



CALIBRATION LABORATORIES

NVLAP LAB CODE 105000-0

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	Expanded Uncertainty ^{Notes 3, 7}	Remarks
DIMENSIONAL			
GAGE BLOCKS (20/D03)			
Steel and Chrome Only	< 0.1 in 0.1 in to 1.0 in > 1.0 in to 4.0 in >4.0 in to 20 in	3.0 μ m 2.9 μ m (1.9 + 0.9L) μ m (5.0 + 0.6L) μ m	Mechanical Comparison
	< 2.6 mm 2.6 mm to 25 mm > 25 mm to 100 mm >100 mm to 500 mm	0.08 μ m 0.07 μ m (0.05 + 0.94L) μ m (0.13 + 0.47L) μ m	Mechanical Comparison
LENGTH and DIAMETER; STEP GAGES (20/D05)			
Length	0 m to 1.2 m	(0.31 + 0.58L) μ m	Moore M48 CMM
LINE STANDARDS (20/D06)			
Line Standards	0 mm to 600 mm	(0.34 + 1.29L) μ m	CMM (optical)
OPTICAL REFERENCE PLANES (20/D08)			
Glass Reticles, Stage Micrometer, Glass Magnification Scales and Calibration Charts	Field-of-View	1.5 μ m	CMM (optical), Measurements taken within camera field-of-view

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CALIBRATION AND MEASUREMENT CAPABILITIES (CMM)			
Measured Parameter or Device Calibrated	Range	Expanded Uncertainty ^{Notes 3, 7}	Remarks
Optical Grid Plates/Reference Planes	0 mm to 848 mm	(0.18 + 1.38 <i>L</i>) μm	CMM (optical)
ROUNDNESS (20/D09)			
Roundness	4.0 mm to 152.4 mm	0.025 μm	Roundness Instrument
SPHERICAL DIAMETER; PLUG / RING GAGES (20/D11)			
Spherical Diameter	≤ 4 in	16 μin	LabMaster Universal
Cylindrical Diameter	≤ 1 in	12 μin	Moore M48 CMM; 36 in
Ring Gages (inside diameter)	to 0.91 m	(0.28 + 1.2 <i>L</i>) μm	
SURFACE TEXTURE (20/D12)			
Ra (Roughness Average)	41 μin to 120 μin (1.04 μm to 3.05 μm) 13 μin to 40 μin (0.33 μm to 1.02 μm) 12 μin (0.31 μm)	5.4 μin (0.14 μm) 4.1 μin (0.10 μm) 1.2 μin (0.03 μm)	Contact Profilometer
TWO DIMENSIONAL GAGES (20/D15)			
Diagonal	0 m to 1.3 m	(0.40 + 2.0 <i>L</i>) μm	Moore M48 CMM
COORDINATE MEASUREING MACHINES (20/D16)			
Diagonal (3D)	0 m to 1.4 m	(0.73 + 2.5 <i>L</i>) μm	Spatial Moore M48 CMM
GEARS (20/D18)			
Involute Profile	to 14 in diameter	(0.47 + 3.08 <i>L</i>) μm	CMM CMM
Infinite Lead/Helix	to 6 in diameter	0.80 μm	
99 in Lead/Helix	to 6 in diameter	0.90 μm	
32 in Lead/Helix	to 6 in diameter	1.1 μm	
16 in Lead/Helix LH	to 6 in diameter	1.2 μm	
16 in Lead/Helix RH	to 6 in diameter	1.2 μm	
11 in Lead/Helix	to 6 in diameter	1.3 μm	
Pin/Journal diameter	to 6 in diameter	0.50 μm	CMM Roundness Instrumtent
Pin/Journal roundness	to 4 in diameter	0.025 μm	

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Measured Parameter or Device Calibrated	Range	Expanded Uncertainty Notes 3, 7	Remarks
Index and Runout	to 24 in	3.3 in μm	CMM with rotary table

