

NVLAP LAB CODE 200958-0

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

J&J Calibration Service Inc.

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Fields of Calibration

Dimensional
DC/ Low Frequency
Time & Frequency
Mechanical
Thermodynamics

This laboratory is compliant to ANSI/NCSL Z540-1-1994; Part 1. (20/A01)

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or		Expanded					
Device Calibrated	Range	Uncertainty Notes 3,5	Remarks				
DIMENSIONAL							
LENGTH & DIAMETER; STEP	GAGES (20/D05)						
Gage Blocks - Croblox or steel	0.050 in to 1.0 in	4 μin	Comparison to master gage Blocks using comparator				
	2.0 in to 4.0 in	2 μin + 1.5 μin/in	stand and gage amplifier				
Long blocks - steel	5.0 in to 10.0 in	2.5 μin + 1.5 μin/in	Comparison to master gage Blocks using universal				
	>10.0 in to 20.0 in	2.8 μin + 1.6 μin/in	measuring machine				
Micrometers, Outside, Inside,	II. 4. 2 :	40 min + 0 CP	Communication to the last				
Depth Field calibrations available Note 4 Mobile laboratory available Note 7	Up to 2 in >2 in to 36 in	40 μin + 0.6 <i>R</i> 40 μin + 3 μin/in + 0.6 <i>R</i>	Comparison to gage blocks				
Calipers	0 in to 6 in	81 μ in + 0.6 R	Comparison to gage blocks				
Field calibrations available Note 4 Mobile laboratory available Note 7	>6 in to 60 in	81 μin + 7.9 μin/in + 0.6 <i>R</i>					
Indicators Field calibrations available Note 4 Mobile laboratory available Note 7	0 in to 4 in	7.6 μ in + 0.6 R	Comparison to gage blocks				

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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

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Measured Parameter or	Range	Expanded Uncertainty Notes 3,5	Damaulya
Device Calibrated	U		Remarks
Height Gages Field calibrations available Note 4	0 in to 40 in	$160 \mu in + 1.7 \mu in/in + 0.6R$	Comparison to gage blocks
Mobile laboratory available Note 7			
Single Axis, Inner Dimension Field calibrations available Note 4 Mobile laboratory available Note 7	0.10 in to 10 in	6.2 μin +1.8 μin/in	Ring comparator and gage blocks
Single Axis, Outer Dimension Field calibrations available Note 4 Mobile laboratory available Note 7	Up to 10 in	13 μin + 1.5 μin/in	Super Micrometer and gage blocks
			Universal measuring
Primary Lab only	< 1 in	5.1 μin	machine and gage blocks
MEASURING WIRES (20/D07)		,	
Thread Wire Sets Field calibrations available Note 4 Mobile laboratory available Note 7	4 TPI to 80 TPI	19 μin	Gage blocks and Super Micrometer
SURFACE TEXTURE (20/D12)		T	
Surface Plates			
Field calibrations available Note 4			
Flatness, overall	Up to 225 in on diag.	45 μin	Electronic levels
	TT . 10 ! !!		Datum gage
Flatness, local area	Up to 12 in on diag.	32 μin	(Repeat-o-meter)
THREADED PLUG & RING GAO	` ′	T	
Thread Ring Gages - pitch diameter Field calibrations available Note 4	> 0 in to 9 in	4.7 x 10 ⁻⁴ in	Setting plug gages
Mobile laboratory available Note 7			
Thread Plug Gages - pitch diameter Field calibrations available Note 4 Mobile laboratory available Note 7	> 0 in to 9 in	33 μin	Super Micrometer and thread wires

