SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

MESS S.C.
Acceso III, Número 16A Nave 10
Parque Industrial Benito Juárez
Querétaro, Qro. 76120, MÉXICO
Oscar Morales Phone: 52 442 476 0646, 52 442 196 4938

CALIBRATION

Valid To: May 31, 2027 Certificate Number: 3047.01

In recognition of the successful completion of the A2LA evaluation process (including an assessment of the organization's compliance with R205 – A2LA's Calibration Program Requirements), accreditation is granted to this laboratory to perform the following calibrations[1, 9]:

I. Dimensional

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
Coordinate Measuring Machines (CMM) Verification[3] –			
E_L - Length Measurement Error	Up to 2000 mm Up to 12 000 mm	(0.52 + 0.90*L*) µm (0.29 + 0.60*L*) µm	ASME B89.4.10360-2, ISO 10360-2 with step gage, gage blocks, laser interferometer
Rotary Table (4th Axis) – Four-axis Errors (FR, FT, FA)	Distance between Sphere: Up to 500 mm & CMM Resolution >= 0.1 µm	1 µm	ISO 10360-3 with test spheres
Single-Stylus Probing Size Errors	Spheres with Nominal Diameter: 25 mm	0.60 µm	ISO 10360-5 with master sphere
Single-Stylus Probing Form Errors	Spheres with Nominal Diameter: 25 mm	0.20 µm	
Scanning Mode Size Errors	Spheres with Nominal Diameter: 25 mm	0.60 µm	
Scanning Mode Form Errors	Spheres with Nominal Diameter: 25 mm	0.20 µm	

Parameter/Equipment	Range	CMC[2, 5, 10] (±)	Comments
Surface Finish (Roughness) Measuring Machines (Profilometers)[3]	Ra: (0.3 to 3.2) µm Rz: (1.5 to 10) µm Pt: (0.36 to 2.6) µm Rsm: (15 to 100) µm	0.048 µm 0.080 µm 0.080 µm 0.080 µm	ISO 12179 with surface finish standards, optical flat
Surface Geometry Analyzers (Contours Instruments)[3]	Angle: 90° X = Up to 1 mm X = (1 to 10) mm X = (10 to 200) mm Z = (1 to 50) mm Radius: (2.5 to 80) mm	1.5' 1.3 µm 1.6 µm (1.7 + 4.5*L*) µm (0.12 + 5.0*L*) µm (1.7 + 4.5*L*) µm	ISO 12179 with gage blocks, master spheres, contour standards
Roughness Standards –			
Z Axis Average Parameters, Ra	Up to 3.5 µm (3.5 to 6.5) µm	(13 + 0.003 Ra) nm (0.01 Ra - 11) nm	Taylor Hobson NOVUS PGI
Z Axis Point Parameters, Rz	Up to 25 µm	(35 + 0.005 Rz) nm	*Ra, Rz, RSm, Rk are values in nm*
Hybrid Parameters, RSm	Up to 150 µm	(60 + 0.001 RSm) nm	
Dimensional Material Ratio Parameters, Rk	Up to 4 µm	(10 + 0.05 Rk) nm	
Percentage Material Ratio Parameters	Up to 100 %	1 %	
Gage Blocks –			NMX-CH-3650-IMNC ASME B89.1.9:
Steel:			
Deviation of Central Length	(0.50 to 10) mm (>10 to 25) mm (>25 to 50) mm (>50 to 75) mm (>75 to 100) mm	0.024 µm 0.030 µm 0.044 µm 0.062 µm 0.081 µm	Gage blocks-ISO; Grade K, electromechanical comparator
Variation in Length	(0.50 to 10) mm (>10 to 25) mm (>25 to 50) mm (>50 to 75) mm (>75 to 100) mm	0.022 µm 0.023 µm 0.025 µm 0.028 µm 0.031 µm	

