



CALIBRATION LABORATORIES

NVLAP LAB CODE 201035 -0

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) ^{Notes 1,2}

Measured Parameter or Device Calibrated	Range	Uncertainty ($k=2$) ^{Note 3}	Remarks
DIMENSIONAL			
LENGTH & DIAMETER; STEP GAGES (20/D05)			
Calipers	0 mm to 10 mm > 10 mm to 125 mm > 125 mm to 250 mm	0.83 μ m 1.8 μ m 3.2 μ m	Gage blocks
Micrometers, OD	0 mm to 10 mm > 10 mm to 125 mm > 125 mm to 250 mm	0.66 μ m 1.7 μ m 3.2 μ m	Gage blocks
Height Gages	0 mm to 125 mm > 125 mm to 250 mm > 250 mm to 500 mm > 500 mm to 750 mm > 750 mm to 1000 mm	1.6 μ m 3.1 μ m 6.0 μ m 8.9 μ m 12 μ m	Gage blocks, Mitutoyo length bar set
Indicators	1 mm to 250 mm	11 μ m/m + 0.63 μ m	ULM
Length	0 mm to 1000 mm	10 μ m/m + 0.25 μ m	ULM
Outside Diameter, Plain	0 mm to 1000 mm	11 μ m/m + 0.25 μ m	ULM
Inside Diameter, Plain	0 mm to 1000 mm	11 μ m/m + 0.25 μ m	ULM

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ROUNDNESS (20/D09)			
Spheres and Balls Diameter Roundness	10 to 30 mm 0.5 μ m	11 μ m/m + 0.25 μ m 0.25 μ m	ULM Talyrond 365
SURFACE TEXTURE (20/D12)			
Surface Finish	0.87 Ra (Nominal)	0.071 Ra	By direct comparison (Ra only)
COORDINATE MEASURING MACHINES (20/D16)			
Length, Diameter and Position	500 mm x 500 mm x 500 mm	3.1 μ m + 2.0 μ m/m	CMM, customer drawing and specifications

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) ^{Notes 1,2}

Measured Parameter or Device Calibrated	Range	Frequency Range	Uncertainty ($k=2$) ^{Note 3}	Remarks
ELECTROMAGNETICS – DC/LOW FREQUENCY				
AC RESISTORS and CURRENT (20/E02)				
AC Current – Generate	0 μ A to 330 μ A	10 to 20 Hz	0.21 % + 0.10 μ A	Fluke 5520A
		20 to 45 Hz	0.15 % + 0.10 μ A	
		45 Hz to 1 kHz	0.13 % + 0.10 μ A	
		1 to 5 kHz	0.31 % + 0.15 μ A	
		5 to 10 kHz	0.81 % + 0.20 μ A	
		10 to 30 kHz	1.6 % + 0.40 μ A	
	330 μ A to 3.3 mA	10 to 20 Hz	0.21 % + 0.15 μ A	
		20 to 45 Hz	0.13 % + 0.15 μ A	
		45 Hz to 1 kHz	0.11 % + 0.15 μ A	
3.3 mA to 33 mA	1 to 5 kHz	0.21 % + 0.20 μ A		
	5 to 10 kHz	0.51 % + 0.30 μ A		
	10 to 30 kHz	1.1 % + 0.6 μ A		
	10 to 20 Hz	20 to 45 Hz	0.18 % + 2 μ A	
		45 Hz to 1 kHz	0.092 % + 2 μ A	
			0.042 % + 2 μ A	

