$ nA $40 * 10^{-6} * I + 40$ nA $55 * 10^{-6} * I + 0.7$ µA $0.1 * 10^{-3} * I + 10$ µA $0.39 * 10^{-3} * I + 0.46$ mA	• JNMISMP04, Issue No.:(2), Date: (15/07/2020) Calibration of DC Current Meter • Euramet cg-15 (V 3.0)
Fixed Values	50 µA 100 µA 200 µA 500 µA 1 mA 2 mA 5 mA 10 mA 20 mA	$8 * 10^{-6} * I$ $10 * 10^{-6} * I$ $9 * 10^{-6} * I$ $7 * 10^{-6} * I$ $6 * 10^{-6} * I$ $12 * 10^{-6} * I$ $10 * 10^{-6} * I$ $10 * 10^{-6} * I$ $15 * 10^{-6} * I$	JNMISMP48, Issue No.:(2), Date: (15/2/2020) I= Measured current

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Measurand	*Measuring Range*	*Calibration and measurement Capability (CMC) [a]*	*Calibration Methods/ Standards/ Remarks*
	50 mA	$22 * 10^{-6} * I$	
	100 mA	$18 * 10^{-6} * I$	
	200 mA	$31 * 10^{-6} * I$	
	500 mA	$15 * 10^{-6} * I$	
	1 A	$28 * 10^{-6} * I$	
	2 A	$59 * 10^{-6} * I$	
	3 A	$55 * 10^{-6} * I$	
	5 A	$52 * 10^{-6} * I$	
	8 A	$0.15 * 10^{-3} * I$	
	10 A	$0.15 * 10^{-3} * I$	
Sources	10 µA to < 0.2 mA	$44 * 10^{-6} * I + 6$ nA	JNMISMP03 [Issue No.:(2) Date: 15/07/2020] - Calibration of DC Current Source I=Measured current
	0.2 mA to < 2 mA	$40 * 10^{-6} * I + 8$ nA	
	2 mA to < 20 mA	$42 * 10^{-6} * I + 60$ nA	
	20 mA to < 0.2 A	$66 * 10^{-6} * I + 1$ µA	
	2.2 A to < 2 A	$0.2 * 10^{-3} * I + 19$ µA	
	2 A to 20 A	$0.55 * 10^{-3} * I + 0.61$ µA	
Clamp Meters	2 A to < 150 A	$6 * 10^{-3} * I + 0.2$ A	JNMISMP64, Issue (2 Date: 15/07/2020 Using 50-turns-coil, Voltage Source 5520A I: Measured current
	150 A to 1000 A	$6 * 10^{-3} * I + 0.6$ A	

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Measurand	*Measuring Range*	*Calibration and measurement Capability (CMC) [a]*	*Calibration Methods/ Standards/ Remarks*
DC Current (Calibration Location: JNMI/Permanent and On-Site)			
Sources	> 100 A to 1000 A	1.74 % . I + 0.02 A	JNMISMP64, Issue (2 Date: 15/7/2020 Using CT or Clamp Meter I: Measured current
DC Resistance (Calibration Location: JNMI/Permanent)			
DC Resistors Measuring Instruments	1 Ω 1.9 Ω 10 Ω 100 Ω 1 k Ω 10 kΩ 19 kΩ 100 kΩ 1 MΩ 10 MΩ 19 MΩ 100 MΩ	$12 * 10^{-6} * R$ $11 * 10^{-6} * R$ $16 * 10^{-6} * R$ $18 * 10^{-6} * R$ $8 * 10^{-6} * R$ $2.5 * 10^{-6} * R$ $3.4 * 10^{-6} * R$ $4.6 * 10^{-6} * R$ $16 * 10^{-6} * R$ $0.13 * 10^{-3} * R$ $0.14 * 10^{-3} * R$ $0.59 * 10^{-3} * R$	• JNMISMP06, Issue No.:(2), Date: (15/07/2020) Calibration of DC Resistance Meters • Euramet cg-15 (V 3.0) R= measured value Using 5720 A Multi-function calibrator
DC Resistors Measuring Instruments	1 GΩ 10GΩ	$18 * 10^{-3} * R$ $31 * 10^{-3} * R$	JNMISMP06, Issue (2), Issue Date: (15/7/2020) Using Decade Resistance Box

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Measurand	*Measuring Range*	*Calibration and measurement Capability (CMC) [a]*	*Calibration Methods/ Standards/ Remarks*
DC Resistors Fixed Values	0.001 0.01 0.1	$0.44 * 10^{-3} * R$ $0.44 * 10^{-3} * R$ $0.1 * 10^{-3} * R$	JNMISMP84, Issue No.:(2), Issue Date: 15/7/2020
	0.1 Ω 1 Ω 1.9 Ω 10 Ω 100 Ω 1 kΩ 10 kΩ 19 kΩ 100 kΩ 1 MΩ 10 MΩ 19 MΩ 100 MΩ	$45 * 10^{-6} * R$ $9 * 10^{-6} * R$ $8 * 10^{-6} * R$ $16 * 10^{-6} * R$ $9 * 10^{-6} * R$ $4 * 10^{-6} * R$ $2.5 * 10^{-6} * R$ $2.4 * 10^{-6} * R$ $4 * 10^{-6} * R$ $12 * 10^{-6} * R$ $0.11 * 10^{-3} * R$ $0.13 * 10^{-3} * R$ $0.62 * 10^{-3} * R$	JNMISMP48, Issue No.:(2), Issue Date: 15/7/2020] R= measured resistance
DC Resistors Sources	0.1 Ω to < 2 Ω 2.0 Ω to < 20 Ω 20 Ω to < 0.2 kΩ	$17 * 10^{-6} * R + 13\ \mu\Omega$ $19 * 10^{-6} * R + 10\ \mu\Omega$ $20 * 10^{-6} * R + 23\ \mu\Omega$	JNMISMP05, Issue No.:(2) Issue Date: (15/07/2020) Calibration of DC Resistance Sources R= measured resistance

