



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

NORTHSTAR CALIBRATION, INC.  
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CALIBRATION

Valid To: August 31, 2024

Certificate Number: 0462.02

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations<sup>1, 8</sup>:

I. Acoustical Quantities

Parameter/Equipment	Range	CMC <sup>2</sup> (±)	Comments
Sound Level Meters <sup>3</sup>	(94 & 114) dB	1.3 dB	Simpson 890-2 generator

II. Chemical Quantities

Parameter/Equipment	Range	CMC <sup>2, 4</sup> (±)	Comments
pH Measuring Instruments	4.01 pH 7.00 pH 10.01 pH	0.019 pH + 0.60R 0.019 pH + 0.60R 0.020 pH + 0.60R	Standard solutions
Conductivity Measuring Instruments	100 µS 1000 µS 10 000 µS	1.8 µS + 0.6R 10 µS + 0.6R 270 µS + 0.6R	Standard solutions

III. Dimensional

Parameter/Equipment	Range	CMC <sup>2,4</sup> ( $\pm$ )	Comments
Gage Blocks	Ceramic Up to 5 in (5 to 20) in  Steel Up to 5 in (5 to 20) in	(1.6 + 0.81L) $\mu$ in (1.6 + 0.90L) $\mu$ in  (1.6 + 0.83L) $\mu$ in (2.0 + 0.84L) $\mu$ in	Gage block comparator
Length Standards	Up to 24 in	(67 + 2.1L) $\mu$ in	Standard measuring machine
Cylindrical Plugs	Up to 1.2 in (1.2 to 4.0) in (4.0 to 20.0) in	(6.9 + 0.5L) $\mu$ in (8.9 + 0.11L) $\mu$ in (7.6 + 1.6L) $\mu$ in	Universal measuring machine (UMM)
Cylindrical Rings	(0.225 to 1.75) in (1.75 to 3.5) in (0.5 to 1.0) in (1.0 to 4.5) in (4.5 to 14.5) in	(2.1 + 11L) $\mu$ in (4.6 + 6.8L) $\mu$ in (5.7 + 0.16L) $\mu$ in (11 + 0.97L) $\mu$ in (7.0 + 2.3L) $\mu$ in	UMM
Threaded Plugs –  Pitch Diameter  Major Diameter	Up to 6 in  Up to 6 in	(66 + 4.6L) $\mu$ in  (49 + 5.6L) $\mu$ in	Benchmic
Threaded Rings –  Pitch Diameter  Minor Diameter	Up to 8 in (Vertical) (8 to 14) in (Horizontal) Up to 4 in  (0.275 to 4) in (4 to 8) in Up to 0.150 in	(75 + 6L) $\mu$ in (71 + 5.6L) $\mu$ in (200 + 8.6L) $\mu$ in  (160 + 11L) $\mu$ in (210 + 1.2L) $\mu$ in (13 + 44L) $\mu$ in	UMM UMM Setting plugs  Tri-bore micrometer Precision height gage Cylindrical pin gages

Parameter/Equipment	Range	CMC <sup>2,4</sup> (±)	Comments
Tapered Threaded Plugs – Pitch Diameter Notch Length	Up to 3 in Up to 2 in	130 μin (210 + 0.2L) μin	Benchmic Precision height gage
Tapered Threaded Rings – Pitch Diameter Thickness of Ring	Up to 3 in Up to 2 in	140 μin 27 μin	Set plugs Benchmic
Thread Wires	Up to 0.12 in	14 μin	UMM
Surface Plate <sup>3</sup> – Flatness Repeat Readings	(17 to 43) in (17 to 43) in (50 to 160) in Up to 160 in	(52 + 0.4D) μin (78 + 0.4D) μin (86 + 1.0D) μin 23 μin	Planekator Electronic level Repeat-o-meter
Calipers <sup>3</sup>	Up to 120 in	(120 + 0.6R + 4L) μin	Gage blocks & cylindrical ring
Micrometers <sup>3</sup>	Up to 24 in	(67 + 0.6R + 9.6L) μin	Gage blocks
Indicators <sup>3</sup>	Up to 6 in	(60 + 0.6R + 10L) μin	Gage blocks
Height Gages <sup>3</sup>	Up to 24 in (24 to 40) in	(63 + 0.6R + 14L) μin (310 + 0.6R + 4L) μin	Gage blocks & amplifier
Optical Comparators <sup>3</sup> – Linear Angular Magnification	Up to 12 in (0 to 360)° (10 to 50) X	(150 + 4.6L) μin 0.035° 0.0023 in	Glass scales, mag checker & balls