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Measured Parameter or Device Calibrated	Range	Frequency Range	Uncertainty ($k=2$) <small>Note 3</small>	Remarks
	33 mA to 330 mA	1 to 5 kHz	0.081 % + 2 μ A	
		5 to 10 kHz	0.21 % + 3 μ A	
		10 to 30 kHz	0.41 % + 4 μ A	
	0.33 A to 3.3 A	10 to 20 Hz	0.18 % + 20 μ A	
		20 to 45 Hz	0.091 % + 20 μ A	
		45 Hz to 1 kHz	0.041 % + 20 μ A	
		1 to 5 kHz	0.10 % + 50 μ A	
		5 to 10 kHz	0.21 % + 100 μ A	
		10 to 30 kHz	0.41 % + 200 μ A	
	3.3 A to 11 A	10 to 45 Hz	0.19 % + 0.10 mA	
		45 Hz to 1 kHz	0.061 % + 0.10 mA	
		1 to 5 kHz	0.61 % + 1 mA	
		5 to 10 kHz	2.5 % + 5 mA	
	11 A to 20 A	45 to 100 Hz	0.062 % + 2 mA	
		100 Hz to 1 kHz	0.11 % + 2 mA	
		1 to 5 kHz	3.1 % + 2 mA	
	10 to 45 Hz	45 Hz to 1 kHz	0.13 % + 5 mA	
		1 to 5 kHz	0.16 % + 5 mA	
		1 to 5 kHz	3.1 % + 5 mA	

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) ^{Notes 1,2}

Measured Parameter or Device Calibrated	Range	Uncertainty ($k=2$) ^{Note 3}	Remarks
DC RESISTANCE and CURRENT (20/E05)			
DC Resistance – Generate	0 Ω to 11 Ω	40 $\mu\Omega/\Omega$ + 1.0 m Ω	Fluke 5520A
	11 Ω to 33 Ω	30 $\mu\Omega/\Omega$ + 1.5 m Ω	
	33 Ω to 110 Ω	30 $\mu\Omega/\Omega$ + 1.4 m Ω	
	110 Ω to 330 Ω	30 $\mu\Omega/\Omega$ + 2.0 m Ω	
	0.33 k Ω to 1.1 k Ω	30 $\mu\Omega/\Omega$ + 2.1 m Ω	
	1.1 k Ω to 3.3 k Ω	30 $\mu\Omega/\Omega$ + 20 m Ω	

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Measured Parameter or Device Calibrated	Range	Uncertainty ($k=2$) <small>Note 3</small>	Remarks
DC Current – Generate	3.3 kΩ to 11 kΩ	30 μΩ/Ω + 21 mΩ	Fluke 5520A
	11 kΩ to 33 kΩ	30 μΩ/Ω + 0.20 Ω	
	33 kΩ to 110 kΩ	30 μΩ/Ω + 0.21 Ω	
	110 kΩ to 330 kΩ	32 μΩ/Ω + 2.0 Ω	
	0.33 MΩ to 1.1 MΩ	32 μΩ/Ω + 2.1 Ω	
	1.1 MΩ to 3.3 MΩ	60 μΩ/Ω + 30 Ω	
	3.3 MΩ to 11 MΩ	0.013 % + 51 Ω	
	11 MΩ to 33 MΩ	0.025 % + 2.5 kΩ	
	33 MΩ to 110 MΩ	0.050 % + 3.0 kΩ	
	110 MΩ to 330 MΩ	0.30 % + 100 kΩ	
	330 MΩ to 1100 MΩ	1.5 % + 500 kΩ	
	0 μA to 330 μA	0.016 % + 0.02 μA	
	330 μA to 3.3 mA	0.011 % + 0.01 μA	
	3.3 mA to 33 mA	0.011 % + 0.25 μA	
33 mA to 330 mA	0.011 % + 2.5 μA		
330 mA to 1.1 A	0.021 % + 40 μA		
1.1 A to 3 A	0.039 % + 40 μA		
3 A to 11 A	0.051 % + 500 μA		
11 A to 20.5 A	0.11 % + 750 μA		
DC VOLTAGE (20/E06)			
DC Voltage – Generate	0 mV to 330 mV	20 μV/V + 1 μV	Fluke 5520A
	330 mV to 3.3 V	11 μV/V + 2.08 μV	
	3.3 V to 33 V	12 μV/V + 20.8 μV	
	33 V to 330 V	18 μV/V + 0.16 mV	
	330 V to 1000 V	18 μV/V + 1.6 mV	

