



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

GREENSLADE & CO., INC.  
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CALIBRATION

Valid To: October 31, 2018

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<sup>1</sup>:

I. Dimensional

Parameter/Equipment	Range	CMC <sup>2,4</sup> (±)	Comments
Gage Blocks	(0.05 to 6) in	(6.5 + 5.9L) 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	28 μin 25 μin 48 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°	190 μin 37 μin 10'	UMM, cylindrical master rings, microscope
Thread Ring Gages, Adjustable <sup>6</sup>	Up to 8 in	W (Set Plug Tolerance)	Set using master set plug gages ANSI/ASME B1.2

Parameter/Equipment	Range	CMC <sup>2,4</sup> (±)	Comments
Thread Plugs – Major Diameter Pitch Diameter Flank Angle	(0.06 to 10) in (0.06 to 10) in Up to 60°	35 μin 80 μin 10'	UMM, best wire method, microscope
Thread Measuring Wires – 60° Sets	(2 to 120) pitch	18 μin	UMM
Digital and Dial Indicators <sup>3</sup>	Up to 2 in	(190 + 0.6R) μin	Gage blocks
Calipers <sup>3</sup>	Up to 60 in	(760 + 0.6R) μin	Gage blocks
Micrometers <sup>3</sup>	Up to 6 in 6 to 24 in	(120 + 0.6R) μin (370 + 0.6R) μin	Gage blocks, optical flats
Gage Pins & Plugs	Up to 5 in	51 μin	UMM
Optical Comparators <sup>3</sup> – Length Radius Angle	Up to 2 in Up to 0.5 in Up to 90°	830 μin 0.0011 in 12'	Glass scale Gage ball Precision angle blocks
Height Gages <sup>3</sup>	Up to 18 in (18 to 48) in	(280 + 0.6R) μin (1100 + 0.6R) μin	Gage blocks
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)	950 μin 950 μin 950 μin 950 μin 950 μin 950 μin 950 μin 950 μin 950 μin 950 μin 950 μin	Height gages, master rings, master plugs  TPI = threads per inch

Parameter/Equipment	Range	CMC <sup>2,4</sup> (±)	Comments
Length Standards	Up to 22 in	(19 + 5.3L) μin	Gage blocks, UMM
Angle	Up to 90°	16'	Measuring microscope, optical comparator

## II. Fastener Industry Specific Gages

Parameter/Equipment	Range	CMC <sup>2</sup> (±)	Comments
Major Diameter Gages	Up to 2 in	200 μin	Master gage blocks
Segment Thread Gage	Up to 2 in	330 μin	Master thread plug
Tri-Roll and Adjustable Thread Gages	Up to 3.375 in	440 μin	Master thread plug
Recess Concentricity Gages	Up to 1.0 in	0.0018 in	Master gage pins & indicator
Tri-Round Gages	Up to 0.5 in	100 μin	Master gage pins
Fastener Length Gages	Up to 1 in Up to 6 in Up to 12 in	250 μin 250 μin 400 μin	Master gage blocks



Parameter/Equipment	Range	CMC <sup>2</sup> (±)	Comments
Internal Thread Gage	Up to 8 in	200 µin	Master rings
“Dimension-All” Fastener Measuring Gages	Up to 2 in	200 µin	Master gage blocks and gage balls
Protrusion Height Gages	Up to 2 in	200 µin	Master gage blocks and gage balls
Penetration Points/Penetration Plugs	Type I, IA, II; 6-lobe, Offset cruciform  Hex, Slot, Square	86 µin  35 µin	Measuring microscope and UMM  UMM
Thread Performance – Test Plates <sup>5</sup>	Up to 0.75 in  M1.5 to M20	200 µin	Hardness tester, electronic bore gages, micrometer, plug gages

### III. Mechanical

Parameter/Equipment	Range	CMC <sup>2</sup> (±)	Comments
Torque Tools	Up to 600 lbf	1.2 % of rdg	Torque transducer and staging fixture
Drill Screw Testers –  Time End Load Speed	Up to 100 s Up to 50 lbf Up to 4000 RPM	0.71 s 0.63 lbf 5.8 RPM	Stopwatch Force gage Tachometer



Parameter/Equipment	Range	CMC <sup>2</sup> (±)	Comments
Indirect Verification of Rockwell Hardness Testers <sup>3</sup>	<b>HRA:</b> (20 to 65) HRA (70 to 78) HRA (80 to 84) HRA  <b>HRBW:</b> (40 to 59) HRBW (60 to 79) HRBW (80 to 100) HRBW  <b>HRC:</b> (20 to 30) HRC (35 to 55) HRC (60 to 65) HRC  <b>HREW:</b> (70 to 79) HREW (84 to 90) HREW (93 to 100) HREW  <b>HRGW:</b> (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 <sup>3</sup>	0 to 60 psi (> 60 to 300) psi (> 300 to 1000) psi (> 1000 to 5000) psi (> 5000 to 10000) psi	0.40 psi 0.71 psi 7.7 psi 22 psi 20 psi	Master pressure gage
Scales <sup>3</sup>	(0 to 0.25 lb (> 0.25 to 5) lb (> 5 to 50) lb (> 50 to 250) lb (> 250 to 5000) lb	0.00023 lb 0.0023 lb 0.0032 lb 0.029 lb 1.2 lb	Handbook 44 Class F Weights

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

<sup>2</sup> 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.



- <sup>3</sup> 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.
- <sup>4</sup> 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.
- <sup>5</sup> Uncertainty is a function of the three characteristics of hardness, thickness, and diameter of the hole.
- <sup>6</sup> Adjustable thread rings are set to applicable specifications using calibrated master set plug gages.

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## 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 17025:2005 *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 8 January 2009).



Presented this 8<sup>th</sup> day of December 2016.

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President and CEO  
For the Accreditation Council  
Certificate Number 1032.01  
Valid to October 31, 2018

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