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Measurand	*Measuring Range*	*Calibration and measurement Capability (CMC) [a]*	*Calibration Methods/ Standards/ Remarks*
	0.2 kΩ to < 2 kΩ	$11 * 10^{-6} * R + 0.38$ mΩ	
	2 kΩ to < 20 kΩ	$8.3 * 10^{-6} * R + 4.7$mΩ	
	20 kΩ to < 0.2MΩ	$8.8 * 10^{-6} * R + 44$ mΩ	
	0.2 MΩ to < 2 MΩ	$18 * 10^{-3} * R + 0.6$ Ω	
	2 MΩ to < 20 MΩ	$0.14 * 10^{-3} * R + 30$ Ω	
	20MΩ to < 0.2GΩ	$0.58 * 10^{-3} * R + 4.7$ kΩ	
	0.2GΩ to < 2 GΩ	$18 * 10^{-3} * R + 2.4$ kΩ	
	2 GΩ to < 20 GΩ	$3 * 10^{-3} * R + 6.8$ MΩ	
AC Voltage (Calibration Location: JNMI/Permanent)			
AC Voltage Sources, fixed values 40 Hz to 1 kHz	0.1 V 1 V 10 V 100 V 1000 V	$25 * 10^{-6} * U$ $24 * 10^{-6} * U$ $25 * 10^{-6} * U$ $27 * 10^{-6} * U$ $39 * 10^{-6} * U$	JNMISMP48, Issue No.: (2) Issue Date: (15/7/2020) U= measured voltage
AC Voltage Measuring Instruments 40 Hz to 1 kHz	22 mV to 220 mV > 220 mV to 2.2 V > 2.2 V to 22 V > 22 V to 220 V > 220 V to 1000 V	$67 * 10^{-6} * U$ + 13 µV $50 * 10^{-6} * U$ + 12 µV $52 * 10^{-6} * U$ + 46 µV $59 * 10^{-6} * U$ + 0.56 mV $80 * 10^{-6} * U$ + 3.2 mV	• JNMISMP08, Issue No.:(2), Issue Date: (15/07/2020) Calibration of AC Voltage Meter • Euramet cg-15 (V 3.0) U= measured voltage

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Measurand	*Measuring Range*	*Calibration and measurement Capability (CMC) [a]*	*Calibration Methods/ Standards/ Remarks*
AC Voltage Sources 40 Hz to 1 kHz	10 mV to < 0.2V 0.2 mV to < 2 V 2 V to < 20 V 20 V to < 200 V 200 V to 1000 V	$1* 10^{-3} * U + 18\ \mu V$ $0.11 * 10^{-3} * U + 26\ \mu V$ $0.10 * 10^{-3} * U + 0.20\ mV$ $0.11* 10^{-3} * U + 2\ mV$ $0.13 * 10^{-3} * U + 19\ mV$	JNMISMP07, Issue No.: (2), Issue Date: (15/07/2020) Calibration of AC Voltage Sources U= measured voltage
AC Voltage Source	1 kV to 20 kV	1.6 % * U	JNMISMP82, Issue No.(2), Issue Date: 15/7/2020 Where U is the Measured Voltage
AC Voltage Meter (Probe)	1 kV to 10 kV	2 % * U	
AC Current (Calibration Location: JNMI/Permanent)			
AC Current Sources Fixed Values 40 Hz to 1 kHz	50 mA 0.1 A 0.2 A 0.5 A 1 A 2 A 3 A 5 A 10 A	$29 * 10^{-6} *I$ $26 * 10^{-6} *I$ $35 * 10^{-6} *I$ $26 * 10^{-6} *I$ $33 * 10^{-6} *I$ $67 * 10^{-6} *I$ $62 * 10^{-6} *I$ $61 * 10^{-6} *I$ $0.16 * 10^{-3} *I$	JNMISMP48, Issue No.:(2), Issue Date: (15/7/2020) I is Measured Current
AC Current	> 22 mA to 220 mA	$0.13 * 10^{-3}* I + 2.5\ \mu A$	• JNMISMP10, Issue No.:(2), Issue Date: (15/07/2020)

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Measurand	*Measuring Range*	*Calibration and measurement Capability (CMC) [a]*	*Calibration Methods/ Standards/ Remarks*
Measuring Instruments 40 Hz to 1 kHz	> 220 mA to 2.2 A > 2.2 A to 5 A > 5 A to 11 A	$0.27 * 10^{-3} * I + 34$ µA $0.47 * 10^{-3} * I + 0.17$ mA $0.49 * 10^{-3} * I + 0.16$ mA	Calibration of AC Current Meter • Euramet cg-15 (V 3.0) I= measured Current
AC Current Sources 40 Hz to 1 kHz	10 mA to < 0. 2 A 0.2 A to < 2A 2 A to 20 A	$0.28 * 10^{-3} * I + 20$ µA $0.66 * 10^{-3} * I + 0.2$ mA $0.95 * 10^{-3} * I + 1.9$ mA	JNMISMP09, Issue No.:(2) Issue Date: (15/07/2020) Calibration of AC Current Source I= measured Current
AC Current Clamp Meters 45 Hz to 65 Hz	2 A to < 150 A 150 A to 1000 A	$3 * 10^{-3} * I + 0.1$ A $4 * 10^{-3} * I + 0.5$ A	JNMISMP65, Issue (2), Issue Date: (15/7/2020) Calibration of Toroidal Clamp Meters I: Measured Current Using 50-turns-coil
AC Current Clamp Meters 45 Hz to 65 Hz	2 A to < 150 A 150 A to 1000 A	$7 * 10^{-3} * I + 0.4$ A $7 * 10^{-3} * I + 1.2$ A	JNMISMP65, Issue (2), Issue Date: (15/7/2020) Calibration of Non-Toroidal Clamp Meters I: Measured Current Using 50-turns-coil
Current Transformer	0 to 100 A	0.13 %* I	JNMISMP99, Issue No.(2), Issue Date: (15/7/2020)
AC Current (Calibration Location: JNMI/Permanent and On-Site)			

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Measurand	*Measuring Range*	*Calibration and measurement Capability (CMC)* [a]	*Calibration Methods/ Standards/ Remarks*
Sources	> 100 A to 1000 A	1.8 % . I + 0.018 A	JNMISMP65, Issue No. (2), Issue Date: (15/7/2020) Using CT or Clamp Meter I: Measured current
Energy Meter Test Benches & Electrical Sources	(5 to 600) V AC/DC (0 to 20) A AC/DC > (20 to 100) A AC/DC (0 to 6) kW	0.17 % *V 0.25 %*I 0.2 %*I 0.25 %*P	JNMISMP100, Issue No.(2), Issue Date: (15/7/2020)
Dimension (Calibration Location: JNMI/Permanent)			
Micrometer for External Measurements	Up to 250 mm	3 µm + 10 * 10^{-6}* ℓ	• JNMISMP36, Issue No. (2), Issue Date: (15/07/2020) • VDI/VDE/DGQ 2618 Part 10.1 ℓ: is measured length
Vernier Caliper for external, internal, & depth measurements (Including digital & dial Indicators)	Up to 300 mm > 300 mm to 500 mm	10 µm 20 µm	• JNMISMP39, Issue No. (2), Issue Date: (15/7/2020) • VDI/VDE/DGQ 2618 Part 9.1 ℓ: is measured length
Dial Gauges	Up to 100 mm	6 µm + 10*10^{-6}* ℓ using i-checker as referenece 2 µm using gauge blocks as a reference	• JNMISMP32, Issue No. (2), Issue Date: (15/7/2020) • VDI/VDE/DGQ 2618 Part 11.1 ℓ: is measured length

