



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

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CALIBRATION

Valid To: October 31, 2022

Certificate Number: 1032.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations^{1, 7}:

I. Dimensional

Parameter/Equipment	Range	CMC ^{2, 4} (±)	Comments
Gage Blocks	(0.05 to 6) in	(5.4 + 5.7L) μin	Twin head comparator w/ master gage blocks
Plain Cylindrical Ring Gages	(0.04 to 0.5) in (0.5 to 5) in (5 to 10) in	26 μin 49 μin 220 μin	UMM, master rings
Thread Ring Gages, Solid – Minor Diameter Pitch Diameter Flank Angle	(0.19 to 10) in (0.19 to 10) in Up to 60°	210 μin 42 μin 6.2'	UMM, cylindrical master rings, microscope
Thread Ring Gages, Adjustable ⁶	Up to 8 in	W (Set Plug Tolerance)	Set using master set plug gages ANSI/ASME B1.2

Parameter/Equipment	Range	CMC ^{2, 4} (±)	Comments
Thread Plugs – Major Diameter Pitch Diameter Flank Angle	(0.06 to 10) in (0.06 to 10) in Up to 60°	26 μin 80 μin 6.2'	UMM, best wire method, microscope
Specialty Gaging Length Radius Angle	Up to 2 in (2 to 8) in Up to 0.5 in Up to 90°	0.0001 in 0.0008 in 0.0001 in 6.2'	Measuring microscope, optical comparator
Thread Measuring Wires – 60° Sets	(2 to 120) pitch	18 μin	UMM
Digital & Dial Indicators ³	Up to 2 in	(24 + 5.1L) μin	Gage blocks
Calipers ³	Up to 60 in	(380 + 11L) μin	Gage blocks
Micrometers ³	Up to 6 in (6 to 24) in	(5.1 + 0.97L) μin (2.2 + 1.5L) μin	Gage blocks, optical flats
Gage Pins & Plugs	Up to 5 in	62 μin	UMM
Optical Comparators ³ – Length Radius Angle	Up to 2 in Up to 0.5 in Up to 90°	0.000 14 in 0.000 14 in 6.2'	Glass scale Gage ball Precision angle blocks
Height Gages ³	Up to 18 in (18 to 48) in	(290 + 0.69L) μin (160 + 3.2L) μin	Gage blocks with surface plate

Parameter/Equipment	Range	CMC ^{2, 4, 8} (±)	Comments
NPT Rings & Plug Gages – Fixed Points	0.0625 (27 TPI) 0.125 (27 TPI) 0.25 (18 TPI) 0.375 (18 TPI) 0.5 (14 TPI) 0.75 (14 TPI) 1 (11.5 TPI) 1.25 (11.5 TPI) 1.5 (11.5 TPI) 2 (11.5 TPI) 3 (8 TPI)	920 μin 920 μin 920 μin 920 μin 920 μin 920 μin 920 μin 920 μin 920 μin 920 μin 920 μin	Indicator, master rings, master plugs TPI = threads per inch
Length Standards	Up to 22 in	(39 + 16L) μin	Gage blocks, UMM
Angle – Measuring Equipment	Up to 90°	6.2'	Measuring microscope, optical comparator
Surface Finish – Roughness Average (Ra)			
Profilometer	Up to 250 μin	(7.6 + 0.6R) μin	Roughness patch profilometer
Roughness Specimen	Up to 250 μin	4.0 μin	

II. Fastener Industry Specific Gages

Parameter/Equipment	Range	CMC ² (±)	Comments
Major Diameter Gages	Up to 2 in	140 μin	Master gage blocks
Segment Thread Gage	Up to 2 in	220 μin	Master thread plug
Tri-Roll & Adjustable Thread Gages	Up to 3.375 in	240 μin	Master thread plug
Recess Concentricity Gages	Up to 1.0 in	0.002 μin	Master gage pins & indicator

Parameter/Equipment	Range	CMC ² (±)	Comments
Tri-Round Gages	Up to 0.5 in	93 μin	Master gage pins
Fastener Length Gages	Up to 1 in Up to 6 in Up to 12 in	290 μin 540 μin 500 μin	Master gage blocks
Internal Thread Gage	Up to 8 in	200 μin	Master rings
“Dimension-All” Fastener Measuring Gages	Up to 2 in	270 μin	Master gage blocks & gage balls
Protrusion Height Gages	Up to 2 in	290 μin	Master gage blocks & gage balls
Penetration Points/Penetration Plugs	Type I, IA, II; 6-lobe, Offset cruciform Hex, Slot, Square	130 μin 32 μin	Measuring microscope and UMM UMM
Thread Performance – Test Plates ⁵	Up to 0.75 in, M1.5 to M20	250 μin	Hardness tester, electronic bore gages, micrometer, plug gages

III. Mechanical

Parameter/Equipment	Range	CMC ² (±)	Comments
Torque Tools	Up to 600 lbf	1.4 % of rdg	Torque transducer & staging fixture
Drill Screw Testers – Time End Load Speed	Up to 100 s Up to 50 lbf Up to 4000 RPM	0.27 s 0.570 lbf 4.9 RPM	Stopwatch Force gage Tachometer

Parameter/Equipment	Range	CMC ^{2, 8} (±)	Comments
Indirect Verification of Rockwell Hardness Testers ³	HRA: (20 to 65) HRA (70 to 78) HRA (80 to 84) HRA HRBW: (40 to 59) HRBW (60 to 79) HRBW (80 to 100) HRBW HRC: (20 to 30) HRC (35 to 55) HRC (60 to 65) HRC HREW: (70 to 79) HREW (84 to 90) HREW (93 to 100) HREW HRGW: (30 to 50) HRGW (55 to 75) HRGW (80 to 94) HRGW	0.66 HRA 0.31 HRA 0.31 HRA 1.4 HRBW 0.94 HRBW 0.65 HRBW 0.50 HRC 0.98 HRC 0.92 HRC 0.57 HREW 0.69 HREW 0.78 HREW 0.62 HRGW 0.46 HRGW 0.45 HRGW	Indirect verification per ASTM E18
Pressure – Measure & Measuring Equipment ³	(0 to 60) psi (> 60 to 300) psi (> 300 to 1000) psi (> 1000 to 5000) psi (> 5000 to 10 000) psi	0.41 psi 0.82 psi 7.7 psi 22 psi 23 psi	Master pressure gage
Scales ³	(0 to 0.25) lb (> 0.25 to 5) lb (> 5 to 50) lb (> 50 to 250) lb (> 250 to 5000) lb	0.000 23 lb 0.0023 lb 0.0032 lb 0.029 lb 1.2 lb	Handbook 44 Class F weights

¹ This laboratory offers commercial 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 and this laboratory meets A2LA R104 – *General Requirements: Accreditation of Field Testing and Field Calibration Laboratories* for these calibrations. 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 In the statement of CMC, L is the numerical value of the nominal length of the device measured in inches and R is the numerical value of the resolution of the device in microinches.
- ⁵ Uncertainty is a function of the three characteristics of hardness, thickness, and diameter of the hole.
- ⁶ Adjustable thread rings are set to applicable specifications using calibrated master set plug gages.
- ⁷ This scope meets A2LA's *P112 Flexible Scope Policy*.
- 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.



Accredited Laboratory

A2LA has accredited

GREENSLADE & CO., INC.

Fort Worth, TX

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 14th day of October 2020

A blue ink signature of the Vice President of Accreditation Services.

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 1032.01
Valid to October 31, 2022

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