CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

A & A Calibration, Inc.

12916 Farmington Rd.
Livonia, MI 48150

Fulfills the requirements of

ISO/IEC 17025:2017

In the field of

CALIBRATION

This certificate is valid only when accompanied by a current scope of accreditation document.
The current scope of accreditation can be verified at www.anab.org.

R. Douglas Leonard Jr., VP, PILR SBU

Expiry Date: 23 November 2023
Certificate Number: L1137-1

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. 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).

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

A & A Calibration, Inc.

12916 Farmington Rd.
Livonia, MI 48150
Pete Huben 734-261-8830

CALIBRATION

Valid to: **November 23, 2023** Certificate Number: **L1137-1**

Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Gage Blocks [2] Steel Chrome Carbide Tungsten Carbide Ceramic	 (0.005 to 4) in (0.005 to 4) in (0.005 to 4) in (0.005 to 4) in	 (2.3 + 1.7*L*) µin (2.3 + 1.3*L*) µin (2.5 + 0.8*L*) µin (2.3 + 1.4*L*) µin	Gage Block Comparator, Master Gage Blocks
Long Gage Blocks [2]	(5 to 20) in	(2.3 + 2*L*) µin	ULM, Master Gage Blocks
Pin Gages (to Class Z)	(0.01 to 1) in	39 µin	Laser Micrometer
Plug Gages [2]	(0.01 to 1) in	14 µin	Comparator, Gage Blocks
	(1 to 10) in	(5.6 + 7.7*L*) µin	
Thread Wires	(0.01 to 0.25) in	14 µin	Universal Supermicrometer
Flush Pins	(0.125 to 5) in	84 µin	Roll Check, Gage Blocks, Master Plug Gages
Ring Gages [2]	(0.124 to 2) in	13 µin	Universal Supermicrometer
	(2 to 10) in	(11 + 5*L*) µin	Ring Gage Comparator, Gage Blocks
Steel Rules [2]	(0.0325 to 72) in	(370 + 10*L*) µin	Glass Scale, DRO
Pitch Micrometer Standard	(1 to 4) in	80 µin	Roll Check, Gage Blocks, Master Plug Gages

Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Angle Blocks [2] (Shop Grade)	(0.25 to 20) ° (20 to 45) °	12 ″ 13 ″	Gage Blocks, Sine Plate, Surface Plate, Mu-Checker
Length Standards [2]	(0.25 to 2) in	28 µin	Universal Supermicrometer
	(2 to 38) in	(22 + 6*L*) µin	Reference Bar, Surface Plate, Mu-Checker
CMM Spheres [2] Diameter Sphericity (run-out) Tooling Ball Sphericity	(0.25 to 2) in*D* (0.25 to 2) in*D* (0.25 to 2) in*D*	20 µin 4.1 µin 20 µin	Supermicrometer Sphericity Gage Supermicrometer
Parallels [2] (Steel / Granite)	(0.062 5 to 10) in	(27 + 7*L*) µin	Gage Blocks, Surface Plate, Mu-Checker
Radius Gages	(0.005 to 1) in	320 µin	Optical Comparator
Roughness Specimens Roughness Average (Ra)	(0.1 to 200) µin	2.7 µin	Profilometer
Outside Micrometer [1,2]	50 µin to 24 in	(63 + 18*L*) µin	Gage Blocks
Inside Micrometer	(1.5 to 72) in	(237 + 16*L*) µin	Reference Bar, Surface Plate
Depth Micrometer [1,2]	50 µin to 12 in	(105 + 6*L*) µin	Gage Blocks
Interchangeable Anvil Thread Micrometer	50 µin to 2 in	140 µin	Optical Comparator, Gage Blocks
Micrometer Heads	50 µin to 1 in	50 µin	Universal Supermicrometer
Dial Indicators [1]	(0.000 5 to 1) in	320 µin	Micrometer Head
Digital Indicators [1]	50 µin to 1 in	92 µin	
Test Indicator [1]	50 µin to 0.06 in	83 µin	Mahr Indicator
High Resolution Indicators	10 µin to 0.002 in	15 µin	Universal Supermicrometer
Calipers [1,2] (Dial, Vernier)	(0.000 5 to 60) in	(613 + 22*L*) µin	Gage Blocks, Long Gage Blocks, Master Ring Gages
Digital Calipers [1,2]	(0.001 to 60) in	(727 + 15*L*) µin	
Bore Gages (2-point)	(0.000 1 to 1) in	130 µin	Micrometer Head

Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Bore Gages [2] (3-point)	(0.25 to 6) in	(96 + 14*L*) µin	Ring Gages
Height Gages [1,2]	(0.000 5 to 40) in	(612 + 5*L*) µin	Reference Bar, Surface Plate, Gage Blocks
Chamfer Gages	(0.000 2 to 2) in	390 µin	Modified Ring Gages, Steel Surface Plate
Precision Levels	Up to 0.007 TIR	223 µin	Surface Plate, Digital Indicator
Protractors (Digital)	(0.01 to 90) °	0.03 °	Sine Plate, Gage Blocks
Protractors (Mechanical)	(1 to 90) °	6 ′	Optical Comparator
Profilometers Roughness Average (Ra)	(1 to 200) µin	2.3 µin	Roughness Specimen

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Force Gages	(0.01 to 10) lbf (0.1 to 100) lbf (0.2 to 200) lbf	0.03 lbf 0.3 lbf 0.6 lbf	ASTM E617 Class 6 Weights
Dial Mikrokator Force	(1 to 40) ozf	1.8 ozf	Force Gage
Torque Wrenches	(0.4 to 250) lbf·ft	1.4 % of reading	Torque Transducer
Torque Transducers	(5 to 250) lbf·in (100 to 1 000) lbf·in (25 to 250) lbf·ft	0.065 % of reading + 0.14 lbf·in 0.1 % of reading + 0.1 lbf·in 0.047 % of reading + 0.04 lbf·ft	Torque Arms, ASTM E617 Class 6 Weights

Calibration and Measurement Capability (CMC) is expressed in terms of the measurement parameter, measurement range, expanded uncertainty of measurement and reference standard, method, and/or equipment. The expanded uncertainty of measurement is expressed as the standard uncertainty of the measurement multiplied by a coverage factor of 2 (k=2), corresponding to a confidence level of approximately 95%.

Notes:

1. On-site calibration service is available for this parameter, since on-site conditions are typically more variable than those in the laboratory, larger measurement uncertainties are expected on-site than what is reported on the accredited scope.
2. L = length in inches; ″ = arc-second; D = diameter; ′ = arc-minute.
3. This scope is formatted as part of a single document including Certificate of Accreditation No. L1137-1.

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