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Measurand	*Measuring Range*	*Calibration and measurement Capability (CMC) [a]*	*Calibration Methods/ Standards/ Remarks*
Gauge Blocks made of Steel or Ceramics	0.5 mm to 100 mm	For the central length 0.08 µm + 0.8*10^{-6}* ℓ ℓ is the length of the gauge block For the deviations fo and fu from the central length 0.05 µm	• JNMISMP (35), Issue No. (2), Issue Date: (15/7/2020) • VDI/VDE/DGQ 2618 Part 3.1
Gauge Blocks made of Tungsten Carbide	0.5 mm to 100 mm	For the central length 0.08 µm + 0.5 * 10^{-6} * L For the deviations fo and fu from the central length 0.05 µm	JNMISMP35, Issue No. (2), Issue Date: (15/7/2020) VDI/VDE/DGQ 2618 Part 3.1
Rulers Measures	Up to 2 m	0.5 mm	JNMISMP46, Issue No. (2), Issue Date: (15/7/2020)
Tape Measures	Up to 10 m		
Linear Scale	Up to 2 m	0.16 mm	JNMISMP51, Issue (2), Issue Date: (15/7/2020)
Coating Thickness Gauge	(0 to 250) µm	4 µm	JNMISMP102 [Issue No. (1), Issue Date: (23/3/2022)
	(> 0.25 to 0.5) mm	9 µm	
	Gauge blocks (0.5 to 25) mm	2 µm	JNMISMP102, Issue No. (1), Issue Date: (23/3/2022)
	Shims 0.05 mm to 0.5 mm	3 µm	

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Measurand	*Measuring Range*	*Calibration and measurement Capability (CMC)* [a]	*Calibration Methods/ Standards/ Remarks*
Thickness and Ultrasonic Thickness Devices	Shims 0.5 mm to 25 mm	7 µm	
Rods / Filaments / Distance / Feeler Gauge/Diameter	0.05 mm to 0.5 mm	1 µm	JNMISMP103, Issue No. (1), Issue Date: (23/3/2022) Reference used Micrometer Reference used Slide caliper.
	0.5 mm to 25 mm	5 µm	
	L > 25 mm	50 µm	
Laser Distance Meter	0.1 m to 10 m	2 mm	JNMISMP105, Issue No. (1), Issue Date: (23/3/2022)
Inside Micrometer / Three Point Micrometer	(0 to 30) mm	3 µm	JNMISMP104, Issue No. (1), Issue Date: (23/3/2022)
	(> 30 to 300) mm	5 µm	
Dial Gauges	0 to 25 mm	0.002 mm	JNMSMP32, Issue No.(2), Issue Date: (15/7/2020) Ceramic Gauge Blocks Calibration using Gauge Blocks
Mass (Calibration Location: JNMI/Permanent)			
Conventional Mass	1 mg to 20 mg 50 mg 100 mg 200 mg 500 mg 1 g	0.003 mg 0.004 mg 0.005 mg 0.006 mg 0.008 mg 0.010 mg	• JNMISMP43, Issue No.:(2), Issue Date: (15/7/2020) • JNMISMP44, Issue No.:(2), Issue Date: (15/7/2020) CMC At Class E2 (Class F1, F2, M1, M2, M12, M23 and M3)

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Measurand	*Measuring Range*	*Calibration and measurement Capability (CMC) [a]*	*Calibration Methods/ Standards/ Remarks*
	2 g 5 g 10 g 20 g 50 g 100 g 200 g 500 g 1 kg 2 kg 5 kg 10 kg	0.012 mg 0.016 mg 0.020 mg 0.025 mg 0.030 mg 0.050 mg 0.10 mg 0.25 mg 0.5 mg 1.0 mg 2.5 mg 5 mg	
Conventional Mass	20 kg 50 kg	30 mg 80 mg	• JNMISMP44, Issue No.:(2), Issue Date: (15/7/2020) • OIML recommendation R - 111 CMC At Class F1 (Class F2, M1, M2, M12, M23 and M3)
Mass	1 mg to 100 mg > 100 mg to 200 mg > 200 mg to 500 mg > 500 mg to 1 g	0.005 mg 0.006 mg 0.008 mg 0.010 mg	• JNMISMP44, Issue No.:(2), Issue Date: (15/7/2020) • OIML recommendation R - 111

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For Jordan National Metrology Institute at Royal Scientific Society/ Amman

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Calibration of Electrical Metrology: DC Voltage (Source & Measure), DC Current (Source & Measure), AC Voltage (Source & Measure), AC Current (Source & Measure), Resistance (Source & Measure), Power & Energy (Power, Energy Meters, Power Factor), & Other Electrical; Current Transformers, Earth Testers, Insulation Testers, & Oscilloscope.

And calibration of Physical & Mechanical Metrology: Mass, Dimensional, Temperature, Humidity Hygrometers/Sensors, Pressure, Force & Torque, Volume & Flow, Time & Frequency, Acoustics, Photometry & Radiometry, Irradiance, & Chemical & Others, & Medical Devices. (Permanent and Onsite)

Measurand	*Measuring Range*	*Calibration and measurement Capability (CMC) [a]*	*Calibration Methods/ Standards/ Remarks*
	> 1 g to 2 g > 2 g to 5 g > 5 g to 10 g > 10 g to 20 g > 20 g to 50 g > 50 g to 100 g > 100 g to 10 kg > 10 kg to 50 kg	0.012 mg 0.015 mg 0.020 mg 0.025 mg 0.030 mg 0.05 mg $5 * 10^{-7} * m_c$ $1.6 * 10^{-6} * m_c$	For free nominal values m_c: conventional mass
Mass (Calibration Location: JNMI/Permanent and On-Site)			
Non-Automatic weighing instruments	Up to 60 kg	$2 * 10^{-6} * m$	EURAMET/cg – 18, Version (4.0) NMISMP45, Issue No. (2), Issue Date: (15/7/2020) For weight pieces according to OIML R 111, class E2 Where m is the measured mass
	> 60 kg to 100 kg	$6 * 10^{-6} * m$	EURAMET/cg – 18, Version (4.0) NMISMP45, Issue No. (2), Issue Date: (15/7/2020) For weight pieces according to OIML R 111, class F1
	> 100 to 1000 kg	$3 * 10^{-5} * m$	EURAMET/cg – 18, Version (4.0) NMISMP45, Issue No. (2), Issue Date: (15/7/2020) For weight pieces according to OIML R 111, class M1and other weights
Temperature (Calibration Location: JNMI/Permanent)			
Temperature Fixed point cells	0.01 °C	5 mK	JNMISMP58, Issue No. (2), Issue Date: (15/7/2020)