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Frequency Range	Expanded Uncertainty Notes 3, 5	Remarks
ELECTROMAGNETICS – DC/LOW FREQUENCY				
AC RESISTORS and CURRENT (20/E02)				
AC Current Source	0 μA to 220 μA	10 Hz to 20 Hz > 20 Hz to 40 Hz > 40 Hz to 1 kHz > 1 kHz to 5 kHz > 5 kHz to 10 kHz	0.027 % + 16 nA 0.019 % + 10 nA 0.016 % + 8 nA 0.030 % + 12 nA 0.11 % + 65 nA	Fluke 5720A
	> 220 μA to 2.2 mA	10 Hz to 20 Hz > 20 Hz to 40 Hz > 40 Hz to 1 kHz > 1 kHz to 5 kHz > 5 kHz to 10 kHz	0.049 % + 40 nA 0.019 % + 35 nA 0.016 % + 35 nA 0.022 % + 0.11 μA 0.11 % + 0.65 μA	
	> 2.2 mA to 22 mA	10 Hz to 20 Hz > 20 Hz to 40 Hz > 40 Hz to 1 kHz > 1 kHz to 5 kHz > 5 kHz to 10 kHz	0.047 % + 0.40 μA 0.057 % + 0.35 μA 0.016 % + 0.35 μA 0.022 % + 0.55 μA 0.11 % + 5 μA	
	> 22 mA to 220 mA	10 Hz to 20 Hz > 20 Hz to 40 Hz > 40 Hz to 1 kHz > 1 kHz to 5 kHz > 5 kHz to 10 kHz	5.1 % + 4.0 μA 0.51 % + 3.5 μA 0.12 % + 2.6 μA 0.12 % + 3.6 μA 0.15 % + 10 μA	
	> 220 mA to 2.2 A	20 Hz to 1kHz > 1 kHz to 5 kHz > 5 kHz to 10 kHz	0.028 % + 35 μA 0.046 % + 80 μA 0.70 % + 0.16 mA	

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Measured Parameter or Device Calibrated	Range	Frequency Range	Expanded Uncertainty Notes 3, 5	Remarks
AC Current Measure	0 μ A to 200 μ A	1 Hz to 10 Hz > 10 Hz to 2 kHz > 2 kHz to 10 kHz > 10 kHz to 30 kHz	7.2 % + 20 nA 0.44 % + 20 nA 0.10 % + 20 nA 0.21 % + 20 nA	Fluke 8508A
	> 200 μ A to 2 mA	1 Hz to 10 Hz > 10 Hz to 2 kHz > 2 kHz to 10 kHz > 10 kHz to 30 kHz	0.052 % + 0.20 μ A 0.030 % + 0.20 μ A 0.030 % + 0.20 μ A 0.073 % + 0.20 μ A	
	> 2 mA to 20 mA	1 Hz to 10 Hz > 10 Hz to 2 kHz > 2 kHz to 10 kHz > 10 kHz to 30 kHz	0.47 % + 2.0 μ A 0.031 % + 2.0 μ A 0.031 % + 2.0 μ A 0.074 % + 2.0 μ A	
	> 20 mA to 200 mA	1 Hz to 10 Hz > 10 Hz to 2 kHz > 2 kHz to 10 kHz > 10 kHz to 30 kHz	0.032 % + 20 μ A 0.029 % + 20 μ A 0.029 % + 20 μ A 0.065 % + 20 μ A	
	> 200 mA to 2 A	10 Hz to 2 kHz > 2 kHz to 10 kHz	0.063 % + 0.20 mA 0.073 % + 0.20 mA	
	> 2 A to 20 A	> 10 Hz to 2 kHz > 2 kHz to 10 kHz	0.21 % + 2.0 mA 0.39 % + 2.0 mA	

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty Notes 3, 5	Remarks
DC RESISTANCE and CURRENT (20/E05)			
DC Resistance Fixed Points	20 $\mu\Omega$ (to 1 000 A)	0.010 %	L&N 4372 Shunt
(Shunts in air)	0.001 Ω (to 500 A)	0.030 %	L&N 4364 Shunts
(Shunts in air)	0.01 Ω (to 100A)	0.010 %	L&N 4361 Shunts
	0.1 Ω (to 15 A)	0.010%	L&N 4360 Shunts

