



# CERTIFICATE OF ACCREDITATION

**The ANSI National Accreditation Board**

Hereby attests that

**Advanced Technical Services NW, Inc.**  
**8612 South 228<sup>th</sup> Street**  
**Kent, Washington 98031**

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: 10 June 2022

Certificate Number: AC-1458



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)**

**Advanced Technical Services NW, Inc.**  
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**CALIBRATION**

Valid to: **June 10, 2022**

Certificate Number: **AC-1458**

**Electrical – DC/Low Frequency**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Voltage - Source	Up to 330 mV 330 mV to 3.3 V (3.3 to 33) V (33 to 330) V 330 V to 1.02 kV	60 $\mu$ V/V + 3 $\mu$ V 50 $\mu$ V/V + 5 $\mu$ V 50 $\mu$ V/V + 50 $\mu$ V 55 $\mu$ V/V + 0.50 mV 55 $\mu$ V/V + 1.5 mV	Fluke 5500A Multi Product Calibrator SOP-LABE-03, Fluke 5500A Manual
AC Voltage - Source	(1 to 33) mV (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz (33 to 330) mV (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz 330 mV to 3.3 V (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz	3.5 mV/V + 20 $\mu$ V 1.5 mV/V + 20 $\mu$ V 2 mV/V + 20 $\mu$ V 2.5 mV/V + 20 $\mu$ V 3.5 mV/V + 33 $\mu$ V 10 mV/V + 60 $\mu$ V 2.5 mV/V + 50 $\mu$ V 0.50 mV/V + 20 $\mu$ V 1 mV/V + 20 $\mu$ V 1.6 mV/V + 40 $\mu$ V 2.4 mV/V + 0.17 mV 7 mV/V + 0.33 mV 1.5 mV/V + 0.25 mV 0.30 mV/V + 60 $\mu$ V 0.80 mV/V + 60 $\mu$ V 1.4 mV/V + 0.30 mV 2.4 mV/V + 1.7 mV 5 mV/V + 3.3 mV	Fluke 5500A Multi Product Calibrator SOP-LABE-03, Fluke 5500A Manual



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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage - Source	(3.3 to 33) V (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (33 to 330) V 45 Hz to 1 kHz (1 to 10) kHz (10 to 20) kHz 330 V to 1.02 kV 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	1.5 mV/V + 2.5 mV 0.40 mV/V + 0.60 mV 0.80 mV/V + 2.6 mV 1.9 mV/V + 5 mV 2.4 mV/V + 17 mV 0.50 mV/V + 6.6 mV 0.80 mV/V + 15 mV 0.90 mV/V + 33 mV 0.60 mV/V + 80 mV 2 mV/V + 0.10 V 2 mV/V + 0.50 V	Fluke 5500A Multi Product Calibrator SOP-LABE-03, Fluke 5500A Manual
DC Current - Source	Up to 3.3 mA (3.3 to 33) mA (33 to 330) mA 330 mA to 2 A (2 to 10) A	0.13 mA/A + 50 nA 0.10 mA/A + 0.15 μA 0.10 mA/A + 3.3 μA 0.30 mA/A + 44 μA 0.60 mA/A + 0.33 mA	Fluke 5500A Multi Product Calibrator SOP-LABE-03, Fluke 5500A Manual
AC Current - Source	(33 to 330) μA (10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (330 μA to 3.3 mA) (10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (3.3 to 33) mA (10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	2.5 mA/A + 0.15 μA 1.3 mA/A + 0.15 μA 1.3 mA/A + 0.25 μA 4 mA/A + 0.15 μA 12.5 mA/A + 0.15 μA 2 mA/A + 0.30 μA 1 mA/A + 0.30 μA 1 mA/A + 0.30 μA 2 mA/A + 0.30 μA 6 mA/A + 0.30 μA 2 mA/A + 3 μA 1 mA/A + 3 μA 0.90 mA/A + 3 μA 2 mA/A + 3 μA 6 mA/A + 3 μA	Fluke 5500A Multi Product Calibrator SOP-LABE-03, Fluke 5500A Manual