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Measurand	*Measuring Range*	*Calibration and measurement Capability (CMC) [a]*	*Calibration Methods/ Standards/ Remarks*
			Comparison with TPW
Resistance Thermometers, direct-reading thermometers & data loggers with external sensors	- 95 °C to -85 °C > - 85 °C to 50 °C > 50 °C to 300 °C > 180 °C to 550 °C > 550 °C to 660 °C 0.01 °C 29.7646 °C	65 mK 25 mK 35 mK 50 mK 0.25 K 5 mK 12 mK	JNMISMP59, Issue No. (2), Issue Date: (15/7/2020) Comparison with standard platinum resistance thermometer Heat Sources used are Ethanol Bath, Oil Bath, Salt Bath, Dry Block Calibrators, three Zone Furnace, as well as a TPW and a Gallium Cell
Liquid in Glass Thermometers	- 85 °C to 300 °C > 300 °C to 550 °C	50 mK 60 mK	JNMISMP62, Issue No. (2), Issue Date: (15/7/2020) Comparison with standard platinum resistance thermometer Heat Sources used are stirred liquid baths
Noble Metal Thermocouples (B,R,S)	-85 °C to 50 °C 50 °C to 660 °C 350 °C to 700 °C 350 °C to 1100 °C	1.1 K 1.2 K 1.3 K 2.2 K	JNMISMP60, Issue No. (2), Issue Date: (15/7/2020) Comparison with standard platinum resistance thermometer

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Measurand	*Measuring Range*	*Calibration and measurement Capability (CMC) [a]*	*Calibration Methods/ Standards/ Remarks*
			Heat Sources used are Ethanol Bath, Oil Bath, and Dry Block Calibrators Comparison with noble metal thermocouples Heat Sources are Dry Block Calibrators and Three Zone Furnace
Base Metal Thermocouples with direct reading devices (internal CJC)	-85 °C to 50 °C > 50 °C to 300 °C 180 °C to 550 °C -95 °C to 140 °C -25 °C to 150 °C 50 °C to 400 °C > 400 °C to 700 °C > 700 °C to 1100 °C	50 mK 62 mK 83 mK 62 mK 0.18 K 0.37 K 0.4 K 2.8 K	JNMISMP61, Issue No. (2), Issue Date: (15/7/2020) Calibration using Ethanol bath, Oil bath, Salt bath, Dry block calibrators and 3-zone furnace Reference Standards used are PT-100 up to 550 °C, and Noble Metal TCs up to 1100 °C
Data loggers with air type sensors (Thermo-Hygrometer)	-85 °C to -10 °C > -10°C to 15 °C > 15°C to 35 °C > 35 °C to 50 °C > 50 °C to 70 °C	0.3 K 0.4 K 0.2 K 0.5K 0.7 K	JNMISMP63, Issue No. (2), Issue Date: (15/7/2020) Comparison with PT-100 Heat Source used is a Climatic Chamber

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Measurand	*Measuring Range*	*Calibration and measurement Capability (CMC)* [a]	*Calibration Methods/ Standards/ Remarks*
	5 °C to 50 °C	0.10 K	JNMISMP97, Issue No. (2), Issue Date: (15/07/2022), Direct Measurement of temperature by Comparison with PT-100 using Portable Climatic Chamber (Permanent & onsite)
Dry block calibrators	-95 to 150 °C > 150 to 400 °C > 400 to 700 °C > 700 to 900 °C > 900 to 1100 °C	80 mK 0.17 K 0.4 K 1 K 8 K	Euramet cg-13, Version (4.0), (09/2017) JNMISMP90, Issue No. (2), Issue Date: (6/4/2022) Comparison with SPRTs and Noble Metal TCs
Resistance thermometers, direct-reading thermometers and data loggers with external sensors	- 95 °C to -85 °C > - 85 °C to 50 °C > 50 °C to 300 °C > 180 °C to 550 °C > 550 °C to 660 °C	62 mK 50 mK 55 mK 70 mK 0.4 K	JNMISMP61, Issue No. (2), Issue Date: (15/7/2020) Comparison with standard platinum resistance thermometer Heat Sources used are Ethanol Bath, Oil Bath, Salt Bath, Dry Block Calibrators, three Zone Furnace

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Measurand	*Measuring Range*	*Calibration and measurement Capability (CMC) [a]*	*Calibration Methods/ Standards/ Remarks*
IR/Radiation Thermometers	-15 to -8 °C - 8 °C to 120 °C > 120 °C to 250 °C > 250 °C to 500 °C > 500 °C to 982 °C	0.6 °C 0.6 °C 1.1 °C 2.3 °C 2.9 °C	VDI/VDE 3511, Part 4.4: 2005 and JNMISMP92, Issue No. (2), Issue Date: 15/7/2020
IR/Radiation Thermometers (Medical)	30 °C to 45 °C	0.2 °C	JNMISMP92, Issue No. (2), Issue Date: (15/7/2020)
Temperature (Calibration Location: JNMI/Permanent and On-Site)			
Thermocouple simulators	-200 °C to 200 °C > 200 °C to 500 °C > 500 °C to 1200 °C	0.7 K 0.5 K 0.35 K	Euramet cg-11, Version 2.0 (03/2011) JNMISMP89, Issue No. (2), Issue Date:15/7/2020 Calibration using Multifunction Calibrator, Nano Voltmeter or Reference DMM
RTD simulators	-200 °C to 400 °C > 400 °C to 800 °C	0.05 K 0.08 K	
Thermocouple Indicators	-200 °C to 200 °C > 200 °C to 500 °C > 500 °C to 1200 °C	0.8 K 0.6 K 0.8 K	
RTD indicators	-200 °C to 400 °C > 400 °C to 800 °C	0.05 K 0.3 K	