Parameter/Equipment	Range	CMC <sup>2,4</sup> (±)	Comments
Optical Flats – Flatness	Up to 3 in	2.8µin	Reference flat & monochromatic light source
Tape Measures, Pi Tapes, Steel Rules <sup>3</sup>	(0.5 to 18) ft (18 to 72) ft	(6900 + 5L) µin 0.013 in	Length fixture
String Potentiometers	Up to 150 in	0.020 % FS	Length fixture/laser
Brinell Scopes <sup>3</sup> Microscopes <sup>3</sup> & Glass Line Reticles <sup>3</sup>	Up to 6 mm Up to 6 in	120 µm 190 µin	Ceramic scale Glass scale
Surface Finish Patch	Up to 250 µin	9.1 µin	Surface analyzer
Surface Finish Analyzer <sup>3</sup>	Up to 250 µin	7.2 µin	Surface finish patch
CMM <sup>3</sup> – Repeatability Linearity Step Gage Laser Volumetric Bi-Directional	Up to 48 in  Up to 48 in Up to 240 in -- --	62 µin  150 µin (5.5 + 0.47L) µin (90 + 13L) µin 55 µin	Master ball Step gage/laser  Ball bar Gage block
Protractors	(0 to 180)°	7 arcmin	Angle blocks, surface plate
Squares	(1 to 24) in	82 µin	Square, height gage, amplifier
Levels	(1 to 24) in	2 arcmin	Sine plate, gage blocks, surface plate

IV. Dimensional Testing/Calibration<sup>1</sup>

Parameter/Equipment	Range	CMC <sup>2, 4, 7, 9</sup> ( $\pm$ )	Comments
1-Dimensional Measurement <sup>7</sup>	Up to 45 in Up to 24 in Up to 20 in Up to 6 in Up to 6 in Up to 1.25 in Up to 2 in Up to 6 in	(72 + 0.94L) $\mu$ in (20 + 3.4L) $\mu$ in (3.9 + 3.4L) $\mu$ in (150 + 5.6L) $\mu$ in (930 + 160L) $\mu$ in (240 + 190L) $\mu$ in 750 $\mu$ in (120 + 20L) $\mu$ in	Precision HG & amp Benchmic UMM Optical comparator Caliper Cylindrical pins Indicator Micrometer  CMM 1-D 2-D 3-D
1-Dimensional Measurement <sup>3, 7</sup>	Up to 4 in Up to 240 in	(7.1 + 2.2L) $\mu$ in (5.5 + 0.47L) $\mu$ in	THV Laser
Angular Measurement <sup>7</sup> (Includes Angle Blocks)	(0 to 180) $^{\circ}$ (0 to 90) $^{\circ}$	(0.033 + 0.000 16R) $^{\circ}$ 2' 50"	Optical comparator Sine plate, gage blocks
Radius Measurement	Up to 2 in	(860 + 390L) $\mu$ in	Optical comparator

V. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC <sup>2, 6</sup> ( $\pm$ )	Comments
DC Voltage <sup>3</sup> – Generate	(0 to 3.3) V (3.3 to 33) V (33 to 1000) V	83 $\mu$ V/V + 5.2 $\mu$ V 90 $\mu$ V/V + 29 $\mu$ V 65 $\mu$ V/V + 3.3 mV	Calibrator