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Measured Parameter or Device Calibrated	Range	Expanded Uncertainty ^{Notes 3, 5}	Remarks
DC Resistance Fixed Points (in air)	1 Ω	3.4 $\mu\Omega/\Omega$	Fluke 742A-1
	10 Ω	2.2 $\mu\Omega/\Omega$	Fluke 742A-10
	100 Ω	3.2 $\mu\Omega/\Omega$	Fluke 742A-100
	1 k Ω	3.6 $\mu\Omega/\Omega$	Fluke 742A-1k
	10 k Ω	3.6 $\mu\Omega/\Omega$	Fluke 742A-10k
	100 k Ω	3.0 $\mu\Omega/\Omega$	Fluke 742A-100k
	1 M Ω	3.0 $\mu\Omega/\Omega$	Fluke 742A-1M
	10 M Ω	6.0 $\mu\Omega/\Omega$	Fluke 742A-10M
	1.9 Ω	95 $\mu\Omega/\Omega$	Fluke 5720A
	19 Ω	24 $\mu\Omega/\Omega$	
	190 Ω	14 $\mu\Omega/\Omega$	
	1.9 k Ω	19 $\mu\Omega/\Omega$	
	19 k Ω	44 $\mu\Omega/\Omega$	
	190 k Ω	57 $\mu\Omega/\Omega$	
	1.9 M Ω	22 $\mu\Omega/\Omega$	
	19 M Ω	108 $\mu\Omega/\Omega$	
	100 M Ω	913 $\mu\Omega/\Omega$	
DC Resistance Measure	0 Ω to 2 Ω	17 $\mu\Omega/\Omega$ + 4 $\mu\Omega$	Fluke 8508A
	> 2 Ω to 20 Ω	12 $\mu\Omega/\Omega$ + 14 $\mu\Omega$	
	> 20 Ω to 200 Ω	13 $\mu\Omega/\Omega$ + 14 $\mu\Omega$	
	> 200 Ω to 2 k Ω	19 $\mu\Omega/\Omega$ + 1.4 m Ω	
	> 2 k Ω to 20 k Ω	44 $\mu\Omega/\Omega$ + 14 m Ω	
	> 20k Ω to 200 k Ω	57 $\mu\Omega/\Omega$ + 0.10 m Ω	
	> 200 k Ω to 2 M Ω	15 $\mu\Omega/\Omega$ + 1.0 Ω	
	> 2 M Ω to 20 M Ω	90 $\mu\Omega/\Omega$ + 10 Ω	
	> 20 M Ω to 200 M Ω	0.17 % + 0.1 M Ω	
	> 200 M Ω to 2 G Ω	0.15 % + 10 k Ω	
DC Current Source	0 μ A to 220 μ A	175 μ A/A + 6 nA	Fluke 5720A
	> 220 μ A to 2.2 mA	35 μ A/A + 7 nA	
	> 2.2 mA to 22 mA	68 μ A/A + 40 nA	
	> 22 mA to 220 mA	89 μ A/A + 0.70 μ A	
	> 220 mA to 2.2 A	86 μ A/A + 12 μ A	

