



# CERTIFICATE OF ACCREDITATION

## The ANSI National Accreditation Board

Hereby attests that

**Alaska Metrology and Calibration Services**  
**224 E. 54<sup>th</sup> Avenue**  
**Anchorage, AK 99518**

Fulfills the requirements of

**ISO/IEC 17025:2017**

and national standard

**ANSI/NCSL Z540-1-1994 (R2002)**

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](http://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: 29 August 2022  
Certificate Number: AC-1715



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  
AND ANSI/NCSL Z540-1-1994 (R2002)**

**Alaska Metrology and Calibration Services**

224 E. 54<sup>th</sup> Avenue  
Anchorage, AK 99518  
Clint Schirard  
907-929-8052

**CALIBRATION**

Valid to: **August 29, 2022**

Certificate Number: **AC-1715**

**Electrical – DC/Low Frequency**

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
DC Voltage – Source <sup>1</sup>	Up to 330 mV (0.33 to 3.3) V (3.3 to 33) V (33 to 330) V (330 to 1 020) V	9.2 $\mu$ V 46 $\mu$ V 0.53 nV 7.4 mV 38 mV	Fluke 5522A Multiproduct Calibrator
DC Voltage – Measure	(10 to 100) mV (0.1 to 1) V (1 to 10) V (10 to 100) V (100 to 1 000) V	4.6 $\mu$ V 10 $\mu$ V 93 $\mu$ V 1.2 mV 13 mV	Keysight 3458A 8.5 Digit Multimeter
DC Current – Source <sup>1</sup>	Up to 330 $\mu$ A (0.33 to 3.3) mA (3.3 to 33) mA (33 to 330) mA (0.33 to 3) A (3 to 20) A	90 nA 0.6 $\mu$ A 4.2 $\mu$ A 42 $\mu$ A 36 mA 25 mA	Fluke 5522A Multiproduct Calibrator
DC Current – Measure	Up to 100 $\mu$ A (0.1 to 1) mA (1 to 10) mA (10 to 100) mA (0.1 to 1) A	9.3 $\mu$ A 5.8 $\mu$ A 6.1 $\mu$ A 11 $\mu$ A 0.14 mA	Keysight 3458A 8.5 Digit Multimeter

**Electrical – DC/Low Frequency**

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Resistance – Source <sup>1</sup>	Up to 11 Ω (11 to 33) Ω (33 to 110) Ω (110 to 330) Ω (0.33 to 1.1) kΩ (1.1 to 3.3) kΩ (3.3 to 11) kΩ (11 to 33) kΩ (33 to 110) kΩ (110 to 330) kΩ (0.33 to 1.1) MΩ (1.1 to 3.3) MΩ (3.3 to 11) MΩ (11 to 33) MΩ (33 to 110) MΩ (110 to 330) MΩ (0.33 to 1.1) GΩ	0.55 mΩ 1.2 mΩ 3.6 mΩ 11 mΩ 36 mΩ 0.11 Ω 0.37 Ω 1.1 Ω 3.6 Ω 11 Ω 42 Ω 0.23 kΩ 1.7 kΩ 9.8 kΩ 65 kΩ 1.2 MΩ 20 MΩ	Fluke 5522A Multiproduct Calibrator
Resistance – Measure	Up to 10 Ω (10 to 100) Ω (0.1 to 1) kΩ (1 to 10) kΩ (10 to 100) kΩ (0.1 to 1) MΩ (1 to 10) MΩ	0.2 mΩ 1.7 mΩ 14 mΩ 0.14 Ω 1.4 Ω 20 Ω 0.63 MΩ	Keysight 3458A 8.5 Digit Multimeter
Electrical Simulation of Thermocouple Indicating Devices – Source/Measure <sup>1</sup>	Type B (600 to 800) °C (800 to 1 000) °C (1 000 to 1 550) °C (1 550 to 1 820) °C Type C (0 to 150) °C (150 to 650) °C (650 to 1 000) °C (1 000 to 1 800) °C (1 800 to 2 316) °C Type E (-250 to -100) °C (-100 to 650) °C (650 to 1 000) °C	0.58 °C 0.51 °C 0.48 °C 0.5 °C 0.48 °C 0.46 °C 0.49 °C 0.63 °C 0.92 °C 0.63 °C 0.41 °C 0.43 °C	Fluke 5522A Multiproduct Calibrator