Parameter/Equipment	Range	CMC <sup>2, 4, 5, 6</sup> ( $\pm$ )	Comments
DC Voltage <sup>3</sup> – Measure	(0 to 1) V (1 to 10) V (10 to 1000) V	47 $\mu$ V/V + 12 $\mu$ V 46 $\mu$ V/V + 51 $\mu$ V 67 $\mu$ V/V + 510 $\mu$ V	Precision bench meter
	(1 to 10) kV	0.015 % + 1.4 mV	Precision bench meter with voltage divider
DC Current <sup>3</sup> – Generate	(0 to 33) mA 33 mA to 2.2 A (2.2 to 11) A (11 to 20) A	0.013 % + 1.9 $\mu$ A 0.044 % + 38 $\mu$ A 0.07 % + 440 $\mu$ A 0.0037 % + 620 $\mu$ A	Calibrator
	(11 to 500) A (500 to 1000) A	0.71 % + 0.022 A 0.51 % + 0.000 89 A	Calibrator, 50 turn coil
DC Current <sup>3</sup> – Measure	(0 to 10) mA (10 to 100) mA (0.1 to 3) A (3 to 20) A	0.038 % + 6.8 $\mu$ A 0.084 % + 2.2 $\mu$ A 0.14 % + 34 $\mu$ A 0.01 % + 0.044 A	Precision bench meter
	(10 to 1000) A	0.064 % + 0.06 A	Current shunt & DMM
DC Welders <sup>3</sup>	DC Volt DC Amps	5.6 % + 0.55 mV 3.7 % mV	DMM, clamp meter, load bank
Resistance <sup>3</sup> – Generate	(0 to 330) $\Omega$ (0.33 to 1.1) k $\Omega$ (1.1 to 11) k $\Omega$ (11 to 330) k $\Omega$ (0.33 to 3.3) M $\Omega$ (3.3 to 33) M $\Omega$ (33 to 330) M $\Omega$	0.011 % + 0.019 $\Omega$ 0.014 % + 0.021 $\Omega$ 0.039 % + 0.94 $\Omega$ 0.014 % + 11 $\Omega$ 0.018 % + 82 $\Omega$ 0.21 % + 570 $\Omega$ 0.62 % + 9.6 k $\Omega$	Calibrator
	Fixed Points	0.1 $\Omega$ 1.0 $\Omega$ 10.0 $\Omega$ 100.0 $\Omega$ 1.0 k $\Omega$ 10.0 k $\Omega$ 100.0 k $\Omega$	Standard resistors
Variable Resistance	(0.001 to 100) G $\Omega$	0.038 % + 0.6R	High voltage decade

Parameter/Equipment	Frequency	CMC <sup>2, 5, 6</sup> ( $\pm$ )	Comments
Resistance <sup>3</sup> – Measure	(0 to 100) $\Omega$ (0.1 to 10) k $\Omega$ (10 to 1) M $\Omega$ (1 to 100) M $\Omega$	0.12 % + 0.0049 $\Omega$ 0.011 % + 0.14 $\Omega$ 0.011 % + 16 $\Omega$ 0.93 % + 610 $\Omega$	Precision bench meter
AC Voltage <sup>3</sup> – Measure			
(0 to 1) V	(3 to 10) Hz (10 to 50) Hz (50 to 300) Hz	0.41 % + 55 $\mu$ V 0.14 % + 57 $\mu$ V 0.74 % + 52 $\mu$ V	Precision bench meter
(1 to 750) V	(3 to 10) Hz (10 to 50) Hz (50 to 300) Hz	0.44 % + 31 mV 0.17 % + 42 mV 0.52 % + 130 mV	
(1 to 10) kV	60 Hz	0.5 %	Voltage divider bench meter
AC Voltage <sup>3</sup> – Generate			
(0.33 to 3.3) V	(10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz	0.0064 % + 7.8E-06 V 0.0075 % 0.0032 % + 9.5E-06 V 0.0048 % + 6.3E-06 V 0.0078 % + 6.7E-06 V 0.052 %	Calibrator
(3.3 to 330) V	45 Hz to 20 kHz	0.14 % + 160 mV	
(330 to 1020) V	45 Hz to 10 kHz	0.07 % + 36 mV	