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Measured Parameter or	DRATION AND ME.	Frequency	PABILITIES (CMC) Note Expanded				
Device Calibrated	Range	Range	Uncertainty Notes 3,5	Remarks			
	ELECTROMAGNETICS – DC/LOW FREQUENCY						
AC CURRENT (20/E02)							
AC Current - Generate Field calibrations	20 μA to 202 μA	10 Hz to 44 Hz	$0.27 \% + 0.25 \mu A$	Transmille 3010A			
available Note 4 Mobile laboratory		45 Hz to 999 Hz	$0.085 \% + 0.15 \mu A$				
available Note 7		1 kHz to 10 kHz	$0.94 \% + 0.25 \mu A$				
	200 μA to 2.02 mA	10 Hz to 44 Hz	$0.27 \% + 0.25 \mu A$				
		45 Hz to 999 Hz	$0.073 \% + 0.20 \mu A$				
		1 kHz to 10 kHz	$0.59 \% + 0.30 \mu\text{A}$				
	2 mA to 20.2 mA	10 Hz to 44 Hz	0.27 % + 3.0 μΑ				
		45 Hz to 999 Hz	$0.048 \% + 2.0 \mu A$				
		1 kHz to 10 kHz	$0.31 \% + 3.0 \mu A$				
	20 mA to 202 mA	10 Hz to 44 Hz	0.27 % + 30 μΑ				
		45 Hz to 999 Hz	$0.051 \% + 20 \mu A$				
		1 kHz to 10 kHz	$0.59 \% + 40 \mu A$				
	200 mA to 2.02 A	10 Hz to 44 Hz	0.27 % + 300 μΑ				
		45 Hz to 999 Hz	$0.074 \% + 200 \mu A$				
		1 kHz to 10 kHz	$0.59 \% + 400 \mu A$				
	2 A to 30 A	30 Hz to 44 Hz	0.24 % + 3.0 mA				
		45 Hz to 99 Hz	0.10 % + 2.0 mA				
		100 Hz to 1 kHz	0.35 % + 4.0 mA				
AC Current - Measure Field calibrations	1 μA to 100 μA	10 Hz to 40 Hz	0.11 % + 15 nA	Transmille 8081			
available Note 4 Mobile laboratory		41 Hz to 1 kHz	0.062 % + 12 nA				
available Note 7		1 kHz to 10 kHz	0.15 % + 30 nA				

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Measured Parameter or		Frequency	Expanded	
Device Calibrated	Range	Range	Uncertainty Notes 3,5	Remarks
	101 mA to 1 A	10 Hz to 40 Hz	$0.11 \% + 0.15 \mu A$	
		41 Hz to 1 kHz	$0.061 \% + 0.12 \mu\text{A}$	
		1 kHz to 10 kHz	$0.15 \% + 0.30 \mu\text{A}$	
	1.001 mA to			
	10 mA	10 Hz to 40 Hz	$0.11 \% + 1.5 \mu A$	
		41 Hz to 1 kHz	$0.074 \% + 1.2 \mu A$	
		1 kHz to 10 kHz	$0.15 \% + 3.0 \mu A$	
	10.001 mA to			
	100 mA	10 Hz to 40 Hz	$0.12 \% + 0.15 \mu A$	
		41 Hz to 1 kHz	$0.062 \% + 12 \mu A$	
		1 kHz to 10 kHz	$0.15 \% + 30 \mu A$	
	101 mA to 1A	10 Hz to 40 Hz	0.14 % + 0.20 mA	
		41 Hz to 1 kHz	0.084 % + 0.15 mA	
		1 kHz to 10 kHz	$0.16 \% + 0.50 \mathrm{mA}$	
	1.001 A to 10 A	10 Hz to 40 Hz	0.21 % + 4.0 mA	
		41 Hz to 1 kHz	0.15 % + 3.0 mA	
	10.001 A to 30 A	10 Hz to 40 Hz	0.21 % + 12 mA	
		41 Hz to 1 kHz	0.15 % + 9.0 mA	

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Measured Parameter or		Expanded	
Device Calibrated	Range	Uncertainty Notes 3,5	Remarks
DC RESISTANCE AND CURREN	NT (20/E05)		
DC Current - Generate	1 μA to 202 μA	0.012 % + 10 nA	Transmille 3010A
Field calibrations available Note 4	202 μA to 2.02 mA	$61 \mu A/A + 30 nA$	
Mobile laboratory available Note 7	2.02 mA to 20.2 mA	$61 \mu A/A + 0.20 \mu A$	
	20.2 mA to 202 mA	$73 \mu A/A + 2.0 \mu A$	
	202 mA to 2.02 A	$0.016 \% + 30 \mu A$	
	2.02 A to 20.2 A	$0.035 \% + 300 \mu A$	
	20.2 A to 30 A	$0.060 \% + 450 \mu A$	