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Measurand	*Measuring Range*	*Calibration and measurement Capability (CMC) [a]*	*Calibration Methods/ Standards/ Remarks*
Climatic Chambers with air circulation systems	-95 °C to 0 °C > 0 °C to 60 °C > 60 °C to 100 °C -85 °C to 0 °C > 0 °C to 60 °C > 60 °C to 100 °C	0.6 K 0.45 K 1.4 K 0.6 K 0.4 K 0.7 K	JNMISMP71, Issue No. (2), Issue Date: (15/7/2020) Euramet cg-20, Version 5.0 (09/2017) Mapping using PT-100 Sensors or Thermocouples If loaded, type and arrangement of loading has to be specified exactly in the calibration certificate
Climatic chambers without air circulation systems	-95°C to 0 °C > 0 °C to 60 °C > 60 °C to 100 °C -85°C to 0 °C > 0 °C to 60 °C > 60 °C to 100 °C	0.7 K 0.5 K 1.6 K 0.7 K 0.5 K 0.8 K	
Heat Enclosures (ovens, Furnaces, Incubators, Autoclaves, Freezers, Baths)	-95 °C to 20 °C > 20 °C to 250 °C > 250 °C to 400 °C > 400 °C to 1100 °C	80 mK 90 mK 1.3 K 6 K	JNMISMP79, Issue No.(2), Issue Date: (15/7/2020) PT-100 Sensors TC Sensors
Air Type Temperature Sensors	5 °C to 50 °C	0.15 K	JNMISMP97, Issue (2), Issue Date: (15/7/2020) Reference is capacitive sensor

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Measurand	*Measuring Range*	*Calibration and measurement Capability (CMC) [a]*	*Calibration Methods/ Standards/ Remarks*
			Uncertainty is an absolute value of relative humidity Calibration Medium: Portable Climatic Chamber (10 to 95) % RH
Temperature (Calibration Location: JNMI/Permanent and On-Site)			
Calibration of industrial thermometers (RTD, TC and direct reading devices)	-95 °C to 140 °C > 125 °C to 400 °C > 400 °C to 1100 °C	0.2 K 0.4 K 5 K	JNMISMP72, Issue No. (2), Date: (15/7/2020) Comparison with RTD
Climatic chambers with air circulation system (On-site)	(5 to 11) % RH (> 11 to 20) % RH (> 20 to 30) % RH (> 30 to 50) % RH (> 50 to 75) % RH (> 75 to 90) % RH (> 90 to 95) % RH	0.6 % RH 0.9 % RH 1.1 % RH 1.9 % RH 2.5 % RH 2.8 % RH 3.5 % RH	• JNMISMP71, Issue (2), Issue Date: (15/7/2020) • Euramet cg-20, Version 5.0 (09/2017), Method C Measurement with capacitive reference humidity sensor If loaded, type and arrangement of loading has to be specified exactly in the calibration certificate
Climatic chambers without air circulation system (On-site)	(5 to 11) % RH (> 11 to 20) % RH (> 20 to 30) % RH (> 30 to 50) % RH	0.6 % RH 1.0 % RH 1.2 % RH 2.1 % RH	

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Measurand	*Measuring Range*	*Calibration and measurement Capability (CMC) [a]*	*Calibration Methods/ Standards/ Remarks*
	(> 50 to 75) % RH (> 75 to 90) % RH (> 90 to 95) % RH	2.9 % RH 3.2 % RH 3.9 % RH	Measurement uncertainty is an absolute value Methods A and B Air temperature 20°C
Humidity (Calibration Location: JNMI/Permanent)			
Hygrometers/ Humidity Sensors, Humidity Indicators	(10 to 20) % RH (> 20 to 30) % RH (> 30 to 50) % RH (> 50 to 75) % RH (> 75 to 90) % RH (> 90 to 95) % RH	0.20 % RH 0.30 % RH 0.60 % RH 0.85 % RH 0.9 % RH 1.1 % RH	DKD-R-5-8 (10/2019) & JNMISMP56, Issue (2), Issue Date: (15/7/2020) 0 °C to 70 °C
Hygrometers / Humidity Sensors, Humidity Indicators	(10 to 20) % RH (> 20 to 30) % RH (> 30 to 50) % RH (> 50 to 75) % RH (> 75 to 90) % RH (> 90 % to 95) % RH	0.40 % RH 0.56 % RH 1.1% RH 1.5 % RH 1.7 % RH 2.1 % RH	DKD-R-5-8 (10/2019) & JNMISMP57, Issue No. (2), Issue Date: (15/7/2020) Reference is capacitive sensor Uncertainty is an absolute value of relative humidity 0 °C to 70 °C
	(5 to 10) % RH (10 to 30) % RH (> 30 to 50) % RH (> 50 to 75) % RH (> 75 to 90) % RH (> 90 to 95) % RH	0.28 % RH 0.70 % RH 1.1 % RH 1.4 % RH 1.6 % RH 1.8 % RH	DKD-R-5-8 (10/2019) & JNMISMP97, Issue No. (2), Issue Date: (15/7/2020) Reference is capacitive sensor Uncertainty is an absolute value of relative humidity

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Measurand	*Measuring Range*	*Calibration and measurement Capability (CMC) [a]*	*Calibration Methods/ Standards/ Remarks*
			Calibration Medium: Portable Climatic Chamber (5 to 50) °C
Hygrometers / Humidity Sensors, Humidity Indicators	(10 to 20) % RH (> 20 to 30) % RH (> 30 to 50) % RH (> 50 to 75) % RH (> 75 to 90) % RH (> 90 % to 95) % RH	0.40 % RH 0.56 % RH 1.1 % RH 1.5 % RH 1.7 % RH 2.1 % RH	JNMISMP97, Issue (2), Issue Date:15/7/2020 Direct Measurement of humidity by Comparison using Reference Capacitive Sensor Heat Source used is a Climatic Chamber 0 °C to 70 °C
	(5 to 10) % RH (10 to 30) % RH (> 30 to 50) % RH (> 50 to 75) % RH (> 75 to 90) % RH (> 90 to 95) % RH	0.25% RH 0.6 % RH 1.0 % RH 1.3 % RH 1.5 % RH 1.7 % RH	JNMISMP97, Issue No. (2), Issue Date:15/7/2020 Direct Measurement of humidity by Comparison using Dew point meter/or Reference Capacitive Sensor Heat Source used is a Portable Climatic Chamber 0 °C to 50 °C **(JNMI/Permanent & Onsite)**
Force (Calibration Location: JNMI/Permanent)			
Load cells (Compression)	10 kN to 100 kN 50 KN to 500 kN	0.034 % * Fi 0.32 % * Fi 0.28 % * Fi	• ISO 376:2011 • ASTM E74:2018