Parameter/Range	Frequency	CMC <sup>2, 5, 6</sup> (±)	Comments
AC Current <sup>3</sup> – Measure			
(0 to 1) A	(3 to 5) Hz (5 to 10) Hz 10 Hz to 5 kHz	0.12 % + 770 μA 0.33 % + 770 μA 0.091 % + 770 μA	Multimeter
(1 to 3) A	(3 to 5) Hz (5 to 10) Hz 10 Hz to 5 kHz	0.12 % + 4.8 mA 0.34 % + 4.4 mA 0.097 % + 4.8 mA	
(10 to 500) A	50 Hz to 1 kHz	0.2 % + 0.096 A	Multimeter, current clamp
(3 to 1000) A	50 Hz to 1 kHz	0.24 % + 0.032 A	Multimeter, shunt
AC Current <sup>3</sup> – Generate			
(0 to 2.2) A	(10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.29 % + 400 μA 0.21 % + 370 μA 0.89 % + 380 μA 0.72 % + 70 μA	Calibrator
(2.2 to 11) A	(45 to 65) Hz (65 to 500) Hz (500 Hz to 1 kHz)	0.14 % + 4.6 mA 0.15 % + 5.1 mA 0.30 % + 8.5 mA	
(11 to 20) A	(45 to 65) Hz (65 to 500) Hz 500 Hz to 1 kHz	0.0075 % + 270 mA 0.0073 % + 140 mA 0.0072 % + 160 mA	
AC Current Clamps <sup>3</sup>			
Toroidal-Type:			
(10 to 500) A (500 to 1000) A	(45 to 65) Hz (45 to 65) Hz	0.71 % + 0.022 A 0.51 % + 0.000 22 A	Calibrator/50 turn coil
Other Clamp Meters:			
(10 to 500) A (500 to 1000) A	(45 to 65) Hz (45 to 65) Hz	0.71% + 0.022 A 0.51 % + 0.000 27 A	



Parameter/Range	Frequency	CMC <sup>2, 4, 6</sup> (±)	Comments
Synchro/Resolver Simulators  (0 to 360)°	  (0 to 10) kHz	  0.0018°	  Angle position indicator
Capacitance <sup>3</sup> – Generate  (0.33 to 330) nF (1.1 to 3.3) μF (3.3 to 33) μF (33 to 330) μF (330 to 1.1) mF  Fixed Points	  50 Hz to 1 kHz 50 Hz to 1 kHz (50 to 400) Hz (50 to 100) Hz (50 to 100) Hz  1 nF 2 nF 3 nF 4 nF 5 nF 6 nF 7 nF 8 nF 9 nF 10 nF 20 nF 30 nF 40 nF 50 nF 60 nF 70 nF 80 nF 90 nF 100 nF 200 nF 300 nF 400 nF 500 nF 1 μF	  0.006 nF/F + 0.6R 0.0058 % + 0.6R + 0.19 nF 0.005 % + 0.6R + 0.0016 μF 0.006 μF/F + 0.6R 0.086 % + 0.6R + 0.011 μF  900 μF/F + 0.6R 5.3 mF/F + 0.6R 3.7 mF/F + 0.6R 24 μF/F + 0.6R 3.7 mF/F + 0.6R 5.1 mF/F + 0.6R 33 mF/F + 0.6R 6.9 mF/F + 0.6R 6.9 mF/F + 0.6R 6.1 mF/F + 0.6R 51 mF/F + 0.6R 51 mF/F + 0.6R 61 mF/F + 0.6R 69 mF/F + 0.6R 110 mF/F + 0.6R 37 mF/F + 0.6R 76 mF/F + 0.6R 110 mF/F + 0.6R 96 mF/F + 0.6R 24 μF/F + 0.6R 24 μF/F + 0.6R 24 μF/F + 0.6R 24 μF/F + 0.6R 24 μF/F + 0.6R	  Calibrator        Capacitor set