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Measured Parameter or	N AND WEASUREMEN	NI CAPABILITIES (CMC Expanded	
Device Calibrated	Range	Uncertainty Notes 3,5	Remarks
DC Current - Measure	0.1 nA to 10 nA	2.3 % + 0.8 pA	Transmille 8081
Field calibrations available Note 4	10 nA to 100 nA	0.39 % + 3.4 pA	
Mobile laboratory available Note 7	100 nA to 1 μA	0.042 % + 17 pA	
	1 μA to 10 μA	$61 \mu A/A + 100 pA$	
	10 μA to 100 μA	$18 \mu\text{A/A} + 0.40 \text{nA}$	
	100 μA to 1 mA	$18 \mu A/A + 4.0 nA$	
	1 mA to 10 mA	$21 \mu A/A + 40 nA$	
	10 mA to 100 mA	$55 \mu A/A + 0.60 \mu A$	
	100 mA to 1 A	$0.027 \% + 13 \mu A$	
	1 A to 10 A	$0.068 \% + 350 \mu A$	
	10 A to 30 A	0.091 % + 15 mA	
Resistance - Generate	$0~\mathrm{m}\Omega$	5.9 mΩ	Transmille 3010A
Field calibrations available Note 4	100 mΩ	$0.013 \% + 0.005 \Omega$	
Mobile laboratory available Note 7	1 Ω	$0.015 \% + 0.005 \Omega$	
	10 Ω	$33 \mu\Omega/\Omega + 0.005 \Omega$	
	100 Ω	$21 \mu\Omega/\Omega + 0.005 \Omega$	
	1 kΩ	$21 \mu\Omega/\Omega + 0.005 \Omega$	
	10 kΩ	$9.8 \ \mu\Omega/\Omega + 0.05 \ \Omega$	
	100 kΩ	$22 \mu\Omega/\Omega + 0.50 \Omega$	
	1 ΜΩ	$32 \mu\Omega/\Omega + 5 \Omega$	
	$10 \mathrm{M}\Omega$	$0.011 \% + 100 \Omega$	
	100 MΩ	$0.21 \% + 2.0 \text{ k}\Omega$	
	$1 \mathrm{G}\Omega$	$1.2 \% + 30 \text{ k}\Omega$	
			Ohmmite resistors with
	1 MΩ	0.066 %	Transmille 8081
	5 ΜΩ	0.066 %	
	10 MΩ	0.066 %	
	25 ΜΩ	0.067 %	
	100 MΩ	0.068 %	
	1 GΩ	0.085 %	

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Measured Parameter or		Expanded	
Device Calibrated	Range	Uncertainty Notes 3,5	Remarks
Resistance - Measure	$0.001~\Omega$ to $1~\Omega$	$29 \mu\Omega/\Omega + 6.0 \mu\Omega$	Transmille 8081
Field calibrations available Note 4	$1.001~\Omega$ to $10~\Omega$	$19 \mu\Omega/\Omega + 30 \mu\Omega$	
Mobile laboratory available Note 7	$10.001~\Omega$ to $100~\Omega$	$17 \mu\Omega/\Omega + 100 \mu\Omega$	
	$100.001~\Omega$ to $1~\mathrm{k}\Omega$	$15 \ \mu\Omega/\Omega + 800 \ m\Omega$	
	$1.001~\Omega$ to $10~\mathrm{k}\Omega$	$17 \ \mu\Omega/\Omega + 8.0 \ m\Omega$	
	$10.001 \text{ k}\Omega$ to $100 \text{ k}\Omega$	$18 \mu\Omega/\Omega + 800 \Omega$	
	$101 \text{ k}\Omega$ to $1 \text{ M}\Omega$	$22 \mu\Omega/\Omega + 2.0 \Omega$	
	$1.001~\mathrm{M}\Omega$ to $10~\mathrm{M}\Omega$	$29 \mu\Omega/\Omega + 80 \Omega$	
	$10.01~\mathrm{M}\Omega$ to $30~\mathrm{M}\Omega$	0.017 %	
	$30.01~\mathrm{M}\Omega$ to $270~\mathrm{M}\Omega$	0.016 %	
	$270.1~\mathrm{M}\Omega$ to $2700~\mathrm{M}\Omega$	0.054 %	
DC VOLTAGE (20/E06)			
DC Voltage - Generate	0 μV to 202 mV	$18 \mu V/V + 2.0 \mu V$	Transmille 3010A
Field calibrations available Note 4	200 mV to 2.02 V	$11 \mu V/V + 2.5 \mu V$	
Mobile laboratory available Note 7	2 V to 20.2 V	$9.9 \mu V/V + 24 \mu V$	
	20 V to 202 V	$14 \mu V/V + 240 \mu V$	
	200 V to 1025 V	$14 \mu V/V + 2.4 \text{ mV}$	
DC Voltage - Measure	0 nV to 100 mV	$13 \mu V/V + 0.17 \mu V$	Transmille 8081
Field calibrations available Note 4	101 mV to 1 V	$7.9 \ \mu V/V + 0.60 \ \mu V$	
Mobile laboratory available Note 7	1.001 V to 10 V	$8.5 \mu V/V + 6.0 \mu V$	
	10.001 V to 100 V	$11 \mu V/V + 80 \mu V$	
	101 V to 1050 V	$12 \mu V/V + 1.2 \text{ mV}$	