**Electrical – DC/Low Frequency**

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Electrical Simulation of Thermocouple Indicating Devices – Source/Measure <sup>1</sup>	Type J		Fluke 5522A Multiproduct Calibrator
	(-210 to -100) °C	0.47 °C	
	(-100 to 760) °C	0.42 °C	
	(760 to 1 200) °C	0.44 °C	
	Type K		
	(-200 to -100) °C	0.5 °C	
	(-100 to 120) °C	0.42 °C	
	(120 to 1 000) °C	0.46 °C	
	(1 000 to 1 372) °C	0.55 °C	
	Type L		
	(-200 to -100) °C	0.53 °C	
	(-100 to 800) °C	0.46 °C	
	(800 to 900) °C	0.42 °C	
	Type N		
	(-250 to -100) °C	0.55 °C	
	(-100 to -25) °C	0.44 °C	
	(-25 to 410) °C	0.42 °C	
	(410 to 1 300) °C	0.47 °C	
	Type R		
	(0 to 250) °C	0.68 °C	
	(250 to 400) °C	0.52 °C	
(400 to 1 000) °C	0.5 °C		
(1 000 to 1 767) °C	0.55 °C		
Type S			
(0 to 250) °C	0.60 °C		
(250 to 1 400) °C	0.53 °C		
(1 400 to 1 767) °C	0.6 °C		
Type T			
(-250 to -150) °C	0.74 °C		
(-150 to 0) °C	0.45 °C		
(0 to 120) °C	0.41 °C		
(120 to 400) °C	0.4 °C		
Type U			
(-200 to 0) °C	0.68 °C		
(0 to 600) °C	0.47 °C		

**Electrical – DC/Low Frequency**

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Resistance Simulation of RTD Indicating Devices – Source <sup>1</sup>	Pt 395, 100 Ω		Fluke 5522A Multiproduct Calibrator
	(-200 to 0) °C	0.05 °C	
	(0 to 100) °C	0.07 °C	
	(100 to 400) °C	0.1 °C	
	(400 to 630) °C	0.12 °C	
	(630 to 800) °C	0.23 °C	
	Pt 3926, 100 Ω		
	(-200 to 0) °C	0.05 °C	
	(0 to 100) °C	0.07 °C	
	(100 to 400) °C	0.1 °C	
	(400 to 630) °C	0.12 °C	
	Pt 3916, 100 Ω		
	(-200 to -190) °C	0.25 °C	
	(-190 to 100) °C	0.06 °C	
	(100 to 400) °C	0.09 °C	
	(400 to 600) °C	0.1 °C	
	(600 to 630) °C	0.23 °C	
	Pt 385, 200 Ω		
	(-200 to 100) °C	0.05 °C	
	(100 to 260) °C	0.07 °C	
	(260 to 400) °C	0.09 °C	
(400 to 600) °C	0.1 °C		
(600 to 630) °C	0.13 °C		
Pt 385, 1 000 Ω			
(-200 to 260) °C	0.06 °C		
(0 to 300) °C	0.07 °C		
(260 to 600) °C	0.08 °C		
(600 to 630) °C	0.23 °C		
Pt 385, 120 Ω			
(-80 to 100) °C	0.08 °C		
(100 to 260) °C	0.14 °C		
Cu 427, 10 Ω			
(-100 to 260) °C	0.3 °C		



ANSI National Accreditation Board

Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
AC Voltage – Source <sup>1</sup>	(1 to 33) mV		Fluke 5522A Multiproduct Calibrator
	(10 to 45) Hz	37 $\mu$ V	
	45 Hz to 10 kHz	13 $\mu$ V	
	(10 to 20) kHz	15 $\mu$ V	
	(20 to 50) kHz	45 $\mu$ V	
	(50 to 100) kHz	0.15 mV	
	(100 to 500) kHz	0.36 mV	
	(33 to 330) mV		
	(10 to 45) Hz	0.13 mV	
	45 Hz to 10 kHz	65 $\mu$ V	
	(10 to 20) kHz	71 $\mu$ V	
	(20 to 50) kHz	0.15 mV	
	(50 to 100) kHz	0.35 mV	
	(100 to 500) kHz	0.85 mV	
	(0.33 to 3.3) V		
	(10 to 45) Hz	1.2 mV	
	45 Hz to 10 kHz	0.65 mV	
	(10 to 20) kHz	0.8 mV	
	(20 to 50) kHz	1.2 mV	
	(50 to 100) kHz	2.9 mV	
	(100 to 500) kHz	9.9 mV	
	(3.3 to 33) V		
	(10 to 45) Hz	13 mV	
	45 Hz to 10 kHz	6.5 mV	
	(10 to 20) kHz	9.9 mV	
	(20 to 50) kHz	15 mV	
	(50 to 100) kHz	37 mV	
	(33 to 330) V		
(10 to 45) Hz	75 mV		
45 Hz to 10 kHz	84 mV		
(10 to 20) kHz	0.11 V		
(20 to 50) kHz	0.13 V		
(50 to 100) kHz	0.82 V		
(330 to 1 020) V			
(10 to 45) Hz	0.37 V		
45 Hz to 10 kHz	0.32 V		
(10 to 20) kHz	0.37 V		