Parameter/Range	Frequency	CMC <sup>2, 4, 6</sup> (±)	Comments
Inductance – Generate			
Fixed Points	200 μH 2 mH 10 mH 20 mH 1 H	820 nH + 0.6R 1.6 μH 1.6 μH 1.3 μH 3.2 mH	Standard inductors

Parameter/Equipment	Range	CMC <sup>2, 6</sup> (±)	Comments
Oscilloscopes <sup>3</sup> –			
Level Sine Wave 50 kHz Reference	1 mV to 5.5 V(p-p)	2.0 % + 300 μV	Calibrator
Level Sine Flatness 5 mV to 5.5 V	50 kHz to 100 MHz (100 to 300) MHz (300 to 600) MHz	3.6 % + 300 μV 4.1 % + 300 μV 6.1 % + 330 μV	Relative to 50 kHz reference
Vertical Gain DC Into 50 Ω Into 1 MΩ	Up to 6.6 V Up to 130 V	0.24 % + 400 μV 0.051 % + 400 μV	
Square Wave Into 50 Ω Into 1 MΩ	1 mV to 6.6 V(p-p) 1 mV to 130 V(p-p)	0.24 % + 400 μV 0.10 % + 400 μV	
Time Marker Output Into 50 Ω	5 s to 50 ms 20 ms to 2 ns In 5-2-1 sequence	25 + 1000t μs/s 2.5 μs/s	Relative to 50 kHz reference t = time in seconds
Pulse Rise Time 5 mV to 2.5 V(p-p)	≤ 350 ps	+0/-120 ps	

Parameter/Equipment	Range	CMC <sup>2</sup> (±)	Comments
Electrical Calibration of Thermocouple Indicating Devices <sup>3</sup> –			
Type J	(-210 to -100) °C (-100 to 1200) °C	0.34 °C 0.26 °C	Calibrator
Type K	(-200 to -100) °C (-100 to 1000) °C (1000 to 1372) °C	0.39 °C 0.30 °C 0.38 °C	
Type T	(-250 to -150) °C (-150 to 400) °C	0.66 °C 0.31 °C	

## VI. Mechanical

Parameter/Equipment	Range	CMC <sup>2, 5, 9</sup> (±)	Comments
Accelerometers – Shear & Charge	(5 to 10) Hz 10 Hz to 1 kHz (1 to 5) kHz (5 to 15) kHz (15 to 20) kHz	1.1 % 0.73 % 0.89 % 1.6 % 2.2 %	Precision air bearing shaker/reference accelerometer – back-to-back comparison method.
Force <sup>3</sup> – Compression & Tension Measuring Equipment	Up to 250 lbf Up to 1000 lbf (1000 to 10 000) lbf Compression Tension  Transducer Output in mV Compression Tension	0.20 % 0.28 %  0.018 % 0.019 %  0.018 % 0.019 %	Precision weights  Load cells

Parameter/Equipment	Range	CMC <sup>2, 4, 5, 9</sup> (±)	Comments
Force <sup>3</sup> – Compression & Tension Measuring Equipment (cont)	(10 000 to 100 000) lbf Compression Tension  Transducer Output in mV Compression Tension	0.019 % 0.024 %  0.017 % 0.019 %	Load cells
Durometers <sup>3</sup> –  Indenter Extension & Shape:  Diameter  Radius  Angle  Extension  Indenter Force	Up to 0.6 in  Up to 0.5 in  Up to 40 deg  Up to 0.110 in  Up to 100 Duros	260 μin  510 μin  0.032°  130 μin  0.45 Duros	ASTM D2240, ASTM F1957
Pressure/Vacuum Gauges & Transducers <sup>3, 4</sup>	(-12 to 300) psig  (10 to 100) psig (100 to 500) psig (500 to 2500) psig (1000 to 10 000) psig	(0.021 + 0.000 099 <i>P</i> ) %  (0.048 + 0.000 11 <i>P</i> ) % (0.13 + 0.000 028 <i>P</i> ) % 0.14 % (0.059 + 2.2×10 <sup>-7</sup> <i>P</i> ) %	Fluke 719  Transducers
Torque Testers <sup>3</sup>	(0.125 to 100) lbf·in  (8 to 250) lbf·ft (251 to 1500) lbf·ft	(0.059 + 0.000 72 <i>A</i> ) lbf·in  (0.062 + 0.0060 <i>A</i> ) lbf·ft (0.89 + 0.0064 <i>A</i> ) lbf·ft	Weights & radius arms; <i>A</i> is applied torque
Torque Tools <sup>3</sup>	(0.01 to 250) lbf·ft (250 to 1000) lbf·ft (1000 to 2000) lbf·ft	1.0 % 0.8 % 0.78 %	Torque tester