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Frequency Range	Expanded Uncertainty Notes 3,5	Remarks
LF AC VOLTAGE (20/E0	9)	ı v G	-	
LF AC Voltage – Generate	0 mV to 202 mV	10 Hz to 44 Hz	0.098 % + 15 μV	Transmille 3010A
Field calibrations available Note 4		45 Hz to 999 Hz	$0.025 \% + 15 \mu V$	
Mobile laboratory available Note 7		1 kHz to 19.999 kHz	$0.033 \% + 28 \mu V$	

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Measured Parameter or		LASUREMIENT CAPAD	Expanded	
Device Calibrated	Range	Frequency Range	Uncertainty Notes 3,5	Remarks
		20 kHz to 99.999 kHz	$0.12 \% + 40 \mu V$	
		100 kHz to 500 kHz	$0.55 \% + 100 \mu\text{V}$	
	200 mV to 2.02 V	10 Hz to 44 Hz	$0.066 \% + 180 \mu\text{V}$	
		45 Hz to 999 Hz	$0.022 \% + 120 \mu\text{V}$	
		1 kHz to 19.999 kHz	$0.032 \% + 180 \mu\text{V}$	
		20 kHz to 99.999 kHz	$0.078 \% + 300 \mu\text{V}$	
		100 kHz to 500 kHz	$0.42 \% + 450 \mu\text{V}$	
	2 V to 20.2 V	10 Hz to 44 Hz	0.060 % + 1.6 mV	
		45 Hz to 999 Hz	0.022 % + 1.0 mV	
		1 kHz to 19.999 kHz	0.032 % + 1.6 mV	
		20 kHz to 99.999 kHz	0.076 % + 3.0 mV	
	20 V to 202 V	30 Hz to 44 Hz	0.062 % + 20 mV	
		45 Hz to 999 Hz	0.021 % + 12 mV	
		1 kHz to 9.999 kHz	0.026 % + 16 mV	
		10 kHz to 40 kHz	0.040 % + 30 mV	
	200 V to 1020 V	30 Hz to 44 Hz	0.072 % + 200 mV	Limited frequency
		45 Hz to 999 Hz	0.027 % + 60 mV	and voltage pairs
		1 kHz to 10 kHz	0.033 % + 120 mV	for this voltage range
LF AC Voltage – Measure Field calibrations	100 nV to 100 mV	10 Hz to 40 Hz	$0.097 \% + 15 \mu V$	Transmille 8081
available Note 4 Mobile laboratory		41 Hz to 200 Hz	$0.049 \% + 9 \mu V$	
available Note 7		201 Hz to 2 kHz	$0.049 \% + 8 \mu V$	
		2 kHz to 20 kHz	$0.055 \% + 10 \mu V$	
		20 kHz to 100 kHz	$0.16 \% + 50 \mu V$	
	101 mV to 1 V	10 Hz to 40 Hz	$0.071 \% + 150 \mu\text{V}$	
		40 Hz to 200 Hz	$0.037 \% + 60 \mu V$	
		200 Hz to 2 kHz	$0.030 \% + 60 \mu V$	
		2 kHz to 20 kHz	$0.11 \% + 100 \mu\text{V}$	

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Measured Parameter or			Expanded	
Device Calibrated	Range	Frequency Range	Uncertainty Notes 3,5	Remarks
		20 kHz to 100 kHz	$0.14 \% + 500 \mu\text{V}$	
		100 kHz to 1 MHz	2.2 % + 25 mV	
	1.001 V to 10 V	40 Hz to 200 Hz	0.037 % + 0.6 mV	
	1.001 7 10 10 7	200 Hz to 2 kHz	0.037% + 0.6 mV	
		2 kHz to 20 kHz	0.11 % + 1 mV	
		20 kHz to 100 kHz	0.14 % + 5 mV	
	10.001 V to 100 V	10 Hz to 40 Hz	0.098 % + 15 mV	
		40 Hz to 200 Hz	0.044 % + 9 mV	
		200 Hz to 2 kHz	0.044 % + 7 mV	
		2 kHz to 20 kHz	0.11 % + 10 mV	
		20 kHz to 50 kHz	0.17 % + 50 mV	
	101 V to 1 kV	40 Hz to 200 Hz	0.049 % + 90 mV	
		200 Hz to 2 kHz	0.062 % + 70 mV	
		2 kHz to 20 kHz	0.093 % + 100 mV	