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Measured Parameter or Device Calibrated	Range	Frequency Range	Uncertainty (k=2) Note 3	Remarks
LF AC VOLTAGE (20/E09)				
AC Voltage – Generate	1 mV to 33 mV	10 Hz to 45 Hz	0.083 % + 6 μV	Fluke 5520A
		45 Hz to 10 kHz	0.020 % + 6 μV	
		10 kHz to 20 kHz	0.020 % + 6 μV	
		20 kHz to 50 kHz	0.11 % + 6 μV	
		50 kHz to 100 kHz	0.35 % + 12 μV	
		100 kHz to 500 kHz	0.81 % + 50 μV	
	33 mV to 330 mV	10 Hz to 45 Hz	0.030 % + 8 μV	
		45 Hz to 10 kHz	0.010 % + 8 μV	
		10 kHz to 20 kHz	0.020 % + 8 μV	
		20 kHz to 50 kHz	0.040 % + 8 μV	
		50 kHz to 100 kHz	0.080 % + 32 μV	
		100 kHz to 500 kHz	0.20 % + 70 μV	
	330 mV to 3.3 V	10 Hz to 45 Hz	0.030 % + 50 μV	
		45 Hz to 10 kHz	0.020 % + 60 μV	
		10 kHz to 20 kHz	0.020 % + 60 μV	
		20 kHz to 50 kHz	0.030 % + 50 μV	
		50 kHz to 100 kHz	0.070 % + 130 μV	
		100 kHz to 500 kHz	0.24 % + 600 μV	
	3.3 V to 33 V	10 Hz to 45 Hz	0.030 % + 0.65 mV	
		45 Hz to 10 kHz	0.020 % + 0.60 mV	
10 kHz to 20 kHz		0.020 % + 0.60 mV		
20 kHz to 50 kHz		0.040 % + 0.60 mV		
50 kHz to 100 kHz		0.090 % + 1.6 mV		
33 V to 330 V	45 Hz to 1 kHz	0.020 % + 2 mV		
	1 kHz to 10 kHz	0.020 % + 6 mV		
	10 kHz to 20 kHz	0.030 % + 6 mV		
	20 kHz to 50 kHz	0.030 % + 6 mV		
	50 kHz to 100 kHz	0.20 % + 50 mV		

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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Frequency Range	Uncertainty ($k=2$) Note 3	Remarks
	330 V to 1020 V	45 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	0.030 % + 12 mV 0.030 % + 10 mV 0.030 % + 10 mV	
CAPACITANCE (20/E10)				
Capacitance – Generate	0.19 to 0.4 nF 0.4 nF to 1.1 nF 1.1 nF to 3.3 nF 3.3 nF to 11 nF 11 nF to 33 nF 33 nF to 110 nF 110 nF to 330 nF 0.33 μ F to 1.1 μ F 1.1 μ F to 3.3 μ F 3.3 μ F to 11 μ F 11 μ F to 33 μ F 33 μ F to 110 μ F 110 μ F to 330 μ F 0.33 mF to 1.1 mF 1.1 mF to 3.3 mF 3.3 mF to 11 mF 11 mF to 33 mF 33 mF to 110 mF	10 Hz to 10 kHz 10 Hz to 10 kHz 10 Hz to 3 kHz 10 Hz to 1000 Hz 10 Hz to 1000 Hz 10 Hz to 1000 Hz 10 Hz to 1000 Hz 10 Hz to 600 Hz 10 Hz to 300 Hz 10 Hz to 150 Hz 10 Hz to 120 Hz 10 Hz to 80 Hz DC to 50 Hz DC to 20 Hz DC to 6 Hz DC to 2 Hz DC to 0.6 Hz DC to 0.2 Hz	0.50 % + 12 pF 0.50 % + 12 pF 0.50 % + 12 pF 0.25 % + 12 pF 0.25 % + 0.12 nF 0.25 % + 0.12 nF 0.25 % + 0.35 nF 0.25 % + 1.2 nF 0.25 % + 3.5 nF 0.25 % + 12 nF 0.40 % + 35 nF 0.45 % + 0.12 μ F 0.45 % + 0.35 μ F 0.45 % + 1.2 μ F 0.45 % + 3.5 μ F 0.45 % + 12 μ F 0.75 % + 35 μ F 1.1 % + 120 μ F	Fluke 5520A