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Measurand	*Measuring Range*	*Calibration and measurement Capability (CMC) [a]*	*Calibration Methods/ Standards/ Remarks*
	100 kN to 1MN 200 kN to 2MN	0.11 % * Fi	• JNMISMP77, Issue No. (2), Issue Date: (15/7/2020)
Load cells (Tension)	10 kN to 100 kN 50 kN to 500 kN 100 kN to 1MN 200 kN to 2MN	0.034 % * Fi 0.32 % * Fi 0.28 % * Fi 0.11 % * Fi	• ISO 376:2011 • ASTM E74:2018 • JNMISMP77, Issue No. (2), Issue Date: 15/7/2020
Torque Wrenches and Torque Measuring Tools	0.565 N.m to 813 N.m	1.5%*Fi	• ISO 6789:2017, parts 1 • JNMISMP91, Issue No. (2), Issue Date: (15/7/2020) where Fi indicate Torque
Force Measuring Instruments in Tension Mode	1 N to 1000 N 1 kN to 50 kN	0.15 % * Fi 0.3 % * Fi	• VDI/VDE 2624 Part 2.1 (2008) • JNMISMP101 Issue No.(3), Issue Date: (02/03/2026) Masses (Class M1) Reference Load Cells
Force Measuring Instruments in Compression Mode	1 N to 1000 N 1 kN to 50 kN	0.15 % * Fi 0.3 % * Fi	
Force (Calibration Location: On-Site)			
Compression Machines	0.1 kN to 100 kN > 100 kN to 1 MN > 1 MN to 2 MN	0.04 % * Fi 0.056 % * Fi 0.074 % * Fi	• ISO 7500-1:2018 • ASTM E4:2021 • JNMISMP (78), Issue No. (2), Issue Date: 15/7/2020

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Measurand	*Measuring Range*	*Calibration and measurement Capability (CMC) [a]*	*Calibration Methods/ Standards/ Remarks*
Tensile Machines	10 N to 100 kN > 100 kN to 1 MN > 1 MN to 2 MN	0.04 % * Fi 0.05 % * Fi 0.074 % * Fi	
Pressure (Calibration Location: JNMI/Permanent)			
Absolute pressure p_{abs}	0.1 bar to 3.5 bar > 3.5 bar to 35 bar > 35 bar to 201 bar	$4.6 * 10^{-5} * p_{abs}$ but not less than 12 µbar $4.6 * 10^{-5} * p_{abs}$ $7 * 10^{-5} * p_{abs}$	• JNMISMP55, Issue No. (2), Issue Date: 15/7//2020 • JNMISMP (74), Issue No. (2), Issue Date: (15/07/2020) • DAkkS-DKD R 6-1, Edition (03/2014), rev. 3 • EURAMET/cg-17, version 4.1 (09/2022) Pressure medium: Gas The uncertainty of the residual pressure has to be taken into account. in connection with a gas/ oil volume Principle of measurement: pabs = pe + pamb.

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Measurand	*Measuring Range*	*Calibration and measurement Capability (CMC)* [a]	*Calibration Methods/ Standards/ Remarks*
			Where Pamb is considered to be 0.8 bar The uncertainty of the measured atmospheric pressure has to be taken into account. In case of atmospheric pressure, comparison using JNMISMP74
Absolute pressure p_{abs}	0.8 bar 20.8 bar to 700.8 bar	$7.5 * 10^{-5} * p_{abs}$ but not less than 4.8 mbar	• JNMISMP55, Issue No. (2), Issue Date: (15/7/2020) • DAkkS-DKD R 6-1, Edition 03/2014, rev. 3 • EURAMET/cg-17, version 4.1 (09/2022) Pressure medium: Oil Principle of measurement: pabs = pe + pamb. Were Pamb is considered to be 0.8 bar

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Measurand	*Measuring Range*	*Calibration and measurement Capability (CMC) [a]*	*Calibration Methods/ Standards/ Remarks*
			The uncertainty of the measured atmospheric pressure has to be taken into account.
Gauge pressure	-0.7 bar to -0.2 bar > -0.2 bar to 0 bar > 0 bar to 0.2 bar > 0.2 bar to 3.5 bar > 3.5 bar to 35 bar > 35 bar to 200 bar	0.07 mbar 0. 011 mbar 0.008 mbar $4.6 * 10^{-5} * pe$ but not less than 12 µbar $4.6 * 10^{-5} * pe$ $7.5 * 10^{-5} * pe$	JNMISMP55, Issue No. (2), Issue Date: (15/7//2020) Pressure medium: Gas in connection with a gas/ oil volume
Gauge pressure P_e	0 bar; 20 bar to 700 bar	$7.5*10^{-5}*pe$ but not less than 4.8 mbar	• JNMISMP55, Issue No. (2), Issue Date: (15/7/2018) • DAkkS-DKD R 6-1, Edition 03/2014, rev. 3 • EURAMET/cg-17, version 4.1 (09/2022) Pressure medium: Oil
Pressure	-0.8 to -0.2 bar 9 to 172 bar 10 to 100 bar > 100 to 1000 bar	0.024 mbar 2.4 mbar 1.2 mbar 21 mbar	JNMISMP55, Issue No. (2), Issue Date : (15/7/2020) Fluke 725xi Fluke 7250xi

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Calibration of Electrical Metrology: DC Voltage (Source & Measure), DC Current (Source & Measure), AC Voltage (Source & Measure), AC Current (Source & Measure), Resistance (Source & Measure), Power & Energy (Power, Energy Meters, Power Factor), & Other Electrical; Current Transformers, Earth Testers, Insulation Testers, & Oscilloscope.

And calibration of Physical & Mechanical Metrology: Mass, Dimensional, Temperature, Humidity Hygrometers/Sensors, Pressure, Force & Torque, Volume & Flow, Time & Frequency, Acoustics, Photometry & Radiometry, Irradiance, & Chemical & Others, & Medical Devices. (Permanent and Onsite)

Measurand	*Measuring Range*	*Calibration and measurement Capability (CMC) [a]*	*Calibration Methods/ Standards/ Remarks*
			E-DWT EDWT
Differential pressure	-0.2 bar to 0.2 bar	0.6 mbar	JNMISMP55, Issue No. (1), Issue Date: (15/7/2020)
Vacuum Gauge/ Calibrator	0.6 bar to 1.1 bar	0.05 mbar + 0.01% of Reading	JNMISMP74, Issue No. (2), Issue Date: (15/7/2020)
Pressure (Calibration Location: On-Site)			
Gauge pressure p_e	-0.8 bar to 0 bar > 0 bar to 20 bar > 20 bar to 200 bar	0.08 mbar 1.0 mbar 29 mbar	• DAkkS-DKD R 6-1, Edition 03/2014, rev. 3 • EURAMET/cg-17, version 4.1 (09/2022) • JNMISMP37, Issue No. (2), Issue Date: (15/7/2020) Pressure medium: Gas
Gauge pressure p_e	0 bar to 700 bar	29 mbar	• DAkkS-DKD R 6-1, Edition 03/2014, rev. 3 • EURAMET/cg-17, version 4.1 (09/2022) • JNMISMP37, Issue No. (2), Issue Date: (15/7/2020) • Pressure medium: Oil

