



CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

Washington Calibration, LLC
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.

A handwritten signature in black ink, appearing to read 'R. Douglas Leonard Jr.', is positioned above a horizontal line.

R. Douglas Leonard Jr., VP, PILR SBU

Expiry Date: 02 February 2023
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

Washington Calibration, LLC

1725 West 3rd Street
Tempe, AZ 85281
Rey Feliz
480-820-0506

CALIBRATION

Valid to: **February 2, 2023**

Certificate Number: **L2152-1**

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	0.007 mV	Martel M2000A Calibrator with HP 3458A 8.5 Digit Multimeter
Thermocouple Temperature Simulation Source and Measure	Type J (32 to 1 112) °F Type K (32 to 2 400) °F Type N (32 to 2 400) °F Type R (32 to 2 400) °F Type S (32 to 2 400) °F Type T (-300 to 392) °F	0.24 °F 0.38 °F 0.35 °F 0.88 °F 1.0 °F 0.23 °F	Martel M2000A Calibrator with HP 3458A 8.5 Digit Multimeter
Thermocouple Temperature Simulation Controllers & Recorders ¹	Type J (32 to 1 112) °F Type K (32 to 2 400) °F Type N (32 to 2 400) °F Type R (32 to 2 400) °F Type S (32 to 2 400) °F Type T (-300 to 392) °F	0.78 °F 0.90 °F 0.89 °F 1.6 °F 1.7 °F 0.77 °F	PIE Thermocouple Calibrator

Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-) ²	Reference Standard, Method, and/or Equipment
Gage Blocks	(0.005 to 4) in (5 to 20) in (0.5 to 100) mm	(4 + 1.1L) μin (7.3 + 1.5L) μin (0.11 + 0.001L) μm	Gage Blocks, Edmunds Gage Block Comparator
Height Masters	Up to 40 in	(39 + 1.3L) μin	Reference Bar Gage Blocks
Length Standards	(0.05 to 10) in	(25 + 1.7L) μin	Supermicrometer
	(11 to 60) in	(39 + 1.3L) μin	Gage Blocks, Height Transfer Standards
Feeler Gages (Leaf-Style)	(0.001 to 0.5) in	28 μin	Supermicrometer
Ring Gages	(0.04 to 11) in	(9.8 + 3.2L) μin	ID Comparator
Plain Plug & Pin Gages	(0 to 10) in	(19 + 2.5L) μin	Supermicrometer
Pin Gages Class Z & ZZ	0 to 0.9 in	54 μin	Laser Micrometer
Thread Plugs	Major Diameter (0.06 to 6) in	(22 + 11L) μin	Supermicrometer Gage Blocks
	Pitch Diameter (0.06 to 6) in	(36 + 9.9L) μin	
Thread Measuring Wires	Unified 60° (4 to 80) TPI	23 μin	Supermicrometer Gage Blocks
	Acme 29° (1 to 20) TPI		
Caliper Masters	Up to 48 in	(39 + 1.3L) μin	Gage Blocks Reference Bar
Surface Plates ¹ Flatness Repeatability	Up to 14 ft x 14 ft	(16 + 0.87X) μin	Autocollimator Repeat-Gage
	± 0.001 in	31 μin	
Surface Roughness Standards	(15 to 130) μin	4.5 μin	Profilometer
2 Pt. Bore Gages	Up to 5 in	63 μin	Supermicrometer

Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-) ²	Reference Standard, Method, and/or Equipment
3 Pt. Bore Gages (0.000 1 Resolution)	Up to 5.5 in	73 μin	Ring Gages
(0.000 2 Resolution)		190 μin	
(0.000 5 Resolution)		290 μin	
Calipers ¹ (0.001 Resolution)	(0 to 120) in	(580 + 0.2L) μin	Gage Blocks
(0.0005 Resolution)	(0 to 60) in	(290 + 0.3L) μin	
Indicators ¹ (0.001 Resolution)	(0 to 4) in	580 μin	Supermicrometer
(0.000 5 Resolution)	(0 to 2) in	290 μin	
(0.000 1 Resolution)		63 μin	
(0.000 05 Resolution)		39 μin	
(0.000 02 Resolution)	(0 to 0.1) in	15 μin	Gage Blocks
Supermicrometer ¹ Linearity	(0 to 2) in	11 μin	Gage Blocks Force Gage Optical Flats Gage Blocks Optical Flats
Micrometers, Outside ¹ (0.001 Resolution)	(0 to 40) in	580 μin	
(0.000 1 Resolution)		(58 + 1L) μin	
(0.000 05 Resolution)	(0.5 to 120) in	(29 + 1.9L) μin	Gage Blocks
Micrometers, Inside ¹ (0.001 Resolution)	(0.5 to 120) in	(580 + 0.6L) μin	Gage Blocks
Micrometers, Depth ¹ (0.001 Resolution)	(0 to 12) in	580 μin	Gage Blocks Reference Bar Gage Blocks
(0.000 1 Resolution)		(71 + 0.6L) μin	
(0.000 05 Resolution)		(46 + 1.1L) μin	
Height Gages ¹ (0.001 Resolution)	(0 to 40) in	(580 + 0.2L) μin	Gage Blocks
(0.0005 Resolution)		(290 + 0.3L) μin	

Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-) ²	Reference Standard, Method, and/or Equipment
Profilometers	(0.1 μin Resolution) (1 μin Resolution)	3.1 μin 3.1 μin	SRM Reference Patches
Steel Rules	(0 to 72) in	(280 + 3L) μin	Optical Comparator
	(0 to 72) in	2 900 μin	Optical Loupe & Standard Rule
Tape Measures	(0 to 40) ft	(2 900 + 0.5L) μin	Optical Loupe & Standard Rule
Optical Comparators ¹ Magnification	10X, 20X 31.25X, 50X, 62.5X, 100X	170 μin	Precision Ball Standard Magnification Overlay
Linearity	(0 to 12) in	91 μin	Stage Micrometer
Angularity and 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 ≥ 70 and < 80 ≥ 80	0.56 HRA 0.74 HRA 0.65 HRA	Indirect Verification Method per ASTM E18
	HRBW < 60 ≥ 60 and < 88 ≥ 88	0.45 HRBW 0.48 HRBW 0.7 HRBW	
	HRC < 35 ≥ 35 and < 60 ≥ 60	0.34 HRC 0.34 HRC 0.34 HRC	
	HREW < 84 ≥ 84 and < 93 ≥ 93	0.27 HREW 0.99 HREW 1.26 HREW	
	HRFW < 80 ≥ 80 and < 93 ≥ 93	0.54 HRFW 0.56 HRFW 1.45 HRFW	

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Rockwell Hardness Testers ¹	HRH < 96 ≥ 96	0.76 HRH 0.98 HRH	Indirect Verification Method per ASTM E18
	HR15N < 78 ≥ 78 and < 90 ≥ 90	0.5 HR15N 0.19 HR15N 1 HR15N	
	HR30N < 55 ≥ 55 and < 77 ≥ 77	0.69 HR30N 0.78 HR30N 0.16 HR30N	
	HR45N < 37 ≥ 37 and < 66 ≥ 66	0.7 HR45N 0.58 HR45N 1.03 HR45N	
	HR15TW < 81 ≥ 81 and < 87 ≥ 87	0.27 HR15TW 0.22 HR15TW 1.1 HR15TW	
	HR30TW < 57 ≥ 57 and < 70 ≥ 70	0.7 HR30TW 0.63 HR30TW 0.26 HR30TW	
	HR15YW < 93 ≥ 93	0.97 HR15YW 0.55 HR15YW	
Microhardness Testers Indirect Verification of Microhardness Testers ¹	HK 300 grf	5.1 HK	Indirect Verification Method per ASTM E384
Knoop	HK 200 grf	9.1 HK	
	HK 100 grf	13.8 HK	
Vickers	HV 500 grf	14 HV	
	HV 200 grf	18.5 HV	
	HV 100 grf	8.7 HV	

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Class F Weights	25 kg	290 mg	Double Substitution Method – Tolerances per NIST Handbook 105-1
	10 kg	130 mg	
	5 kg	58 mg	
	3 kg	35 mg	
	2 kg	24 mg	
	1 kg	13 mg	
	500 g	8.2 mg	
	300 g	6.7 mg	
	200 g	2.3 mg	
	100 g	1.2 mg	
	50 g	0.69 mg	
	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	0.093 mg	
	300 mg	0.081 mg	
200 mg	0.07 mg		
100 mg	0.058 mg		
50 mg	0.049 mg		

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Class F Weights	30 mg	0.044 mg	Double Substitution Method – Tolerances per NIST Handbook 105-1
	20 mg	0.041 mg	
	10 mg	0.035 mg	
	5 mg	0.033 mg	
	3 mg	0.029 mg	
	2 mg	0.029 mg	
	1 mg	0.029 mg	
	50 lb	530 µlb	
	30 lb	290 µlb	
	25 lb	290 µlb	
	20 lb	290 µlb	
	10 lb	130 µlb	
	5 lb	53 µlb	
	3 lb	29 µlb	
	2 lb	29 µlb	
	1 lb	18 µlb	
	0.5 lb / 8 oz	5.1 µlb	
	0.3 lb	2.6 µlb	
	0.2 lb	2.6 µlb	
	0.1 lb	1.5 µlb	
0.05 lb	0.88 µlb		
0.03 lb	0.64 µlb		
0.02 lb	0.64 µlb		

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Class F Weights	0.01 lb	0.46 μ lb	Double Substitution Method – Tolerances per NIST Handbook 105-1
	0.005 lb	0.033 μ lb	
	0.003 lb	0.026 μ lb	
	0.002 lb	0.026 μ lb	
	0.001 lb	0.021 μ lb	
	4 oz	42 μ oz	
	2 oz	24 μ oz	
	1 oz	18 μ oz	
	0.5 oz	10 μ oz	
	0.3 oz	10 μ oz	
	0.25 oz	10 μ oz	
	0.2 oz	7 μ oz	
	0.125 oz	6 μ oz	
	0.1 oz	5 μ oz	
	0.062 5 oz	5 μ oz	
	0.05 oz	4 μ oz	
	0.031 25 oz	4 μ oz	
	0.03 oz	4 μ oz	
0.015 oz	3 μ oz		
Class F Weights	0.02 oz	3 μ oz	Double Substitution Method – Tolerances per NIST Handbook 105-1
	0.01 oz	3 μ oz	
Torque Wrenches	(4 to 50) ozf·in	0.2 ozf·in	Torque Calibration System
	(25 to 1 000) lbf·in	0.007 6 + 0.003 3 lbf·in / lbf·in	
	(25 to 1 000) lbf·ft	0.36 + 0.002 9 lbf·ft / lbf·ft	

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	1.3 °F 0.72 °C	Multi-Channel Datalogger with Type K Thermocouple as Per AMS 2750F

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 = length in inches.
3. This scope is formatted as part of a single document including Certificate of Accreditation No. L2152-1.



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