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Measured Parameter or Device Calibrated	Range	Expanded Uncertainty Notes 3, 5	Remarks
DC Current Measure	> 2.2 A to 11 A > 11 A to 100 A 0 μ A to 200 μ A > 200 μ A to 2 mA > 2 mA to 20 mA > 20 mA to 200 mA > 200 mA to 2 A > 2 A to 20 A > 20 A to 1000 A	0.045 % + 0.48 mA 0.032 % + 0.03% output 73 μ A/A + 0.40 nA 12 μ A/A + 4.0 nA 59 μ A/A + 40 nA 90 μ A/A + 0.8 μ A 0.019 % + 16 μ A 0.041 % + 0.4 mA 0.010%	Fluke 5725A Amplifier Valhalla 2555A Fluke 8508A L&N/ Rubicon Shunts Comparison to DC Shunts at Source Current 0.15 A to 1000 A
DC Current Source/Measure (Calibration of DC Shunts)	10 $\mu\Omega$ to 100 m Ω	0.010 %	
DC VOLTAGE (20/E06)			
DC Voltage Source	0 mV to 220 mV > 220 mV to 2.2 V > 2.2 V to 11 V > 2.2 V to 22 V > 22 V to 220 V > 220 V to 1100 V	151 μ V/V + 0.40 μ V 5.0 μ V/V + 0.70 μ V 4.4 μ V/V + 2.5 μ V 9.1 μ V/V + 4 μ V 17.1 μ V/V + 40 μ V 137 μ V/V + 400 μ V	Fluke 5720A Fluke 8508A
DC Voltage Measure	0 V to 200 mV > 200 mV to 2 V > 2 V to 20 V > 20 V to 200 V > 200 V to 1000 V	151 μ V/V + 0.10 μ V 3.5 μ V/V + 0.40 μ V 9.1 μ V/V + 4.0 μ V 18.2 μ V/V + 40 μ V 148.1 μ V/V + 0.50 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/E09)				
LF AC Voltage Source	0 mV to 2.2 mV	10 Hz to 20 Hz > 20 Hz to 40 Hz > 40 Hz to 20 kHz	0.088 % + 4.0 μ V 0.11 % + 4.0 μ V 0.084 % + 4.0 μ V	Fluke 5720A

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Measured Parameter or Device Calibrated	Range	Frequency Range	Expanded Uncertainty ^{Notes 3, 5}	Remarks
	> 2.2 mV to 22 mV	> 20 kHz to 50 kHz	0.055 % + 4.0 μ V	
		> 50 kHz to 100 kHz	0.063 % + 5.0 μ V	
		> 100 kHz to 300 kHz	0.49 % + 10 μ V	
		> 300 kHz to 500 kHz	0.50 % + 20 μ V	
		> 500 kHz to 1 MHz	0.55 % + 20 μ V	
	> 22 mV to 220 mV	10 Hz to 20 Hz	0.12 % + 4.0 μ V	
		> 20 Hz to 40 Hz	0.091% + 4.0 μ V	
		> 40 Hz to 20 kHz	0.053% + 4.0 μ V	
		> 20 kHz to 50 kHz	0.096 % + 4.0 μ V	
		> 50 kHz to 100 kHz	0.11 % + 5.0 μ V	
		> 100 kHz to 300 kHz	0.16 % + 10 μ V	
		> 300 kHz to 500 kHz	0.42 % + 20 μ V	
		> 500 kHz to 1 MHz	0.48 % + 20 μ V	
	> 220 mV to 2.2 V	10 Hz to 20 Hz	0.026 % + 12 μ V	
		> 20 Hz to 40 Hz	0.15 % + 7.0 μ V	
		> 40 Hz to 20 kHz	0.078 % + 7.0 μ V	
		> 20 kHz to 50 kHz	0.059 % + 7.0 μ V	
		> 50 kHz to 100 kHz	0.13 % + 17 μ V	
		> 100 kHz to 300 kHz	0.15 % + 20 μ V	
		> 300 kHz to 500 kHz	0.42 % + 25 μ V	
		> 500 kHz to 1 MHz	0.48 % + 45 μ V	
	> 2.2 V to 22 V	10 Hz to 20 Hz	0.024 % + 40 μ V	
		> 20 Hz to 40 Hz	93 μ V/V + 15 μ V	
		> 40 Hz to 20 kHz	51 μ V/V + 8.0 μ V	
		> 20 kHz to 50 kHz	85 μ V/V + 10 μ V	
		> 50 kHz to 100 kHz	0.015 % + 30 μ V	
		> 100 kHz to 300 kHz	0.073 % + 80 μ V	
		> 300 kHz to 500 kHz	0.41 % + 0.20 mV	
		> 500 kHz to 1 MHz	0.43 % + 0.30 mV	
	> 2.2 V to 22 V	10 Hz to 20 Hz	0.056 % + 0.40 mV	
		>20 Hz to 40 Hz	137 μ V/V + 0.15 mV	
		> 40 Hz to 20 kHz	82 μ V/V + 50 μ V	