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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current – Source	(33 to 330) mA (10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz 330 mA to 2.2 A (10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (2.2 to 11) A (45 to 65) Hz (65 to 500) Hz 500 Hz to 1 kHz	2 mA/A + 30 μA 1 mA/A + 30 μA 0.90 mA/A + 30 μA 2 mA/A + 30 μA 6 mA/A + 30 μA 2 mA/A + 0.30 mA 1 mA/A + 0.30 mA 7.5 mA/A + 0.30 mA 0.60 mA/A + 3 mA 1 mA/A + 3 mA 3.3 mA/A + 3 mA	Fluke 5500A Multi Product Calibrator SOP-LABE-03, Fluke 5500A Manual
Resistance - Source	Up to 11 Ω (11 to 33) Ω (33 to 110) Ω (110 to 330) Ω 330 Ω 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 330 kΩ to 1.1 MΩ (1.1 to 3.3) MΩ (3.3 to 11) MΩ (11 to 33) MΩ (33 to 110) MΩ	0.12 mΩ/Ω + 6 mΩ 0.12 mΩ/Ω + 10 mΩ 90 μΩ/Ω + 10 mΩ 90 μΩ/Ω + 10 mΩ 90 μΩ/Ω + 60 mΩ 90 μΩ/Ω + 60 mΩ 90 μΩ/Ω + 0.60 Ω 90 μΩ/Ω + 0.60 Ω 0.11 mΩ/Ω + 6 Ω 0.12 mΩ/Ω + 6 Ω 0.15 mΩ/Ω + 55 Ω 0.15 mΩ/Ω + 55 Ω 0.60 mΩ/Ω + 0.55 kΩ 1 mΩ/Ω + 0.55 kΩ 5 mΩ/Ω + 5.5 kΩ	Fluke 5500A Multi Product Calibrator SOP-LABE-03, Fluke 5500A Manual
Resistance Simulation of RTD Indicators	PT 100 Ω, 385 (-180 to 0) °C (0 to 360) °C (360 to 750) °C	0.05 °C 0.01 °C 0.23 °C	Fluke 5500A Multi Product Calibrator SOP-LABE-03, Fluke 5500A Manual
Millivolt Simulation of Thermocouple Indicators	Type K (-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 1 000) °C (1 000 to 1 372) °C	0.33 °C 0.18 °C 0.16 °C 0.26 °C 0.4 °C	Fluke 5500A Multi Product Calibrator SOP-LABE-03, Fluke 5500A Manual

**Electrical – DC/Low Frequency**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Millivolt Simulation of Thermocouple Indicators	Type J (-210 to -100) °C	0.27 °C	Fluke 5500A Multi Product Calibrator SOP-LABE-03, Fluke 5500A Manual
	(-30 to 150) °C	0.14 °C	
	(150 to 760) °C	0.17 °C	
	(760 to 1 200) °C	0.23 °C	
	Type T (-250 to -150) °C	0.63 °C	
	(-150 to 0) °C	0.24 °C	
(0 to 120) °C	0.16 °C		
(120 to 400) °C	0.14 °C		

**Length – Dimensional Metrology**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Gage Blocks <sup>2</sup>	(0.01 to 4) in	(2.1 + 4.5L) μin	Mahr UMM, Gage Blocks SOP-LABM-04 Rev B
Calipers <sup>2</sup>	Up to 60 in	(4 + 4.9L) μin	Gage Blocks SOP-LABM-17
Micrometers <sup>2</sup>	Up to 20 in	60 μin	Gage Blocks SOP-LABM-08
Indicators <sup>2</sup> Dial and Digital	Up to 2 in	13 μin	Mahr UMM, Gage Blocks SOP-LABM-10 SOP-LABM-11
Height Gage <sup>2</sup>	Up to 60 in	(22 + 4.8L) μin	Gage Blocks SOP-LABM-09

**Mass and Mass Related**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Force (Tension) Load Cells <sup>1</sup>	Up to 750 lbf	0.017 lbf	Class F Weights SOP-FIELD-12 Rev New ASTM E4
Force (Tension) Load Cells <sup>1</sup>	(58 to 1 010) lbf	0.15 lbf	Load Cells SOP-FIELD-12 Rev New ASTM E4
	(288 to 10 100) lbf	0.58 lbf	
	(1 146 to 51 000) lbf	2 lbf	
	(5 504 to 101 000) lbf	18 lbf	

**Mass and Mass Related**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Force (Compression) Load Cells <sup>1</sup>	Up to 190 lbf	0.008 9 lbf	Class F Weights SOP-FIELD-12 Rev New ASTM E4
Force (Compression) Load Cells <sup>1</sup>	(29 to 505) lbf (200 to 10 100) lbf (2 543 to 61 000) lbf (23 652 to 400 000) lbf	0.057 lbf 0.55 lbf 3.5 lbf 35 lbf	Load Cells SOP-FIELD-12 Rev New ASTM E4
Vacuum	(-29 to 0) inHg	0.14 inHg	Pressure Calibrator SOP-FIELD-15
Pressure	Up to 95 psi (95 to 237.5) psi (237.5 to 475) psi (475 to 3 000) psi (3 000 to 10 000) psi	0.13 psi 0.14 psi 0.24 psi 1.6 psi 5.4 psi	
Scales	(1 to 20) g (20 to 210) g (0.46 to 21) lb (21 to 190) lb (190 to 750) lb (751 to 1 770) lb	0.000 36 g 0.001 2 g 0.001 4 lb 0.005 1 lb 0.02 lb 0.04 lb	Class F Weights SOP-FIELD-24

**Time and Frequency**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Frequency - Source	0.01 Hz to 10 kHz (10 to 100) kHz	25 $\mu$ Hz/Hz + 1 mHz 25 $\mu$ Hz/Hz + 15 mHz	Fluke 5500A Multi Product Calibrator

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. This scope is formatted as part of a single document including Certificate of Accreditation No. AC-1458.



R. Douglas Leonard Jr., VP, PILR SBU