SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005
& ANSI/NCSL Z540-1-1994

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CALIBRATION

Valid To: December 31, 2018 Certificate Number: 1527.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations[1]:

I. Dimensional

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Optical Comparator[3] –			
Magnification, 126×	5×, 10×, 20×, 31.25 in, 50× 100×	0.7× 0.13× 0.27× 0.54×	Glass master & ruler
X-Y Linearity Rotation Squareness	Up to 12 in 360° 6 in	180 µin 5′ 150 µin	Glass master Precision square
Automatic Video Comparator[3], 126× –			
X-Y-Z Coordinates	X, Y: (0 to 12) in X, Y: (0 to 40) in Z: (0 to 6) in	(120 + 2.2*L*) µin (110 + 5*L*) µin 140 µin	Glass master Step gage Gage block
Squareness	6 in	150 µin	Precision square

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Articulating Arm CMM[3] –			
Linear Repeatability	24 in	0.0006 in	Step gage
Ball Bar	Up to 24 in	0.0011 in	4 positional checks
Manual Vision System[3], 126× –			
X-Y-Z Coordinates	X, Y: (0 to 12) in X, Y: (1 to 40) in Z: (0 to 12) in	(150 + 1.5*L*) µin (130 + 4.7*L*) µin 140 µin	Glass master Check master Gage block
Squareness	6 in	200 µin	Precision square
CMM[3] –			
X-Y-Z coordinates Repeatability	Up to 40 in	(100 + 5*L*) µin 100 µin	Step gage
Squareness (XY, XZ, YZ)	Up to 24 in	120 µin	Precision square
Ball Bar	Up to 24 in	400 µin	4 positional checks
Universal Length Measuring Machine[3] –			
Linearity	Up to 300 mm	(0.03 + 2.5*L*/1000) µm	Gage blocks, force gage
Parallelism	Up to 300 mm	1.4 µm	Sphere
Laser Micrometer[3]	Up to 1 in	16 µin	Comparison to master pin gages
Height Gage[3]	Up to 40 in	(130 + 3.7*L*) µin	Step gage, gage blocks, indicator
Thread Wires	(Up to 0.5) in	12 µin	Universal length measuring machine

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Surface Plate[3] –			
Flatness	(8 × 12) in to (24 × 48) in	45 µin	Planekator
Flatness	(24 × 48) in to (6 × 12) ft	46 µin	Autocollimator
Repeat Reading	(8 × 12) in to (6 × 12) ft	43 µin	Repeat-o-meter
Threads[3] –			
Thread Rings (Functional Diameter)	Up to 12 in	300 µin	Universal length measuring machine, set plugs, sine plate, thread wires
Thread Plugs, Set Plugs (Pitch Diameter)	Up to 13 in	(60 + 5*L*) µin	
Cylindrical Measure[3] –			
OD Gages ID Gages	Up to 20 in (0.08 to 0.3) in (> 0.3 to 15) in	(8.7 + 2.7*L*) µin (30 + 7*L*) µin (24 + 6*L*) µin	Universal length measuring machine, gage blocks, cylindrical masters, laser gage
Custom Designed Gages	Up to 20 in	(7 + 3.7*L*) µin	
Micrometer Length Standards[3]	Up to 20 in	(36 + 2.6*L*) µin	Universal length machine
	(> 20 to 40) in	(150 + 3.9*L*) µin	Precision height gage
Micrometers[3] –			
Length	Up to 24 in	(64 + 1.5*L*) µin	Gage blocks
Parallelism	Up to 1 in	61 µin	Gage balls
Gage Blocks	< 1 in (1 to 4) in (> 4 to 20) in	(3.3 + 0.8*L*) µin (2.5 + 2.3*L*) µin (5.9 + 2.3*L*) µin	Electronic comparator, gage blocks

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Calipers[3]	Up to 12 in (18 to 40) in	800 µin (800 + 1.2*L*) µin	Gage blocks Check master
Indicators[3]	Up to 12 in	(23 + 1.1*L*) µin	Universal length measuring machine, gage block & stand, indicator calibrator
Step Gage	Up to 24 in	(95 + 4*L*) µin	Electronic comparator, master step gage
Glass Scales	Up to 12 in	(8 + 2.9*L*) µin	Universal length measuring machine with microscope
Squares[3]	Up to 12 in	70 µin	Squaremaster and master square
Bore Gages[3]	Up to 6 in	200 µin	Gage blocks, ring gage
CMM Spheres, Spheres-Balls[3]	Up to 5 in	20 µin	Universal length measuring machine
Line Scales[3] – Steel Rulers	Up to 48 in	0.0018 in	Vision system or comparison to master ruler

II. Dimensional Testing/Calibration[1]

Parameter/Equipment	Range	CMC[2] (±)	Comments
Length – 1D[5]	Up to 40 in Up to 50 mm Up to 300 mm Up to 12 in Up to 6 in Up to 1 in Up to 4 in	270 µin 59 µm 90 µm 940 µin 130 µin 100 µin 13 µin	Micro-Hite Supra 500, UMG-50 Supra 500 Calipers Micrometer Indicators Gage blocks
Length – 2D[5]	(12 × 6) in	250 µin	Optical comparator
Length – 3D[5]	(39 × 47 × 24) in (10 × 6 × 6) in (25 × 25 × 10) in (6 × 6 × 6) in	180 µin 150 µin 140 µin 210 µin	Zeiss CMM Micro-Vu Vertex Micro-Vu Excel Micro-Vu Sol

III. Mechanical

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Torque[3]	(10 to 100) in·ozf (5 to 1000) in·lbf (25 to 250) ft·lbf (251 to 600) ft·lbf	0.0066*R* 0.0032*R* 0.0032*R* 0.0066*R*	Torque calibrator
Indirect Verification of Rockwell Hardness Testers[3]	HRC: (20 to 30) HRC (35 to 55) HRC (60 to 65) HRC	 1 HRC 1 HRC 1 HRC	Indirect verification method per ASTM E18 with test blocks
Indirect Verification of Superficial Hardness Testers[3]	HRBW: (40 to 59) HRBW (60 to 79) HRBW (80 to 100) HRBW	 1 HRBW 1 HRBW 1 HRBW	Indirect verification method per ASTM E18 with test blocks

Parameter/Equipment	Range	CMC[2] (±)	Comments
Indirect Verification of Superficial Hardness Testers[3] (cont)	HR30TW: (43 to 56) HR30TW (57 to 69) HR30TW (70 to 83) HR30TW HR30N: (42 to 50) HR30N (55 to 73) HR30N (77 to 82) HR30N	 1 HR30TW 1 HR30TW 1 HR30TW 1 HR30N 1 HR30N 1 HR30N	Indirect verification method per ASTM E18 with test blocks

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

[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 length of the unit under test in either inches or millimeters (where appropriate) and R is the range of the unit under test.

[5] 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.

Accredited Laboratory

A2LA has accredited

F. D. HURKA COMPANY

Charlotte, NC

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 the requirements of ANSI/NCSLI Z540-1-1994 and *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 2nd day of November 2016.

President/CEO
For the Accreditation Council
Certificate Number 1527.01
Valid to December 31, 2018

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