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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 Measure	> 22 V to 220 V	> 20 kHz to 50 kHz	96 μ V/V + 0.10 mV	2.2 x 10 ⁷ V-Hz 2.2 x 10 ⁷ V-Hz 2.2 x 10 ⁷ V-Hz
		> 50 kHz to 100 kHz	0.014 % + 0.20 mV	
		> 100 kHz to 300 kHz	0.078 % + 0.60 mV	
		> 300 kHz to 500 kHz	0.41 % + 2.0 mV	
		> 500 kHz to 1 MHz	0.60 % + 3.2 mV	
		10 Hz to 20 Hz	0.22 % + 4.0 mV	
		> 20 Hz to 40 Hz	0.18 % + 1.5 mV	
		> 40 Hz to 20 kHz	0.22 % + 0.60 mV	
		> 20 kHz to 50 kHz	0.13 % + 1.0 mV	
		> 50 kHz to 100 kHz	0.043 % + 2.5 mV	
	> 220 V to 1000 V	> 100 kHz to 300 kHz	0.11 % + 16 mV	Fluke 5720A/5725A
		> 300 kHz to 500 kHz	0.59 % + 40 mV	
		> 500 kHz to 1 MHz	0.89 % + 80 mV	
	> 750 V to 1100 V	15 Hz to 40 Hz	0.098 % + 16 mV	
		> 40 Hz to 1 kHz	0.10 % + 3.5 mV	
	220 V to 750 V	40 Hz to 1 kHz	0.064 % + 4.0 mV	
		> 1 to 20 kHz	0.086 % + 6.0 mV	
		> 20 to 30 kHz	0.028 % + 11 mV	
		> 30 to 50 kHz	0.30 % + 11 mV	
		> 50 to 100 kHz	0.51 % + 45 mV	
	> 750 V to 1100 V	40 Hz to 1 kHz	0.14 % + 3.5 mV	
		> 1 to 20 kHz	0.027 % + 6.0 mV	
		> 20 to 30 kHz	0.29 % + 11 mV	
	0 V to 200 mV	1 Hz to 10 Hz	0.026 % + 14 μ V	Fluke 8508A
		> 10 Hz to 100 Hz	0.15 % + 4.0 μ V	
		> 100 Hz to 2 kHz	0.10 % + 2.0 μ V	
		> 2 kHz to 10 kHz	0.10 % + 4.0 μ V	
		> 10 kHz to 30 kHz	0.085 % + 8.0 μ V	
		> 30 kHz to 100 kHz	0.15 % + 20 μ V	

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Measured Parameter or Device Calibrated	Range	Frequency Range	Expanded Uncertainty ^{Notes 3, 5}	Remarks
	> 0.2 V to 2 V	1 Hz to 10 Hz	0.016 % + 0.12 mV	
		> 10 Hz to 100 Hz	0.012 % + 20 μ V	
		> 100 Hz to 2 kHz	79 μ V/V + 20 μ V	
		> 2 kHz to 10 kHz	0.011 % + 20 μ V	
		> 10 kHz to 30 kHz	0.022 % + 40 μ V	
		> 30 kHz to 100 kHz	0.058 % + 0.20 mV	
		> 100 kHz to 300 kHz	0.30 % + 2 mV	
		> 300 kHz to 1 MHz	1.0 % + 20 mV	
	> 2 V to 20 V	1 Hz to 10 Hz	0.053 % + 1.2 mV	
		> 10 Hz to 100 Hz	0.015 + 0.20 mV	
		> 100 Hz to 2 kHz	0.012 + 0.20 mV	
		> 2 kHz to 10 kHz	0.015 % + 0.20 mV	
		> 10 kHz to 30 kHz	0.023 % + 0.40 mV	
		> 30 kHz to 100 kHz	0.058 % + 2.0 mV	
		> 100 kHz to 300 kHz	0.31 % + 20 mV	
		> 300 kHz to 1 MHz	1.2 % + 0.20 V	
	> 20 V to 200 V	1 Hz to 10 Hz	0.22 % + 12 mV	
		> 10 Hz to 100 Hz	0.22 % + 2.0 mV	
		> 100 Hz to 2 kHz	0.030 % + 2.0 mV	
		> 2 kHz to 10 kHz	0.031 % + 2.0 mV	
		> 10 kHz to 30 kHz	0.13 % + 4.0 mV	
		> 30 kHz to 100 kHz	0.43 % + 20 mV	
	> 200 V to 1000 V	1 Hz to 10 Hz	0.095 % + 70 mV	
		> 10 Hz to 40 Hz	0.095 % + 20 mV	
		> 40 kHz to 10 kHz	0.10 % + 20 mV	
		> 10 kHz to 30 kHz	0.28 % + 40 mV	
		> 30 kHz to 100 kHz	0.46 % + 0.20 V	