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Uncertainty ($k=2$) Note 3	Remarks
MECHANICAL			
TORQUE (20/M15)			
Torque Wrenches	0.5 N·m to 11.3 N·m 14 N·m to 136 N·m 136 N·m to 1100 N·m	1.3 % 1.0 % 2.2 %	Torque calibration system

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Measured Parameter or Device Calibrated	Range	Uncertainty ($k=2$) ^{Note 3}	Remarks	
THERMODYNAMIC				
LABORATORY THERMOMETERS, DIGITAL & ANALOG (20/T03)				
Temperature Measure	0 °C to 232 °C	1.7 °C	Eurothem model 6180A and thermocouple Beamex MC5 w/ Type N T/C	
	0 °C to 200 °C	1.0 °C		
PRESSURE (20/T05)				
Pressure Measuring Equipment – Gage	-14 psi to 0 psi	0.046 psi	Beamex MC5 calibrator with EXT20C pressure module	
	0 psi to 30 psi	0.053 psi		
	30 psi to 100 psi	0.076 psi		
	100 psi to 300 psi	0.13 psi		
TEMPERATURE INDICATORS (20/T08)				
Thermocouple Simulation – Measuring Equipment and Measure	Type J	-210 °C to -100 °C	0.27 °C	Fluke 5520A w/TC Wires
		-100 °C to -30 °C	0.16 °C	
		-30 °C to 150 °C	0.14 °C	
		150 °C to 760 °C	0.17 °C	
		760 °C to 1200 °C	0.23 °C	
	Type K	-200 °C to -100 °C	0.33 °C	
		-100 °C to -25 °C	0.18 °C	
		-25 °C to 120 °C	0.16 °C	
		120 °C to 1000 °C	0.26 °C	
		1000 °C to 1372 °C	0.40 °C	
	Type N	-200 °C to -100 °C	0.40 °C	
		-100 °C to -25 °C	0.22 °C	
		-25 °C to 120 °C	0.19 °C	
		120 °C to 410 °C	0.18 °C	
		410 °C to 1300 °C	0.27 °C	

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Measured Parameter or Device Calibrated	Range	Uncertainty ($k=2$) ^{Note 3}	Remarks
Type T	-250 °C to -150 °C	0.63 °C	Fluke 5520A
	-150 °C to 0 °C	0.24 °C	
	0 °C to 120 °C	0.16 °C	
	120 °C to 400 °C	0.14 °C	
Electrical Calibration of RTDs – Measuring Equipment and Measure Pt 385, 100 Ω	-200 °C to -80 °C	0.05 °C	
	-80 °C to 0 °C	0.05 °C	
	0 °C to 100 °C	0.07 °C	
	100 °C to 300 °C	0.09 °C	
	300 °C to 400 °C	0.10 °C	
	400 °C to 630 °C	0.12 °C	
	630 °C to 800 °C	0.23 °C	
Pt 3926, 100 Ω	-200 °C to -80 °C	0.05 °C	
	-80 °C to 0 °C	0.05 °C	
	0 °C to 100 °C	0.07 °C	
	100 °C to 300 °C	0.09 °C	
	300 °C to 400 °C	0.10 °C	
	400 °C to 630 °C	0.12 °C	
Pt 3916, 100 Ω	-200 °C to -190 °C	0.25 °C	
	-190 °C to -80 °C	0.04 °C	
	-80 °C to 0 °C	0.05 °C	
	0 °C to 100 °C	0.06 °C	
	100 °C to 260 °C	0.07 °C	
	260 °C to 300 °C	0.08 °C	
	300 °C to 400 °C	0.09 °C	
	400 °C to 600 °C	0.10 °C	
	600 °C to 630 °C	0.23 °C	
Pt 385, 200 Ω	-200 °C to -80 °C	0.04 °C	
	-80 °C to 0 °C	0.04 °C	
	0 °C to 100 °C	0.04 °C	
	100 °C to 260 °C	0.05 °C	

