



CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

Accredited Labs dba Washington Calibration

1725 West 3rd Street
Tempe, AZ 85281

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.

Jason Stine, Vice President

Expiry Date: 02 February 2027

Certificate Number: L2152-1



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

Accredited Labs dba Washington Calibration

1725 West 3rd Street
Tempe, AZ 85281
Brett Bohannon 208-860-3981

CALIBRATION

ISO/IEC 17025 Accreditation Granted: **13 January 2025**

Certificate Number: **L2152-1**

Certificate Expiry Date: **02 February 2027**

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Voltage – Source/Measure	(0 to 100) mV	7 μ V	Measurement/Comparison to Martel M2000A Calibrator with HP 3458A 8.5 Digit Multimeter
Thermocouple Temperature Simulation Source and Measure	Type J (-300 to 0) °F (0 to 2 100) °F Type K (-300 to 0) °F (0 to 2 400) °F Type N (-430 to 0) °F (0 to 2 370) °F Type R (32 to 2 400) °F Type S (32 to 2 400) °F Type T (-300 to 0) °F (0 to 750) °F	0.51 °F 0.27 °F 0.73 °F 0.44 °F 0.57 °F 0.47 °F 2.4 °F 2.4 °F 0.79 °F 0.38 °F	Measurement/Comparison to Martel M2000A Calibrator with HP 3458A 8.5 Digit Multimeter

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Thermocouple Temperature Simulation Controllers & Recorders ¹	Type J (-300 to 0) °F	0.9 °F	Measurement/Comparison to PIE Thermocouple Calibrator
	(0 to 2 100) °F	0.79 °F	
	Type K (-300 to 0) °F	1.1 °F	
	(0 to 2 400) °F	0.93 °F	
	Type N (-430 to 0) °F	1 °F	
	(0 to 2 370) °F	0.94 °F	
	Type R (32 to 2 400) °F	2.8 °F	
	Type S (32 to 2 400) °F	2.8 °F	
Type T (-300 to 0) °F		1.1 °F	
	(0 to 750) °F	0.83 °F	

Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Gage Blocks ²	(0.01 to 4) in (5 to 20) in	(4.3 + 1L) μin (10 + 1.3L) μin	Comparison to Gage Blocks, Edmunds Gage Block Comparator
Gage Blocks ²	(0.5 to 100) mm (0.01 to 4) in	(0.11 + 0.001L) μm (6.6 + 0.83L) μin	Comparison to Grade 1 Gage Blocks, P&W Labmaster®
Height Masters ²	Up to 40 in	(39 + 1.3L) μin	Comparison to Reference Bar Gage Blocks
Length Standards ²	(0.05 to 10) in	(25 + 1.7L) μin	Measurement using Supermicrometer®
Length Standards ²	(11 to 60) in	(38 + 1.3L) μin	Comparison to Gage Blocks, Height Transfer Standards
Feeler Gages (Leaf-Style)	(0.001 to 0.5) in	28 μin	Measurement using Supermicrometer®

Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Ring Gages ²	(0.125 to 11) in	$(7.2 + 3.4L) \mu\text{in}$	Comparison to Grade 1 Gage Blocks, P&W Labmaster [®]
Plain Plug & Pin Gages ²	(0 to 10) in	$(20 + 2.4L) \mu\text{in}$	Measurement using Supermicrometer [®]
Pin Gages (Class Z and ZZ)	0 to 0.9 in	54 μin	Measurement using Laser Micrometer
Thread Plugs ² Major Diameter	(0.06 to 6) in	$(23 + 11L) \mu\text{in}$	Measurement using Gage Blocks, Supermicrometer [®] , Master Thread Wires
Pitch Diameter	(0.06 to 6) in	$(81 + 6.4L) \mu\text{in}$	
Thread Measuring Wires Unified 60°	(4 to 80) TPI	28 μin	Measurement using Gage Blocks, Supermicrometer [®]
Acme 29°	(1 to 20) TPI	28 μin	
Caliper Masters ²	Up to 48 in	$(39 + 1.3L) \mu\text{in}$	Measurement using Gage Blocks, Reference Bar
Surface Plates ^{1,2} Overall Flatness	Up to 14 ft x 14 ft	$(16 + 0.87X) \mu\text{in}$	In accordance with Fed Spec GGG-P-463 using Autocollimator
Local Flatness (Repeat Readings)	0.001 in	31 μin	Repeat-Gage
Surface Roughness Standards	(15 to 130) μin	4.5 μin	Measurement using Profilometer
2-point Bore Gages	Up to 5 in	63 μin	Comparison to Supermicrometer [®]
3-point Bore Gages (0.000 1 in Resolution)	Up to 5.5 in	73 μin	Comparison to Ring Gages
(0.000 2 in Resolution)	Up to 5.5 in	190 μin	
(0.000 5 in Resolution)	Up to 5.5 in	290 μin	
Calipers ^{1,2} (0.001 Resolution)	Up to 120 in	$(580 + 0.2L) \mu\text{in}$	Comparison to Gage Blocks
(0.000 5 Resolution)	Up to 60 in	$(290 + 0.3L) \mu\text{in}$	

Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Indicators ¹ (0.000 1 in Resolution)	Up to 2 in	63 μin	Measurement using Supermicrometer [®]
(0.000 05 in Resolution)	Up to 2 in	39 μin	
(0.000 02 in Resolution)	Up to 0.1 in	13 μin	
Supermicrometer ^{® 1} Linearity	Up to 2 in	11 μin	Comparison to Gage Blocks
Outside Micrometers ^{1,2} (0.001 in Resolution)	Up to 40 in	580 μin	Comparison to Gage Blocks
(0.000 1 in Resolution)	Up to 40 in	(58 + 1L) μin	
(0.000 05 in Resolution)	(0.5 to 120) in	(29 + 1.9L) μin	
Inside Micrometers ^{1,2} (0.001 Resolution)	(0.5 to 120) in	(580 + 0.6L) μin	Comparison to Gage Blocks
Depth Micrometers ^{1,2} (0.001 in Resolution)	Up to 12 in	580 μin	Comparison to Gage Blocks, Reference Bar
(0.000 1 in Resolution)	Up to 12 in	(71 + 0.6L) μin	
(0.000 05 in Resolution)	Up to 12 in	(46 + 1.1L) μin	
Height Gages ^{1,2} (0.001 in Resolution)	Up to 40 in	(580 + 0.2L) μin	Comparison to Gage Blocks, Reference Bar
(0.000 5 in Resolution)	Up to 40 in	(290 + 0.3L) μin	
Profilometers ³ (0.1 μin Resolution)	120 μin	3.1 μin	Comparison to SRM Reference Patches
(1 μin Resolution)	120 μin	3.1 μin	
Steel Rules ²	Up to 72 in	(280 + 3L) μin	Measurement using Optical Comparator
Steel Rules	Up to 72 in	2 900 μin	Comparison to Standard Rule, Optical Loupe
Tape Measures ²	Up to 40 ft	(2 900 + 0.28L) μin	Comparison to Standard Rule & Optical Loupe

Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Optical Comparators ¹ X-Y Linearity	Up to 12 in	91 µin	Comparisons to Stage Micrometer
Magnification	10X, 20X 31.25X, 50X, 62.5X, 100X	170 µin	Magnification Overlay
Angularity, Squareness	(0 to 360)°	0.01°	Steel Square

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Rockwell Hardness Testers ¹	HRA < 70	0.33 HRA	Indirect verification per ASTM E18 using Hardness Test Blocks
	≥ 70 and < 80	0.49 HRA	
	≥ 80	0.19 HRA	
	HRBW < 60	0.4 HRBW	
	≥ 60 and < 88	0.51 HRBW	
	≥ 88	0.45 HRBW	
	HRC < 35	0.41 HRC	
	≥ 35 and < 60	0.36 HRC	
	≥ 60	0.37 HRC	
	HREW < 84	0.51 HREW	
	≥ 84 and < 93	0.26 HREW	
	≥ 93	0.53 HREW	
	HRFW < 80	0.52 HRFW	
	≥ 80 and < 93	0.48 HRFW	
	≥ 93	0.5 HRFW	
	HRH < 96	0.44 HRH	
	≥ 96	0.53 HRH	

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Rockwell Superficial Hardness Testers ¹	R15N < 78 ≥ 78 and < 90 ≥ 90	0.52 HR15N 0.46 HR15N 0.55 HR15N	Indirect verification per ASTM E18 using Hardness Test Blocks
	HR30N < 55 ≥ 55 and < 77 ≥ 77	0.32 HR30N 0.31 HR30N 0.28 HR30N	
	HR45N < 37 ≥ 37 and < 66 ≥ 66	0.71 HR45N 0.63 HR45N 0.26 HR45N	
	HR15TW < 81 ≥ 81 and < 87 ≥ 87	1 HR15TW 0.49 HR15TW 0.5 HR15TW	
	HR30TW < 57 ≥ 57 and < 70 ≥ 70	0.6 HR30TW 0.58 HR30TW 0.21 HR30TW	
	HR15YW < 93 ≥ 93	0.55 HR15YW 0.5 HR15YW	
Knoop Hardness Testers ¹	422 HK 0.3 408 HK 0.2 517 HK 0.1	24 HK 19 HK 19 HK	Indirect verification per ASTM E384 using Hardness Test Blocks
Vickers Hardness Testers ¹	548 HV 0.5 453 HV 0.2 370 HV 0.1	16 HV 19 HV 32 HV	Indirect verification per ASTM E384 using Hardness Test Blocks
Mass Determination – NIST Class F Weights (SI)	25 kg 10 kg 5 kg 3 kg 2 kg 1 kg 500 g 300 g 200 g 100 g	0.29 g 0.13 g 58 mg 35 mg 24 mg 13 mg 8.2 mg 6.7 mg 2.3 mg 1.2 mg	Double Substitution Method using Balances, Master Weights; Tolerances per NIST Handbook 105-1