Parameter/Equipment	Range	CMC <sup>2,4</sup> (±)	Comments
Mass (Weights) <sup>3</sup>	(1 to 500) g	1.2 mg	520 g balance, weight sets
	(1 to 10) lb	120 mg	Verification with Class 1 & 4 weights, precision scale
	(> 10 to 75) lb	550 mg	Precision scale, weight set
Scales & Balances <sup>3</sup>	(0.002 to 6.8) lb (6.8 to 50) lb (50 to 1000) lb (1001 to 5000) lb (5001 to 10 000) lb	(0.000 040 + 0.6R) lb (0.0022 + 0.0027W + 0.6R) lb (0.30 + 0.6R) lb (1.6 + 0.6R) lb (2.1 + 0.6R) lb	Verification with Class 1, 4 & F weights; <i>W</i> is the weight reading
Indirect Verification of Brinell Hardness Testers <sup>3</sup> –			
10/500/15	Up to 225 HBW	1.7 HBW	Indirect verification method per ASTM E10 of Brinell hardness testers
10/3000/15	(226 to 650) HBW	1.9 HBW	
Indirect Verification of Micro-Indentation Hardness Testers (Knoop & Vickers) <sup>3</sup> –			
Knoop	(100 to 250) HK (251 to 650) HK > 650 HK	11 HK 33 HK 64 HK	Indirect verification method per ASTM E92
Vickers	(100 to 240) HV (241 to 600) HV > 600 HV	26 HV 75 HV 160 HV	

Parameter/Equipment	Range	CMC <sup>2</sup> (±)	Comments
Indirect Verification of Rockwell & Rockwell Superficial Hardness Testers <sup>3</sup> –	HRA:		ASTM E18
	Low	1.4 HRA	
	Medium	1.4 HRA	
	High	1.5 HRA	
	HRBW:		
	Low	1.9 HRBW	
	Medium	1.5 HRBW	
	High	1.0 HRBW	
	HRC:		
	Low	1.3 HRC	
	Medium	1.4 HRC	
	High	1.0 HRC	
HR15N:			
Low	1.3 HR15N		
Medium	1.2 HR15N		
High	1.4 HR15N		
HR30N:			
Low	1.9 HR30N		
Medium	2.0 HR30N		
High	1.8 HR30N		
HR45N:			
Low	1.4 HR45N		
Medium	1.4 HR45N		
High	1.4 HT45N		
HR15TW:			
Low	1.5 HR15TW		
Medium	1.5 HR15TW		
High	1.7 HR15TW		
HR30TW:			
Low	1.9 HR30TW		
Medium	2.0 HR30TW		
High	1.8 HR30TW		
HR45TW:			
Low	2.0 HR45TW		
Medium	1.7 HR45TW		
High	1.7 HR45TW		

Parameter/Equipment	Range	CMC <sup>2,5</sup> (±)	Comments
Tachometers	Up to 99 999 RPM	0.0028 % + 0.078 RPM	Calibrator

## VII. Thermodynamics

Parameter/Equipment	Range	CMC <sup>2,9</sup> (±)	Comments
Infrared Thermometers <sup>3</sup>	(85 to 750) °F	(0.65 + 0.0016T) °F	Black body calibrator <i>T</i> is the temperature reading
Temperature – Generate	(-15 to 350) °C (5 to 600) °F	0.07 °C 0.13 °F	Drywell
Humidity – Measure	(10 to 95) % RH	0.29 + 0.011 % RH	Humidity generator & thermos-hygrometer
Temperature – Measure	(-30 to 0) °C (-22 to 32) °F  (0 to 100) °C (32 to 212) °F  (100 to 260) °C (212 to 500) °F	0.047 °C 0.085 °F  0.048 °C 0.085 °F  0.058 °C 0.10 °F	SPRT