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Measured Parameter or Device Calibrated	Range	Uncertainty ($k=2$) ^{Note 3}	Remarks
Pt 385, 500 Ω	260 °C to 300 °C	0.12 °C	
	300 °C to 400 °C	0.13 °C	
	400 °C to 600 °C	0.14 °C	
	600 °C to 630 °C	0.16 °C	
Pt 385, 1000 Ω	-200 °C to -80 °C	0.04 °C	
	-80 °C to 0 °C	0.05 °C	
	0 °C to 100 °C	0.05 °C	
	100 °C to 260 °C	0.06 °C	
	260 °C to 300 °C	0.08 °C	
	300 °C to 400 °C	0.08 °C	
	400 °C to 600 °C	0.09 °C	
	600 °C to 630 °C	0.11 °C	
Ni 385, 120 Ω	-200 °C to -80 °C	0.03 °C	
	-80 °C to 0 °C	0.03 °C	
	0 °C to 100 °C	0.04 °C	
	100 °C to 260 °C	0.05 °C	
	260 °C to 300 °C	0.06 °C	
	300 °C to 400 °C	0.07 °C	
	400 °C to 600 °C	0.07 °C	
	600 °C to 630 °C	0.23 °C	
Cu 427, 10 Ω	-80 °C to 0 °C	0.08 °C	
	0 °C to 100 °C	0.08 °C	
	100 °C to 300 °C	0.14 °C	
	-100 °C to 260 °C	0.30 °C	
END			

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Notes

Note 1: A Calibration and Measurement Capability (CMC) is a description of the best result of a calibration or measurement (result with the smallest uncertainty of measurement) that is available to the laboratory's customers under normal conditions, when performing more or less routine calibrations of nearly ideal measurement standards or instruments. The CMC is described in the laboratory's scope of accreditation by: the measurement parameter/device being calibrated, the measurement range, the uncertainty associated with that range (see note 3), and remarks on additional parameters, if applicable.

Note 2: Calibration and Measurement Capabilities are traceable to the national measurement standards of the U.S. or to the national measurement standards of other countries and are thus traceable to the internationally accepted representation of the appropriate SI (Système International) unit.

Note 3: The uncertainty associated with a measurement in a CMC is an expanded uncertainty with a level of confidence of approximately 95 %, typically using a coverage factor of $k = 2$. However, laboratories may report a coverage factor different than $k = 2$ to achieve the 95 % level of confidence. Units for the measurand and its uncertainty are to match. Exceptions to this occur when marketplace practice employs mixed units, such as when the artifact to be measured is labeled in non-SI units and the uncertainty is given in SI units (Example: 5 lb weight with uncertainty given in mg).

Note 3a: The uncertainty of a specific calibration by the laboratory may be greater than the uncertainty in the CMC due to the condition and behavior of the customer's device and specific circumstances of the calibration. The uncertainties quoted do not include possible effects on the calibrated device of transportation, long term stability, or intended use.

Note 3b: As the CMC represents the best measurement results achievable under normal conditions, the accredited calibration laboratory shall not report smaller uncertainty of measurement than that given in a CMC for calibrations or measurements covered by that CMC.

Note 3c: As described in Note 1, CMCs cover calibrations and measurements that are available to the laboratory's customers under *normal conditions*. However, the laboratory may have the capability to offer special tests, employing special conditions, which yield calibration or measurement results with lower uncertainties. Such special tests are not covered by the CMCs and are outside the laboratory's scope of accreditation. In this case, NVLAP requirements for the labeling, on calibration reports, of results outside the laboratory's scope of accreditation apply. These requirements are set out in Annex A.1.h. of NIST Handbook 150, Procedures and General Requirements.

Note 4: Uncertainties associated with field service calibration may be greater as they incorporate on-site environmental contributions, transportation effects, or other factors that affect the measurements. (This note applies only if marked in the body of the scope.)

Note 5: Values listed with percent (%) are percent of reading or generated value unless otherwise noted.

Note 6: NVLAP accreditation is the formal recognition of specific calibration capabilities. Neither NVLAP nor NIST guarantee the accuracy of individual calibrations made by accredited laboratories.

Note 7: See [NIST Handbook 150](#) for further explanation of these notes.

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