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
Gage Blocks – (cont) Ceramic:			NMX-CH-3650-IMNC ASME B89.1.9:
Deviation of Central Length	(0.50 to 10) mm (>10 to 25) mm (>25 to 50) mm (>50 to 75) mm (>75 to 100) mm	0.024 µm 0.031 µm 0.048 µm 0.067 µm 0.087 µm	Gage blocks-ISO; Grade K, electromechanical comparator
Variation in Length	(0.50 to 10) mm (>10 to 25) mm (>25 to 50) mm (>50 to 75) mm (>75 to 100) mm	0.022 µm 0.023 µm 0.024 µm 0.026 µm 0.029 µm	
Micrometer	Up to 1000 mm	(0.85 + 16L) µm	JIS 7502:2016, gage blocks
Calipers	Up to 1000 mm	(1.0 + 21L) µm	ISO 13385-1, ISO 13385-2, gage blocks with ring gage
Articulated Arm Coordinate Measuring Machines (AACMM)[3] –			ASME B89.4.22:
Volumetric Performance, Radius	Up to 1500 mm	(4.5 + 7.0L) µm	Length standards, step gages
Effective Diameter Performance, Sphere Diameter	30 mm (nominal)	2.0 µm	Master sphere

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
Roundness Measuring Machines[3] –			ISO 4291:
Sensitivity	(0.4 to 10) µm (160 to 500) µm	65 nm + 46 nm/µm 0.090 µm	Optical flat, gage blocks
Radial Error	(6 to 25) mm	0.050 µm	Roundness standard
Axial Error	(15 to 70) mm	0.040 µm	Optical flat
Optical Comparators[3] – Vision Systems & Measuring Microscopes			JIS B 7184:
X & Y Axis – Error of Indication	Up to 300 mm (300 to 500) mm	(1.1 + 3.5*L*) µm (3.0 + 4.5*L*) µm	Glass scales
Z Axis – Error of Indication	Up to 300 mm	(2.4 + 3.2*L*) µm	Gage blocks
Angle[6]	Up to 180°	1.3'	Angular reticule
Universal Length Machine (ULMs, UMMs)[3]			
Res. ≥0.01 µm	Up to 1000 mm	(0.25 + 2.0*L*) µm	Gage blocks
Res. ≥0.01 µm	Up to 2000 mm	(0.25 + 1.6*L*) µm	Laser interferometer
Res. ≥1 µm	Up to 5000 mm	(1.3 + 1.5*L*) µm	Laser interferometer
Contour Standards –			
X, Z Length Radius Angles	Up to 220 mm Up to 80 mm Up to 180°	(3.0 + 15*L*) µm (3.0 + 15*L*) µm 0.01°	Taylor Hobson NOVUS PGI
Roundness Standards –			
Radius	Up to 150 mm	46 nm	ISO 4291by error separation method with roundness/cylindrical profile measuring instrument

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
Length Standards (Bars, Rods, Micrometers Setting Standards, & Fixtures Used as Length Standards)	(10 to 550) mm Up to 1500 mm	(0.81 + 1.0*L*) µm (1.7 + 7.0*L*) µm	Universal length machine (ULM) CMM used as comparator (substitution method), step gages
Surface Plates (Granite & Cast Iron)[3] – Overall Flatness	Size of Plate: (160 x 100) mm to (4000 x 1600) mm	(1.7 + 1.6*L*) µm	Partial calibration per NMX-CH-8512-1:IMNC, NMX-CH-8512-2:IMNC with photoelectric autocollimator, electronic differential levels; *L* is the diagonal measurement
Height Gages	Up to 1000 mm	(5.7 + 3.2*L*) µm	ISO 13225:2012, gage blocks
Length Indicators – (Dial, Test/Lever, Linear Amplifiers)			Mitutoyo I-Checker:
Res. = 0.001 mm	0.1 µm to 0.2 mm	0.35 µm	ISO 9493
Res. = 0.001 mm	(0.2 to 101.6) mm	(1.1 + 2.0*L*) µm	ISO 463, ISO 13102
Res. = 0.01 mm	0.1 µm to 1.6 mm	2.6 µm	ISO 9493
Cylindrical Gages – Plain Ring Gages			ANSI/ASME B89.1.6:
Internal Diameter Class "Z, ZZ"	(3 to 150) mm	1.4 µm	Universal length machine (ULM)
Roundness:			
Diameter	Up to 400 mm	0.15 µm	Roundness machine
Height	Up to 500 mm	0.15 µm	
Cylindrical Gages – Plain External Diameters (Plug Gages, Disks, Pin Thread Wires)	(0.1 to 100) mm	(0.48 + 5.2*L*) µm	Universal length machine (ULM)