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Measurand	*Measuring Range*	*Calibration and measurement Capability (CMC) [a]*	*Calibration Methods/ Standards/ Remarks*
Pressure	-1 to -0.2 bar 0.2 to 3.5 bar	0.12 mbar 0.12 mbar	Pace6000, Druck, DAkkS-DKD R 6-1, Edition 03/2014, rev. 3 JNMISMP(55), Issue No. (2), Issue Date:15/7/2020
Pressure calibrator	(-2500 to -1) Pa (1 to 2500) Pa	(0.6R + 0.1% Rdg) Pa Rdg: measured value	
Barometric Measurement (Calibration Location: JNMI/Permanent)			
Absolute pressure barometric pressure) p_{abs}	90 kPa	0.01 kPa	JNMISMP74, Issue No. (2), Issue Date: (15/7/2020)
Barometric Measurement (Calibration Location: On-Site)			
Absolute pressure (barometric pressure) pabs	84 kPa - 110 kPa	0.01 kPa	JNMISMP74, Issue No. (2), Issue Date: (15/7/2020)
Electrical- Earth Testers and Meggers (Calibration Location: JNMI/Permanent)			
Earth Resistance	1 mΩ to 10 kΩ	0.26 %	JNMISMP83, Issue No.(2), Issue Date: (15/7/2020)
Insulation Resistance (Meggers & Insulation Testers)	1 kΩ to 100 GΩ	0.26 %	JNMISMP83, Issue No.(2), Issue Date: (15/7/2020)
Sound Level Meters (Calibration Location: JNMI/Permanent)			
Sound Pressure Level	94 dB, 114 dB	0.3 dB	JNMISMP85, Issue No.(2), Issue Date: (15/7/2020)

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Measurand	*Measuring Range*	*Calibration and measurement Capability (CMC) [a]*	*Calibration Methods/ Standards/ Remarks*
(Sound Level Meters & Acoustic Calibrators)			
Electrical- Power Meters (Calibration Location: JNMI/Permanent)			
AC Power Meters	0.01 kW to 20 kW / PF (lead/lag) 1 PF 0.9 PF 0.8 PF 0.7 PF 0.6 PF 0.5 PF 0.4 PF 0.3 PF 0.2 PF 0.0 PF	0.1 % 0.0004 PF 0.005 PF 0.006 PF 0.007 PF 0.008 PF 0.008 PF 0.008 PF 0.009 PF 0.010 PF 0.013 PF	JNMISMP86, Issue No.(2), Issue Date: (15/7/2020) Where P is the indicated power
Volume (Calibration Location: JNMI/Permanent)			
Pipettes	10uL ≤ V ≤ 500 uL 500uL < V ≤ 1000 uL	0.024 µL $2.14 * 10^{-5} * V + 0.019$ uL	• JNMISMP52, Issue No.(2), Issue Date: (15/7/2020) • Euramet cg-19, Version 3 (09/2018) • ISO Series 8655:2022

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Measurand	*Measuring Range*	*Calibration and measurement Capability (CMC) [a]*	*Calibration Methods/ Standards/ Remarks*
			Where V is Measured Volume
Volumetric Apparatus	10 mL ≤ V ≤ 500 mL 500 mL < V ≤ 1000 mL V > 1 L	0.004 % 0.003 % 0.002 %	• JNMISMP52 Issue No.(2), Issue Date: (15/7/2020) • Euramet cg-19, Version 3 (09/2018) & • ISO Series 8655: 2022
Infusion Pump Analyzer	(1 to 1000) ml	0.1 ml	JNMISMP52, Issue No. (2), Issue Date: (15/7/2020). Calibration techniques/ Method: Gravimetric Method at a flow rate 25 ml/hour
Infusion Pump	(1 to 1000) ml	0.1 ml	
Time, Frequency and PF (Calibration Location: JNMI/Permanent)			
Oscilloscope Vertical Deflection Rise Time Bandwidth Horizontal Deflection	(0 to 100) V 100 ps to 1 ms (0 to 1000) MHz 2 ns to 5 s	0.6 % * V 5 % * T 7 % * F 0.1 % * T	JNMISMP93, Issue No.(2) Issue Date: 15/7/2020 1) MPC 5520A 2) Signal Generator MG 3601 A Based on: Euramet cg-07: Version 1:2011 Where V is Voltage, T is Time and F is Frequency

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Measurand	*Measuring Range*	*Calibration and measurement Capability (CMC) [a]*	*Calibration Methods/ Standards/ Remarks*
Time-primary	(0 to 60) s (1 to 15) minute (15 to 30) minute (30 to 420) minute 7 hour to 24 hour	38 ms 0.1 s 0.1 s 0.1 s 5.2 s	Tektronix Timer/Counter Analyzer FCA 3103 JNMISMP98, Issue No.(2), Issue Date: (15/7/2020)
Rotational Speed Sources & Tachometers	60 rpm – 600000 rpm	0.6 rpm + 0.01% * Sp	Fluke 5520A and Optical Tacho Adaptor JNMISMP38, Issue No.(2), Issue Date: (15/7/2020) Where Sp is the speed value
Time, Frequency & PF (Calibration Location: JNMI/Permanent and On-Site)			
Power Factor Meter (Lead/Lag)	1 PF 0.9 PF 0.8 PF 0.7 PF 0.6 PF 0.5 PF 0.4 PF 0.3 PF 0.2 PF 0.0 PF	0.0004 PF 0.005 PF 0.006 PF 0.007 PF 0.008 PF 0.008 PF 0.008 PF 0.009 PF 0.01 PF 0.013 PF	Fluke 5720A JNMISMP94, Issue No.(2), Issue Date: (15/7/2020) Where PF is the Power factor Calibration techniques/ Method: Direct Comparison against DPM

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Measurand	*Measuring Range*	*Calibration and measurement Capability (CMC) [a]*	*Calibration Methods/ Standards/ Remarks*
Function/Signal Generators (Frequency)	(0 to 3) GHz	$50 * 10^{-6} * F$ Where F is the measured Frequency	Tektronix Timer/Counter/Analyzer FCA 3103 Calibration of Frequency Only JNMISMP95,Issue No.(2), Date: (15/7/2020) Calibration techniques/ Method: Direct Comparison against Frequency Counter
Frequency Counters	(0 to 1000) MHz	$80 * 10^{-6} * F$ Where F is the measured Frequency	Fluke 5520A Signal Generator MG 3601 A JNMISMP96, Issue No. (2), Issue Date: (15/7/2020) Calibration techniques/ Method: Direct Comparison against Function Generator and GPS Receiver
Stop watch, Timer, chronograph	1 second to 7 hours 7 hours to 24 hours	0.6 s 12 s	Reference Stop Watch JNMISMP98, Issue No.(2), Issue Date: (15/7/2020) Based on: NIST Guideline Stopwatch and Timer Calibrations Special Publication 960-12 (edition 2009)
Wind Speed (Calibration Location: JNMI/Permanent)			
	(0.8 to 2.5) m/s	0.21 m/s	JNMISMP111, Issue No. (1),