**Electrical – DC/Low Frequency**

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
AC Voltage – Measure	(1 to 10) mV		Keysight 3458A 8.5 Digit Multimeter
	40 Hz to 50 kHz	0.13 mV	
	(50 to 100) kHz	0.15 mV	
	(10 to 100) mV		
	1 Hz to 20 kHz	0.13 mV	
	(20 to 100) kHz	0.14 mV	
	(100 to 300) kHz	0.15 mV	
	100 mV to 1 V		
	(1 to 40) Hz	0.14 mV	
	40 Hz to 1 kHz	0.15 mV	
	(1 to 20) kHz	0.19 mV	
	(20 to 50) kHz	0.24 mV	
	(50 to 100) kHz	0.62 mV	
	(100 to 300) kHz	1.7 mV	
	(1 to 10) V		
	(1 to 40) Hz	0.57 mV	
	40 Hz to 1 kHz	0.43 mV	
	(1 to 50) kHz	0.66 mV	
	(50 to 100) kHz	1.7 mV	
	(100 to 300) kHz	5.1 mV	
(10 to 100) V			
40 Hz to 1 kHz	4.4 mV		
(1 to 20) kHz	8.1 mV		
(20 to 50) kHz	7.7 mV		
(50 to 100) kHz	23 mV		
100 V to 1 kV			
40 Hz to 1 kHz	0.11 V		
AC Current – Source <sup>1</sup>	(29 to 330) $\mu$ A		Fluke 5522A Multiproduct Calibrator
	10 Hz to 10 kHz	1.4 $\mu$ A	
	(10 to 30) kHz	1.5 $\mu$ A	
	(0.33 to 3.3) mA		
	(10 to 20) Hz	1.6 $\mu$ A	
	(20 to 45) Hz	1.5 $\mu$ A	
	45 Hz to 1 kHz	1.4 $\mu$ A	
	(1 to 5) kHz	1.5 $\mu$ A	
	(5 to 10) kHz	3.4 $\mu$ A	
	(10 to 30) kHz	3.6 $\mu$ A	

**Electrical – DC/Low Frequency**

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment	
AC Current – Source <sup>1</sup>	(3.3 to 33) mA 10 Hz to 5 kHz (5 to 10) kHz (10 to 30) kHz (33 to 330) mA 10 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz (0.33 A to 3.3) A 10 to 1 kHz (1 to 5) kHz (5 to 10) kHz (3.3 to 20) A 45 Hz to 5 kHz	14 $\mu$ A 16 $\mu$ A 33 $\mu$ A 0.14 mA 2.4 mA 0.2 mA 0.39 mA 1.4 mA 1.9 mA 6.2 mA 59 mA	Fluke 5522A Multiproduct Calibrator	
AC Current Clamp-on Meters <sup>1</sup>	(20 to 1 000) A (45 to 100) Hz	1.2 A	Fluke 5522A Multiproduct Calibrator, Fluke 5500A/COIL 50-turn Coil	
AC Current – Measure	(5 to 100) $\mu$ A 100 Hz to 1 kHz (0.1 to 1) mA 100 Hz to 1 kHz (1 to 10) mA 100 Hz to 1 kHz (10 to 100) mA 100 Hz to 1 kHz (0.1 to 1) A 100 Hz to 1 kHz	56 nA 0.12 $\mu$ A 1.1 $\mu$ A 11 $\mu$ A 0.21 mA	Keysight 3458A 8.5 Digit Multimeter	
Capacitance – Source <sup>1</sup>	10 Hz to 10 kHz 10 Hz to 10 kHz 10 Hz to 3 kHz 10 Hz to 1 kHz 10 Hz to 1 kHz 10 Hz to 1 kHz 10 Hz to 1 kHz	(190 to 400) pF (0.4 nF to 1.1) nF (1.1 to 3.3) nF (3.3 to 11) nF (11 to 33) nF (33 to 110) nF (110 to 330) nF	20 pF 16 pF 27 pF 38 pF 0.19 nF 0.38 nF 1.2 nF	Fluke 5522A Multiproduct Calibrator



### Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Capacitance – Source <sup>1</sup>			
10 Hz to 1 kHz	(0.33 to 1.1) $\mu$ F	1.5 nF	Fluke 5522A Multiproduct Calibrator
(10 to 300) kHz	(1.1 to 3.3) $\mu$ F	3.2 nF	
(10 to 150) kHz	(3.3 to 11) $\mu$ F	10 nF	
(10 to 120) kHz	(11 to 33) $\mu$ F	32 nF	
(10 to 80) kHz	(33 to 110) $\mu$ F	0.1 $\mu$ F	
(10 to 50) kHz	(110 to 330) $\mu$ F	0.3 $\mu$ F	
(0 to 20) Hz	(0.33 to 1.1) mF	12 $\mu$ F	
(0 to 6) Hz	(1.1 to 3.3) mF	12 $\mu$ F	
(0 to 2) Hz	(3.3 to 11) mF	15 $\mu$ F	
(0 to 0.6) Hz	(11 to 33) mF	0.12 mF	
(0 to 0.2) Hz	(33 to 110) mF	0.16 mF	

### Length – Dimensional Metrology

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Micrometers <sup>1,2</sup>	Up to 6 in (6 to 20) in	86 $\mu$ m (46 + 8L) $\mu$ m	Grade FS2 Gage Blocks
Calipers <sup>1,2</sup>	Up to 6 in (6 to 20) in	86 $\mu$ m (46 + 8L) $\mu$ m	
Depth Micrometers <sup>1,2</sup>	Up to 6 in	86 $\mu$ m	

### Mass and Mass Related

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Differential Pressure Gages	Up to 24 in H <sub>2</sub> O (4 °C)	0.004 5 in H <sub>2</sub> O	Dwyer 1420 Hook Gage
Pressure Gages <sup>1</sup>	Up to 30 psig	0.04 psi	Comparison to Fluke 700PD5 Pressure Module
	(30 to 100) psig	0.15 psi	Comparison to Fluke 700PO6 Pressure Module

**Mass and Mass Related**

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Pressure Gages <sup>1</sup>	(100 to 500) psig	0.38 psi	Comparison to Fluke 700P07 Pressure Module
	(500 to 1 000) psig	0.64 psi	Comparison to Fluke 700P08 Pressure Module
	(1 000 to 5 000) psig	5.2 psi	Comparison to Fluke 700P30 Pressure Module
	(5 000 to 10 000) psig	9.2 psi	Comparison to Fluke 700P31 Pressure Module
Pressure Transducers	Up to 100 psig (100 to 500) psig (500 to 1 000) psig (1 000 to 5 000) psig (5 000 to 10 000) psig	0.03 psi 0.13 psi 0.28 psi 2.8 psi 5.2 psi	Ruska 2485 Hydraulic Piston Gage
Analytical Balances <sup>1</sup>			ASTM E617 Class 1 weights and NIST Handbook 44 utilized for the calibration of the weighing system.
(0.001 mg resolution)	Up to 2 g	0.1 mg	
(0.01 mg resolution)	Up to 20 g	0.1 mg	
(0.1 mg resolution)	Up to 200 g	0.4 mg	
(1 mg resolution)	Up to 1 kg Up to 2 kg	2.4 mg 4 mg	
(10 mg resolution)	Up to 5 kg	13 mg	
(0.1 g resolution)	Up to 20 kg	0.12 g	
Digital Scales <sup>1,3</sup>	Up to 100 lb (100 to 200) lb (200 to 300) lb (300 to 400) lb (400 to 500) lb (500 to 600) lb	0.19 lb 0.31 lb 0.44 lb 0.57 lb 0.71 lb 0.84 lb	NIST Class F weights and NIST Handbook 44 utilized for the calibration of the weighing system.
Torque Wrenches	4 lbf-in to 1 000 lbf-ft	0.25 % of reading	CDI Suretest Torque Calibration System

**Mass and Mass Related**

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Torque Calibration Systems	(30 to 200) ozf·in (5 to 100) lbf·in (5 to 250) lbf·ft (10 to 1 000) lbf·ft	0.17 % of reading 0.09 % of reading 0.02 % of reading 0.02 % of reading	NIST Class F Weights, Weight Hangers, Torque Wheels, Torque Arms

**Thermodynamic**

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Temperature – Source	-30 °C 0 °C 100 °C 200 °C 300 °C	0.03 °C 0.005 °C 0.01 °C 0.02 °C 0.03 °C	Hart 5681 SPRT, Hart 1560/2560 Reference Readout, Hart 6330 Calibration Bath, Hart 7103 Calibration Micro-Bath

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.
3. The CMC for scales and balances is highly dependent upon the resolution of the unit under test. The CMC presented here does not include the resolution of the unit under test. The resolution will be included in the reported measurement uncertainty at the time of calibration.
4. This scope is formatted as part of a single document including Certificate of Accreditation No. AC-1715.



R. Douglas Leonard Jr., VP, PILR SBU