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
Spheres –			ISO 3290-1, ISO 3290-2:
Diameter	(1.5 to 100) mm	(0.41 + 5.0*L*) µm	Class G 10 to G 200, universal length machine (ULM)
Roundness:			
Diameter	Up to 400 mm	0.15 µm	Roundness machine
Height	Up to 500 mm	0.15 µm	
Feeler Gauges/Thickness Gauges –			
Plastic	(0.01 to 5) mm	(0.65 + 90*L*) µm	JIS B 7524; universal length machine (ULM)
Steel	(0.01 to 5) mm	(0.37 + 90*L*) µm	
Wire Test Sieve Cloth & Test Sieves – XY Openings	(0.075 to 40) mm	(2 + 220*L*) µm	NMX-CH-012-1-INMC-2007, ASTM E11; vision system
Cylindrical Gages – Thread Plugs			Universal length machine (ULM), thread wires; metric & unified 60° threads
Simple Pitch Diameter	(0.35 to 8) mm (4 to 64) tpi (3 to 40) tpi (2 to 16) tpi	(2.5 + 3.0*L*) µm	Whitworth 55°, ACME 29°
Major Diameter	Up to 100 mm	(2.5 + 3.0*L*) µm	Universal length machine (ULM)
Cylindrical Gages – Thread Rings			Universal length machine (ULM), spherical probe
Simple Pitch Diameter	(0.6 to 3) mm (10 to 40) tpi (10 to 16) tpi	2.2 µm	Metric & unified 60° threads Whitworth 55°, ACME 29°
Minor Diameter	(3 to 100) mm	2.2 µm	

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
Radius Gages	0.5 µm to 25.4 mm	1.6 µm	Direct measurements with vision system
Spherical Caps –			
Radius	(5 to 95) mm	1.5 µm	Substitution method with CMM & standard sphere or standard cap
Form	(0.1 to 5.0) µm	0.25 µm	
Harmonics & Cylindrical Roughness Standards –			
Wavelength Amplitude	≤10 µm	40 nm	Taylor Hobson NOVUS PGI
Ra Rz RSm	Up to 3.5µm Up to 25 µm Up to 150 µm	20 nm 25 nm 90 nm	
Magnification or Flick Standards Calibration –			
Static Method	(0.1 to 500) µm	75 nm	Taylor Hobson NOVUS PGI
Dynamic Method	(0.1 to 500) µm	250 nm	Taylor Hobson, Talyrond 595H
Laser Tracker Calibration			
Length Error	Up to 15 m	10 µm	ISO 10360-10, bar with SMRs sphere
Probing Size Error		2.2 µm	
Probing Form Error		2.5 µm	
Probing Location Error		0.82 µm	

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
Optical 3D CMS			
Distortion Error	(30 to 360) mm	(7.0 + 10*L*) µm	ISO 10360-13, ball bar, flat bar
Probing Size Error	(10 to 25) mm	5.0 µm	
Probing Form Error	(10 to 25) mm	4.5 µm	
Flatness Error	Up to 50 x 570 mm	6.5 µm	
Error in Concatenated Volume	(100 to 950) mm	(7.0 + 10*L*) µm	
Depth Standards Height	(0.2 to 1000) µm	(23 + 0.002*H*) nm	Taylor Hobson NOVUS PGI

II. Dimensional Testing/Calibration[1]

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
Length – 1D, 2D, 3D Measurements (Size, Position & Geometric/Form)[4]	Up to 2860 mm (Diagonal): X = Up to 2400 mm Y = Up to 1200 mm Z = Up to 1000 mm	(2.5 + 10*L*) µm	CMM, hand tools, part drawings, customer requirements
	Up to 1500 mm	34 µm	Articulating arm, CMM (AACMM), part drawings, customer requirements
	Up to 2700 mm	55 µm	
	Up to 3700 mm	91 µm	