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Measurand	*Measuring Range*	*Calibration and measurement Capability (CMC) [a]*	*Calibration Methods/ Standards/ Remarks*
Air Velocity (Anemometer)	(>2.5 to 15) m/s	0.5 m/s	Issue Date: (7/3/2023) Calibration techniques/ Method: Direct Comparison against Hot Wire Anemometer.
Illuminance (Calibration Location: JNMI/Permanent)			
Illuminance (Luxmeter)	(10 to 5000) lux	2.3 % of reading	JNMISMP112, Issue No. (1), Issue Date: (12/7/2023) Based on: ISO/CIE 19476, characterization of the performance of illuminance meters and luminance meters
Irradiance (Calibration Location: JNMI/Permanent and On-site)			
Solar Irradiance (Pyranometer)	5-50 µV/ (W/m^2)	2.3 %	JNMISMP110, Issue No.(1), Issue Date: (15/7/2020) Based on: ISO 9847
AC/DC Voltage Source (Calibration Location: JNMI/Permanent and On-site)			
AC High Voltage	1 kV to 90 kV	0.42 % of reading	JNMISMP82, Issue No. (2), Issue Date: (15/07/2020) Calibration techniques/ Method: Direct Measurement Against a High Voltage Probe
DC High Voltage	1kV to 70kV	0.42 % of reading	
Flow (Calibration Location: JNMI/Permanent)			
Volume Flow Rate of Gas	(0.15 to 300) L/min	(0.4% Rdg + 0.6R) L/min	OIML R137 1&2, & JNMISMP114, Issue No. (1) Issue Date:2/2/2025 Based on: ISO 14511:2019

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Measurand	*Measuring Range*	*Calibration and measurement Capability (CMC) [a]*	*Calibration Methods/ Standards/ Remarks*
			Rdg: measured value R: Resolution of UUC
Volume Flow Rate of Liquid	(0.005 to 10) m^3/h	(0.1 %Rdg+ 0.6R) m^3/h	JNMISMP113, Issue No. (1), Issue Date:1/2/2025 Based on: ISO 4185 Rdg: measured value R: Resolution of UUC
Current, Voltage & Resistance (Calibration Location: JNMI/Permanent)			
Safety analyzer	1V to 300V 1 µA to 20 A (1 – 200) MΩ	(0.01 %Rdg+ 0.6R)V (0.01 %Rdg+ 0.6R)A (0.26 %Rdg+ 0.6R) MΩ	JNMISMP08, Issue No. (2), Issue Date: (15/7/2020), & JNMISMP10, Issue No. (2), Issue Date: (15/7/2020), & JNMISMP83, Issue No. (1), Issue Date: (25/2/2025). Calibration techniques/ Method: Direct Measurement of Voltage, Current and Insulation Resistance Rdg: measured value
Chemical (Calibration Location: JNMI/Permanent)			
pH value (pH Meter)	(4 to 10) pH	0.03 pH	JNMISMP107, Issue No. (2), Issue Date: (2/2/2026) Based on BS EN 60746-2 &-3
Electrolytic Conductivity (Conductivity Meter)	1.4 to 4.13 mS/cm	1.8 % Rdg % + 0.6 µS/cm	JNMISMP107, Issue No. (2), Issue Date: (2/2/2026)

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Measurand		*Measuring Range*	*Calibration and measurement Capability (CMC) [a]*	*Calibration Methods/ Standards/ Remarks*
				Based on BS EN 60746-2 &-3 Rdg: measured value
Determination of Gas Concentration in Air for Safety Monitors (Gas Detector) (Calibration Location: JNMI/Permanent)				
CO Concentration		0 to 100 ppm	(5 %Rdg+ 0.6R)	JNMISMP106, Issue No. (1), Issue Date: (01/05/2022) Rdg: measured value R: Resolution of UUC
Oxygen Volume Fraction		0 to 25 vol%	(2 %Rdg+ 0.6R)	
H_2S Concentration		0 to 100 ppm	(5 %Rdg+ 0.6R)	
Lower Explosive Limit (LEL)		0 to 100 LEL	(2 %Rdg+ 0.6R)	
Medical Devices (Calibration Location: JNMI/Permanent)				
Patient Simulator/ Monitor	Simulated/ Measured Heart Rate (ECG)	(5 to 300) BPM	1 BPM	JNMISMP116, Issue No. (1), Issue Date: (16.10.2025), & JNMISMP61, Issue No. (2), Issue Date:15/7/2020, & JNMISMP55, Issue No. (2), Issue Date: (15/7/2020) Calibration techniques/ Method: calibration of frequency, temperature and pressure Rdg: measured value BPM: Beat Per Minute
	Simulated/ Measured Oxygen Saturation (SpO_2)	(70 to 100) %	(2 %Rdg+ 0.6R) SPO_2	
	Simulated /Measured Non-Invasive Blood Pressure (NIBP)	(1 to 300) mm Hg	0.1 mm Hg	
	Simulated /Measure	(30 to 45) °C	0.1 °C	

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Measurand		*Measuring Range*	*Calibration and measurement Capability (CMC)* [a]	*Calibration Methods/ Standards/ Remarks*
	d Temperature			R: Resolution of UUC

a) The reported CMCs are expressed at approximately the 95 % level of confidence, using a coverage factor of k = 2. The actual measurement uncertainty of a specific calibration performed by the laboratory may be greater than the CMC due to the behavior of the customer's device and to influences from the circumstances of the specific calibration.

List of employees in the laboratory who are technically responsible for issuing the calibration certificates in the scope of accreditation:

1. **Director of JNMI / Eng. Mustafa F. Flaifel**
2. **Manager of Electrical Metrology Division/ Eng. Sukaina Deebajeh**
3. **Acting Manager of Physical and Mechanical Metrology Division / Eng. Mariam Bishtawi**
4. **Head of Physical Calibration Laboratory / Eng. Dua'a Flaifel**
5. **Senior Calibration Technician/ Mahmoud Sayyah**
6. **Senior Calibration Technician/ Omar Al-Omari**
7. **Senior Calibration Technician/ Waheed Al-Ali**
8. **Senior Calibration Technician/ Fadi Al-Husban**
9. **Calibration Specialist/ Eng. Ala' Dirani**
10. **Calibration Specialist/ Eng. Mohammad Ibdah**
11. **Calibration Specialist/ Eng. Abed Al-Rahman Muaddi**
12. **Calibration Specialist/ Eng. Ahmad Yaseen**