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Measured Parameter or Device Calibrated	Range	Expanded Uncertainty ^{Notes 3,5}	Remarks
TIME and FREQUENCY			
FREQUENCY DISSEMINATION (20/F01)			
Frequency Measure	1 MHz 5 MHz 10 MHz	1×10^{-12} Hz/Hz 1×10^{-12} Hz/Hz 1×10^{-12} Hz/Hz	NIST FMAS + Fluke 910R
MECHANICAL			
MASS DETERMINATION (20/M08)			
Mass	25 kg 20 kg 10 kg 5 kg 2 kg 1 kg 500 g 200 g 100 g 50 g 20 g 10 g 5 g 2 g 1 g 500 mg 200 mg 100 mg 50 mg 20 mg 10 mg 5 mg 2 mg 1 mg	23 mg 13 mg 4.6 mg 2.6 mg 0.96 mg 0.48 mg 0.23 mg 0.12 mg 80 µg 41 µg 21 µg 19 µg 11 µg 6.6 µg 6.4 µg 3.6 µg 3.5 µg 3.5 µg 3.0 µg 3.2 µg 2.9 µg 2.9 µg 2.8 µg 2.5 µg	Echelon II

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Measured Parameter or Device Calibrated	Range	Expanded Uncertainty Notes 3,5	Remarks
TORQUE (20/M15)			
Torque Measure	5 lb-in to 50 lb-in	0.33 %	TTC 400 Torque Calibrator
	30 lb-in to 400 lb-in	0.26 %	
	80 lb-in to 1000 lb-in	0.22 %	
	20 lbf to 250 lbf	0.25 %	

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Test Load Range	Readability	Expanded Uncertainty Note 3	Remarks
CALIBRATION OF WEIGHING INSTRUMENTS (20/M16)				
Balances Field calibrations available Note 4	30 kg	1 g	1.3 g	
	20 kg	0.1 g	0.13 g	
	10 kg	0.01 g	12 mg	
	1 kg	1 mg	1.3 mg	
	100 g	0.1 mg	0.13 mg	
	10 g	0.01 mg	0.13 mg	
	1 g	0.001 mg	0.0016 mg	

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Measured Parameter or Device Calibrated	Range	Expanded Uncertainty Notes 3, 5	Remarks
THERMODYNAMIC			
LABORATORY THERMOMETERS, DIGITAL and ANALOG (20/T03)			
Temperature Measuring Devices Note 4	-90 °C to 0 °C	0.0078 °C	Ametek HTC 125A Dry Well w/SPRT and 1594A Digital Readout 7012 Liquid Bath w./SPRT and 1594A Digital Readout Ametek HTC 125A Dry Well w/SPRT and 1594A Digital Readout 9173 Dry Well w/SPRT and 1594A Digital Readout
	0 °C to 30 °C	0.0024 °C	
	0 °C to 125 °C	0.0065 °C	
	126 °C to 420 °C	0.0026 °C	