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
Profile & Surface Texture[4] –			
Profile	Z: Up to 50 mm X: Up to 200 mm	2.0 µm	Profile & surface texture machine, part drawings, customer requirements
Surface Texture Up to a 30 mm Scan	Z: Amplitude/Average Parameters (R, W, P_a, P_q)	50 nm	
	Z: Point/Spacing Parameters (R_{Sm}, W_{Sm}, P_{Sm}, HSC, P_c)	150 nm	
	Hybrid Parameters	140 nm	
Geometry/Form –	Probe Arm Range: Diameter = Up to 300 mm Height Z = Up to 500 mm		Roundness machine, CMM; part drawings & customer requirements
Rotational:			
Roundness	Radius (5 to 150) mm	(0.15 to 0.38) µm	
Flatness	Radius (5 to 150) mm	(0.22 to 0.41) µm	
Axial Parallelism	Radius (5 to 150) mm	0.22 µm	
Cylindricity	Height (5 to 500) mm	(0.21 to 1.2) µm	
Squareness	Radius (5 to 150) mm	0.25 µm	
Runout	Radius (5 to 150) mm	(0.24 to 0.43) µm	
Coaxially	Height (5 to 500) mm	0.25 µm	
Linear:			
Straightness	Height (5 to 500) mm	(0.21 to 1.2) µm	
Parallelism	Height (5 to 500) mm	0.20 µm	
Squareness	Height (5 to 500) mm	0.25 µm	
Non-Contact Measurements –			
Angle	Angle 0° to 360°	3.5' arc	Vision system
Length	Up to 640 mm	$(1.5 + 3.0L)$ µm	
Radius	Up to 300 mm	$(1.6 + 3.0L)$ µm	
Laser Measuring Device	Up to 10 m	$\sqrt{(0.6 + 0.0095L)^2}$ mm	Laser Tacker
Optical 3D Measurement	Maximum Volume (2 x 2 x 1) m	$(25 + 50L)$ µm	Optical 3D CMS

III. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC[2, 7] (±)	Comments
DC Voltage – Generate	(1 to <330) mV (0.33 to <3.3) V (3.3 to <33) V (33 to <330) V (330 to 1) kV	40 µV/V + 2.0 µV 22 µV/V + 10 µV 24 µV/V + 200 µV 36 µV/V + 6.0 mV 36 µV/V + 10 mV	Fluke 5522A
DC Voltage – Measure	(10 to 100) mV (>0.1 to 1) V (>1 to 10) V (>10 to 100) V (>0.1 to 1) kV	18 µV/V + 1.0 µV 13 µV/V + 4.3 µV 14 µV/V + 96 µV 19 µV/V + 330 µV 19 µV/V + 4.6 mV	Transmille 8081 DMM
DC Voltage – Equipment to Output	(0.1 to 6) kV	0.012 kV	Fluke 80K-6 Multimeter, NI-USB 4065, NMX-CH-131/1-SCFI, NMX-CH-110/1-SCFI, NMX-CH-131-2-SCFI
DC Current – Generate	(0.02 to 0.2) mA (>0.2 to 2) mA (>2 to 20) mA (>20 to 200) mA (>0.2 to 2) A (>2 to 20) A (>20 to 30) A	0.2 mA/A + 20 nA 0.1 mA/A + 230 nA 0.1 mA/A + 3.0 µA 0.1 mA/A + 23 µA 0.26 mA/A + 120 µA 0.6 mA/A + 600 µA 1.0 mA/A + 900 µA	Transmille 4010
Resistance – Generate	(1 to <11) Ω (11 to <110) Ω (0.11 to <1.1) kΩ (1.1 to <11) kΩ (11 to <110) kΩ (0.11 to <1.1) MΩ (1.1 to <3.3) MΩ (3.3 to <11) MΩ (11 to <33) MΩ (33 to <110) MΩ (110 to <330) MΩ	80 µΩ/Ω + 20 mΩ 60 µΩ/Ω + 30 mΩ 56 µΩ/Ω + 40 mΩ 56 µΩ/Ω + 400 mΩ 56 µΩ/Ω + 2 Ω 64 µΩ/Ω + 22 Ω 120 µΩ/Ω + 820 Ω 260 µΩ/Ω + 500 Ω 500 µΩ/Ω + 46 kΩ 1 mΩ/Ω + 100 kΩ 6 mΩ/Ω + 200 kΩ	Fluke 5522A