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or		Expanded	
Device Calibrated	Range	Uncertainty Notes 3,5	Remarks
LF CAPACITANCE (20/E10)			
LF Capacitance - Generate	10 nF	0.32 %	Transmille 3010A
Field calibrations available Note 4	20 nF	0.32 %	
Mobile laboratory available Note 7	50 nF	0.30 %	
	100 nF	0.30 %	
	1 μF	0.47 %	
	10 μF	0.71 %	
LF INDUCTANCE (20/E11)			
LF Inductance - Generate	1 mH to 10 H	0.60 %	Transmille 3010A
Field calibrations available Note 4			
Mobile laboratory available Note 7			

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Measured Parameter or	ION AND MEASUREM	Expanded	
Device Calibrated	Range	Uncertainty Notes 3,5	Remarks
	TIME AND F	REQUENCY	
FREQUENCY DISSEMINATION	N (20/F01)	T	I
Frequency Measuring Devices Field calibrations available Note 4 Mobile laboratory available Note 7	1 Hz to 10 MHz	1.2 μHz/Hz	Transmille 3010A
Frequency Source Devices Field calibrations available Note 4 Mobile laboratory available Note 7	1 Hz to 1 MHz	2.5 μHz/Hz + 2 digits	Transmille 8081
TORQUE (20/M15)	МЕСНА	NICAL	
Torque Tools	4 lbf-in to 50 lbf-in	0.55 %	ASME B107.300, ISO 6789-2
Field calibrations available Note 4	30 lbf-in to 400 lbf-in	0.46 %	using torque transducers
Mobile laboratory available Note 7	80 lbf-in to 1000 lbf-in	0.32 %	
	20 lbf-ft to 250 lbf-ft	0.42 %	
	60 lbf-ft to 600 lbf-ft	0.41 %	
			ASME B107.300
Torque Transducers	4 lbf-in to 50 lbf-in	0.20 %	
Field calibrations available Note 4	30 lbf-in to 400 lbf-in	0.20 %	using torque arm and weights
Mobile laboratory available Note 7	80 lbf-in to 1000 lbf-in	0.20 %	
	20 lbf-ft to 250 lbf-ft	0.20 %	
	60 lbf-ft to 600 lbf-ft	0.20 %	
WEIGHING INSTRUMENTS (20	0/M16)		
Class I, II	Up to 750 g	0.0042 mg/g + 0.048 mg	HB 44 with ASTM 1 weights
Class III	Up to 230 kg	150 mg/kg + 4.8 mg	HB 44 with ASTM 6 weights

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Measured Parameter or	ION AND MEASUREM	Expanded	
Device Calibrated	Range	Uncertainty Notes 3,5	Remarks
THERMODYNAMIC			
LABORATORY THERMOMETERS, DIGITAL AND ANALOG (20/T03)			
Temperature			
Temperature Source Devices	-80 °C to 420 °C	0.022 °C	SPRT temperature probe and
(baths, calibrators)			Transmille 8081
Temperature Measuring Devices	0 °C to 230 °C	0.032 °C + 0.6R	SPRT temperature probe,
(thermometers, probes)	>230 °C to 420 °C	0.053 °C + 0.6R	Transmille 8081 w/temp bath
Temperature Measuring Devices	0 °C to 100 °C	0.45 °C	Gemini Dry well with PRT
Field Calibrations Available Note 4	100 °C to 420 °C	1.3 °C	
Mobile Laboratory Available Note 7			
PRESSURE (20/T05)			
Pressure –	10 psig to 500 psig	0.019 %	ASME B40.100
Hydraulic Pressure Measuring	200 psig to 10 000 psig	0.018 %	using deadweight tester
Devices			
Pressure Measuring Devices	30 psig to 10 000 psig	0.12%	Secondary Standard Gages
Field Calibrations Available Note 4			With Sources
Mobile Laboratory Available Note 7			
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.5 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: The laboratory utilizes a mobile lab for most of its field service work. Please note that uncertainties listed are valid whenever the work is performed in the mobile lab. If work is done in customer facility, then note 4 will apply.

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