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	421 °C to 700 °C	0.0059 °C	9173 Dry Well w/ 5624 PRT		
	701 °C to 1000 °C	0.22 °C	9112 Tube Furnace w/ 5624 PRT		
LEAK ARTIFACTS (20/T04)					
Leak Artifacts	1.0 X 10 ⁻⁴ atm cc/sec to 9.9 X 10 ⁻⁴ atm cc/sec	6.4 %	Vacuum Decay Method		
	1.0 X 10 ⁻⁵ atm cc/sec to 9.9 X 10 ⁻⁵ atm cc/sec	4.2 %			
	1.0 X 10 ⁻⁶ atm cc/sec to 9.9 X 10 ⁻⁶ atm cc/sec	4.4 %			
	7.0 X 10 ⁻⁷ atm cc/sec to 9.9 X 10 ⁻⁷ atm cc/sec	4.5 %			
	5.0 X 10 ⁻⁷ atm cc/sec to 6.9 X 10 ⁻⁷ atm cc/sec	5.3 %			
	3.0 X 10 ⁻⁷ atm cc/sec to 4.9 X 10 ⁻⁷ atm cc/sec	5.6 %			
	PRESSURE (20/T05)				
	Pneumatic Deadweight Piston Gauge (Absolute & Gauge Mode)	1.3 psi to 23.73 psi (9.0 kPa to 164 kPa)		0.0023 %	Direct Pressure Comparison Nitrogen
		23.73 psi to 95.96 psi (164 kPa to 662 kPa)		0.0016 %	
		95.96 psia to 1002.91 psia (662 kPa to 6915 kPa)		0.0018 %	
Hydraulic Deadweight Piston Gauge (Gauge Mode)	202 psig to 3706.21 psig (1.39 MPa to 25.55 MPa)	0.0063 %	Direct Comparison Oil		
	3706.2 psig to 19 854 psig (25.5 MPa to 136.9 MPa)	0.0057 %			

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Measured Parameter or Device Calibrated	Range	Expanded Uncertainty ^{Notes 3, 5}	Remarks
Hydraulic Deadweight Piston Gauge (Gauge Mode)	19 853 psig to 39 579 psig (136.9 MPa to 273 MPa)	0.0058 %	Direct Comparison Nitrogen
	201.9 psig to 3706.3 psig (1.39 MPa to 25.55 MPa)	0.0045 %	
	3706.3 psig to 15 000 psig (25.55 MPa to 103.5 MPa)	0.0057 %	
VACUUM and LOW PRESSURE TRANSDUCERS (20/T10)			
Capacitance Diaphragm Gauge	0.001 Torr to 0.004 Torr 0.004 Torr to 0.01 Torr 0.01 Torr to 1.0 Torr 1.0 Torr to 10 Torr 10 Torr to 100 Torr 100 Torr to 1000 Torr	(where x is the applied pressure) (0.0035x ^{-0.949}) % 0.64 % 0.43 % 0.090 % 0.29 % 0.085 %	Direct Comparison; MKS Baratron, 1 Torr MKS Baratron 10 Torr MKS Baratron, 100 Torr MKS Baratron, 1000 Torr
Ionization Gauge	1.0 X 10 ⁻⁴ Torr to 1.0 X 10 ⁻⁶ Torr 1.0 X 10 ⁻⁶ Torr to 1.0 X 10 ⁻⁷ Torr 1.0 X 10 ⁻⁷ Torr to 1.0 X 10 ⁻⁸ Torr 1.0 X 10 ⁻⁸ Torr to 1.0 X 10 ⁻⁹ Torr	5.9 % 4.0 % 4.3 % 5.4 %	Direct Comparison; Granville-Phillips 370121
Spinning Rotor Gauge	1.0 X 10 ⁻⁴ Torr to 1.0 X 10 ⁻⁷ Torr	Greater of (1% or 4.38E-06x ^{-6.16E-01})	Direct Comparison; MKS SRG-2CE
END			

2017-03-22 through 2018-03-31

Effective dates

For the National Voluntary Laboratory Accreditation Program



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CALIBRATION LABORATORIES

NVLAP LAB CODE 105000-0

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: L is length in same units as measurand (units shown in Range column).

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