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Mass Determination – NIST Class F Weights (SI)	50 g	0.69 mg	Double Substitution Method using Balances, Master Weights; Tolerances per NIST Handbook 105-1
	30 g	0.52 mg	
	20 g	0.4 mg	
	10 g	0.29 mg	
	5 g	0.21 mg	
	3 g	0.17 mg	
	2 g	0.15 mg	
	1 g	0.12 mg	
	500 mg	93 µg	
	300 mg	81 µg	
	200 mg	7 µg	
	100 mg	58 µg	
	50 mg	49 µg	
	30 mg	44 µg	
	20 mg	41 µg	
	10 mg	35 µg	
	5 mg	33 µg	
	3 mg	29 µg	
	2 mg	29 µg	
	1 mg	29 µg	
Mass Determination – NIST Class F Weights (Avoirdupois)	50 lb	0.000 57 lb	Double Substitution Method using Balances, Master Weights; Tolerances per NIST Handbook 105-1
	30 lb	0.000 33 lb	
	25 lb	0.000 31 lb	
	20 lb	0.000 33 lb	
	10 lb	0.000 14 lb	
	5 lb	0.000 062 lb	
	3 lb	0.000 035 lb	
	2 lb	0.000 031 lb	
	1 lb	0.000 019 lb	
	0.5 lb	0.000 006 6 lb	
	0.3 lb	0.000 004 8 lb	
	0.2 lb	0.000 003 5 lb	
	0.1 lb	0.000 002 2 lb	
	0.05 lb	0.000 001 4 lb	
	0.03 lb	0.000 001 3 lb	
	0.02 lb	0.000 016 oz	
	0.01 lb	0.000 012 oz	

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Mass Determination – NIST Class F Weights (Avoirdupois)	0.005 lb 0.003 lb 0.002 lb 0.001 lb 4 oz 2 oz 1 oz 0.5 oz 0.3 oz 0.25 oz 0.2 oz 0.125 oz 0.1 oz 0.062 5 oz 0.05 oz 0.031 25 oz 0.03 oz 0.015 oz 0.02 oz 0.01 oz	0.000 001 2 oz 0.000 000 85 oz 0.000 000 59 oz 0.000 000 34 oz 0.000 044 oz 0.000 029 oz 0.000 028 oz 0.000 022 oz 0.000 019 oz 0.000 018 oz 0.000 016 oz 0.000 013 oz 0.000 009 5 oz 0.000 011 oz 0.000 009 2 oz 0.000 006 oz 0.000 008 1 oz 0.000 004 9 oz 0.000 003 oz 0.000 003 oz	Double Substitution Method using Balances, Master Weights; Tolerances per NIST Handbook 105-1
Torque Wrenches	(4 to 50) ozf·in (25 to 1 000) lbf·in (25 to 1 000) lbf·ft	0.2 ozf·in 0.33 % of reading + 0.007 6 lbf·in 0.29 % of reading + 0.36 lbf·ft	Comparison to Torque Calibration System
Pneumatic Vacuum – Measuring Equipment	(-26 to 100) inHg	0.037 % of reading + 0.005 inHg	Comparison to Mensor 2101 Digital Pressure Gauge
Pneumatic Pressure – Measuring Equipment	(0 to 500) psig	0.059 psi	Comparison to Mensor Corp CPC6050 Modular Pressure Controller
Hydraulic Pressure – Measuring Equipment	(0 to 15 000) psig	0.026 % of reading + 0.007 3 psi	Comparison to Fluke RPM4-E-DWT A100Me-L Electronic Deadweight Tester

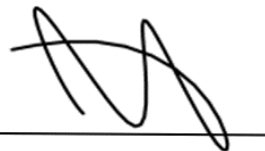
Thermodynamic

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Temperature Uniformity Survey ¹	(32 to 2 400) °F (0 to 1 316) °C	(2.5 + 0.004 5F) °F (1.4 + 0.004 5C) °C	Measurement using Multi-Channel Datalogger, Type K Thermocouple per AMS 2750G.

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 or mm where applicable, X = diagonal length in inches, F = temperature reading in Fahrenheit, C = temperature reading in Celsius.
3. The value listed in the Range column is an approximate value. The certified value of the reference patch will be utilized at the time of calibration along with the inherent uncertainty.



Jason Stine, Vice President