Parameter/Range	Frequency	CMC[2, 7] (±)	Comments
AC Voltage – Generate			
(1 to <33) mV	45 Hz to 10 kHz	0.30 mV/V + 12 µV	Fluke 5522A
(33 to <330) mV		0.30 mV/V + 94 µV	
(0.33 to <3.3) V		0.30 mV/V + 920 µV	
(3.3 to <33) V		0.30 mV/V + 11 mV	
(33 to <330) V		0.38 mV/V + 90 mV	
(0.33 to 1) kV		0.60 mV/V + 56 mV	
(33 to <330) mV	(>10 to 20) kHz	0.32 mV/V + 30 µV	
(0.33 to <3.3) V		0.38 mV/V + 230 µV	
(3.3 to <33) V		0.48 mV/V + 3.8 mV	
(33 to <330) V		0.50 mV/V + 12 mV	
AC Voltage – Measure			
(10 to 100) mV	40 Hz to 1 kHz	0.6 mV/V + 18 µV	Transmille 8081 DMM
(>0.1 to 1) V		0.6 mV/V + 120 µV	
(>1 to 10) V		0.6 mV/V + 1.2 mV	
(>10 to 100) V		0.6 mV/V + 18 mV	
(>0.1 to 1) kV		0.6 mV/V + 180 mV	
AC Voltage – Equipment to Output			Fluke 80K-6 Multimeter, NI-USB 4065, NMX-CH-131/1-SCFI, NMX-CH-110/1-SCFI, NMX-CH-131-2-SCFI
(0.1 to 6) kV	(45 to 500) Hz	0.012 kV	
AC Current – Generate			
(0.02 to 0.2) mA	45 Hz to 1 kHz	1.4 mA/A + 1.1 µA	Transmille 4010
(>0.2 to 2) mA		1.2 mA/A + 1.7 µA	
(>2 to 20) mA		0.8 mA/A + 4 µA	
(>20 to 200) mA		0.8 mA/A + 240 µA	
(>0.2 to 2) A		1.2 mA/A + 4.8 mA	
(>2 to 30) A		1.6 mA/A + 16 mA	

Parameter/Range	Frequency	CMC[2, 7] (±)	Comments
AC Current – Measure (0.1 to 1) mA (>1 to 10) mA (>10 to 100) mA (>0.1 to 1) A (>1 to 10) A (>10 to 30) A	40 Hz to 1 kHz	1.0 mA/A + 240 nA 1.0 mA/A + 2.4 µA 1.0 mA/A + 24 µA 1.4 mA/A + 300 µA 2.4 mA/A + 6 mA 2.4 mA/A + 18 mA	Transmille 8081 DMM
AC Current – Clamp on Meters (11 to 1500) A	(45 to 65) Hz	1.5 A	Transmille 4010 & 50 turn coil (type thyroid), NMX-CH-131/1-SCFI, NMX-CH-110/1-SCFI, NMX-CH-131/2-SCFI

Parameter/Equipment	Range	CMC[2, 7] (±)	Comments
DC Current – Measure	(0.1 to 1) µA (>1 to 10) µA (>10 to 100) µA (>0.1 to 1) mA (>1 to 10) mA (>10 to 100) mA (>0.1 to 1) A (>1 to 10) A (>10 to 30) A	1.4 mA/A + 68 pA 200 µA/A + 400 pA 56 µA/A + 5.8 nA 56 µA/A + 62 nA 64 µA/A + 660 nA 94 µA/A + 1.2 µA 470 µA/A + 26 µA 1.1 mA/A + 700 µA 1.5 mA/A + 9 mA	Transmille 8081 DMM
Resistance – Measure	(0.1 to 1) Ω (>1 to 10) Ω (>10 to 100) Ω (>0.1 to 1) kΩ (1 to 10) kΩ (>10 to 100) kΩ (>0.1 to 1) MΩ (>1 to 10) MΩ	94 µΩ/Ω + 24 µΩ 63 µΩ/Ω + 870 µΩ 56 µΩ/Ω + 7.9 mΩ 25 µΩ/Ω + 20 mΩ 30 µΩ/Ω + 400 mΩ 31 µΩ/Ω + 1.6 Ω 36 µΩ/Ω + 56 Ω 48 µΩ/Ω + 880 Ω	Transmille 8081 DMM