## VIII. Time & Frequency

Parameter/Equipment	Range	CMC <sup>2,9</sup> (±)	Comments
Frequency – Generate	Up to 12 kHz 12 kHz to 2 MHz 50 kHz to 600 MHz	28 µHz/Hz + 1.3 mHz 26 µHz/Hz + 16 mHz 2.7 µHz/Hz	Calibrator
Frequency <sup>3</sup> – Measure	Up to 160 MHz 40 MHz to 1.3 GHz	3.2 µHz/Hz 5.9 µHz/Hz	Counter

Parameter/Equipment	Range	CMC <sup>2</sup> (±)	Comments
Timers & Stopwatches <sup>3</sup>	Up to 24 hrs	5.9 μs/s	Counter

<sup>1</sup> This laboratory offers commercial dimensional testing/calibration service and field calibration service.

<sup>2</sup> Calibration and Measurement Capability (CMC) is the smallest uncertainty of measurement that a laboratory can achieve within its scope of accreditation when performing more or less routine calibrations of nearly ideal measurement standards or nearly ideal measuring equipment. CMCs represent expanded uncertainties expressed at approximately the 95 % level of confidence, usually 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.

<sup>3</sup> Field calibration service is available for this calibration. Please note the actual measurement uncertainties achievable on a customer's site can normally be expected to be larger than the CMC found on the A2LA Scope. Allowance must be made for aspects such as the environment at the place of calibration and for other possible adverse effects such as those caused by transportation of the calibration equipment. The usual allowance for the actual uncertainty introduced by the item being calibrated, (e.g., resolution) must also be considered and this, on its own, could result in the actual measurement uncertainty achievable on a customer's site being larger than the CMC.

<sup>4</sup> In the statement of CMC,  $L$  is the numerical value of the nominal length of the device measured in inches;  $D$  is the numerical value of the diagonal length of the device measured in inches;  $R$  is the resolution of the device under test;  $P$  is the numerical value of the pressure;  $RH$  is the numerical value of the relative humidity.

<sup>5</sup> In the statement of CMC, % denotes percent of reading unless otherwise noted.

<sup>6</sup> The stated measured values are determined using the indicated instrument (see Comments). This capability is suitable for the calibration of the devices intended to measure or generate the measured value in the ranges indicated. CMCs are expressed as either a specific value that covers the full range or as a percentage or fraction of the reading plus a fixed floor specification.

<sup>7</sup> This laboratory meets R205 – *Specific Requirements: Calibration Laboratory Accreditation Program* for the types of dimensional calibrations listed above. Accredited test reports issued containing appropriate statements of measurement results, measurement uncertainty, and traceability are considered equivalent to a “calibration” certificate.

<sup>8</sup> This scope meets A2LA's *P112 Flexible Scope Policy*.

<sup>9</sup> The type of instrument or material being calibrated is defined by the parameter. This indicates the laboratory is capable of calibrating instruments that measure or generate the values in the ranges indicated for the listed measurement parameter.





# Accredited Laboratory

A2LA has accredited

## **NORTHSTAR CALIBRATION, INC.**

Owatonna, MN

for technical competence in the field of

## Calibration

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This laboratory also meets R205 – Specific Requirements: Calibration Laboratory Accreditation Program. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).



Presented this 12<sup>th</sup> day of July 2022.

A blue ink signature of Mr. Trace McInturff.

Mr. Trace McInturff Vice President, Accreditation Services  
For the Accreditation Council  
Certificate Number 462.02  
Valid to August 31, 2024  
Revised May 9, 2023

*For the calibrations to which this accreditation applies, please refer to the laboratory's Calibration Scope of Accreditation.*