Parameter/Equipment	Range	CMC[2r] (±)	Comments
Electrical Simulation of Thermocouple Indicators –			
Type B	(600 to 1820) °C	0.18 °C	Fluke 5522A
Type C	(0 to 2316) °C	0.16 °C	
Type E	(-250 to 1000) °C	0.094 °C	
Type J	(-210 to 1200) °C	0.094 °C	
Type K	(-200 to 1372) °C	0.10 °C	
Type N	(-200 to 1300) °C	0.11 °C	
Type R	(0 to 1767) °C	0.20 °C	
Type S	(0 to 1767) °C	0.21 °C	
Type T	(-250 to 400) °C	0.094 °C	
Clamp-On Meters	(11 to 1500) A	1.2 A	Transmille 4010 & 50 turn coil (type thyroid), NMX-CH-131/1-SCFI, NMX-CH-110/1-SCFI, NMX-CH-131/2-SCFI
Electrical Simulation of RTD –			
Type Pt 385, 100Ω	(-100 to 800) °C	0.036 °C	Transmille 4010, OIML-R-84, ASTM-E-230 “Calibration of Thermocouples” Euramet cg-08/v.01
Type Pt 25	(-200 to 800) °C	0.036 °C	
Type Pt 100	(-200 to 800) °C	0.55 °C	
Type Pt 250	(-200 to 800) °C	0.3 °C	
Type Pt 500	(-200 to 500) °C	0.9 °C	
Type Pt 1000	(-200 to 800) °C	0.45 °C	
Type Pt 385, 500 Ω	(-200 to 630) °C	0.031 °C	
Type Pt 385, 1000 Ω	(-200 to 630) °C	0.027 °C	
Type Pt Ni 385, 120 Ω	(-80 to 260) °C	0.051 °C	
Type Cu 42 710 Ω	(-100 to 260) °C	0.17 °C	

IV. Mechanical

Parameter/Equipment	Range	CMC[2, 8] (±)	Comments
Force Measuring Devices[3] –			ISO 376:2004, NMX-CH-376-I-IMNC-2008:
Tension & Compression	(0.2 to 25) N (>25 to 500) N (>500 to 1600) N	0.032 % of rdg 0.0039 % of rdg 0.0026 % of rdg	Dead weights used as mass standards
	(1 to 10) kN (>10 to 100) kN (33 to 334) kN (89 to 890) kN	0.026 % of rdg 0.020 % of rdg 0.053 % of rdg 0.065 % of rdg	Load cells & digital indicators
Force Testing Machines –			ISO 7500-1:2004, NMX-CH-7500-1-IMNC-2008:
Tension & Compression	(0.2 to 25) N (>25 to 500) N (>500 to 1600) N	0.032 % of rdg 0.0039 % of rdg 0.0026 % of rdg	Dead weights used as mass standards
	(1 to 10) kN (>10 to 100) kN (33 to 334) kN (89 to 890) kN	0.026 % of rdg 0.020 % of rdg 0.053 % of rdg 0.065 % of rdg	Load cells & digital indicators
Compression Only	(222 to 2224) kN	0.091 % of rdg	Load cells & digital indicators
Torque Instruments –			ISO 6789:2003; NMX-CH-6789-IMNC-2006:
Hand Torque Tools, Torque Wrenches	(0.2 to 2) N·m (1 to 10) N·m (2.5 to 25) N·m (15 to 150) N·m (40 to 400) N·m (150 to 1500) N·m	(0.33 to 0.19) % of rdg (0.27 to 0.18) % of rdg (0.32 to 0.16) % of rdg (0.29 to 0.15) % of rdg (0.23 to 0.15) % of rdg (0.33 to 0.16) % of rdg	Torque transducers with indicators *Uncertainties at intermediate values by linear interpolation.*
Torque – Measuring Equipment (Torque Transducers/Torque Analyzers	(50 to 150) N·m (150 to 500) N·m (500 to 2400) N·m	(0.17 to 0.14) % of rdg (0.14 to 0.04) % of rdg (0.087 to 0.029) % of rdg	Mass as dead weights, loading arm *Uncertainties at intermediate values by linear interpolation.*

Parameter/Equipment	Range	CMC[2] (±)	Comments
Vacuum Gage	(-12 to 0) psi	0.01 psi	2700G- BG200K, MESS-PR-PRO-001
Pressure Gage	Up to 100 psi (100 to 1000) psi (1000 to 5000) psi (5000 to 10 000) psi (10 000 to 30 000) psi (30 000 to 60 000) psi	0.025 psi 0.25 psi 1.3 psi 2.5 psi 15 psi 30 psi	2700G-BG200K, 2700G-BG2M, 2700G-BG3.5M, 2700G-BG7M, 2700G-G20M, 2700G-G35M, 2700G-G70M, ADT672, ADT672-10-GP60K-PSI-AM, MESS-PR- PRO-001

V. Thermodynamic

Parameter/Equipment	Range	CMC[2, 8] (±)	Comments
Temperature – Measuring Equipment	(-45 to 0) °C (>0 to 140) °C (>140 to 660) °C (>660 to 700) °C	0.060 °C 0.080 °C 0.10 °C 0.25 °C	Fluke 5626 SPRT with Fluke 8845A DMM & Fluke 9170-9173 dry blocks
Infrared Thermometers	(-20 to 35) °C (35 to 100) °C (>100 to 200) °C (>200 to 350) °C (>350 to 500) °C (>500 to 1000) °C (>1000 to 1500) °C	3.2 °C 0.45 °C 0.64 °C 1.1 °C 1.5 °C 4.5 °C 7 °C	Fluke 4181 IR calibrator ε = 0.95, λ = (8 to 14) µm
Temperature Chamber	(-70 to 300) °C (301 to 650) °C (651 to 1000) °C	0.1 °C 0.5 °C 1.3 °C	Fluke 1586A, AMS 2750F
Thermo-Hygrometer – Humidity Temperature	 (10 to 99) % RH (10 to 50) °C	 2.2 % RH 0.1 °C	Vaisala HMP75, CENAM technical guidance

VI. Time & Frequency

Parameter/Equipment	Range	CMC[2] (±)	Comments
Tachometer	10 Hz to 10 kHz (600 to 600 000) rpm	0.013 Hz 0.75 rpm	Standford research systems SR620
Stopwatch	(5 to 86 400) s	0.66 s	Stanford Research System SR620

MECHANICAL

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following test on metals, plastic:

Test Description	Test Method
Tension and Compression Forces	ISO 6892-1, ISO 7438; MESS-FZ-PRO-003
Tensile Yield Strength, Elongation	ISO 6892-1, ISO 7438; MESS-FZ-PRO-003

---

[1] This laboratory offers commercial dimensional testing/calibration service and field calibration service.

[2] Calibration and Measurement Capability Uncertainty (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.

[3] 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.

[4] This laboratory meets R205 – *Specific Requirements: Calibration Laboratory Accreditation Program* for the types of dimensional tests listed above and is considered equivalent to that of a calibration.

[5] In the statement of CMC, L is the numerical value of the nominal length of the device measured in meters, H is the numerical value of the height in nm.

[6] Applicable to optical comparators.

[7] 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 percent or fraction of the reading plus a fixed floor specification.

[8] 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.

[9] This scope meets A2LA's *P112 Flexible Scope Policy*.

[10] In the statement of CMC, percentages are to be read as percent of indicated value.

Accredited Laboratory

A2LA has accredited

MESS S.C.

Queretaro, MEXICO

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 25th day of June 2025.

Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 3047.01
Valid to May 31, 2027

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